

Special Supplement Inside: Going Green

September 2011

GROUND SUPPORT WORLDWIDE

Munich Airport's \$2.6 Billion **Expansion**

**Planning for
120 planes
an hour
and 159,000
passengers a day**

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Reducing Ground Support Emissions

Hydrogen-powered GSE
may offer another source
of clean power

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Ground Time

A visit to MSP made me realize just how demanding it is to secure on-time schedules.



STEVE SMITH

I toured the Minneapolis-St. Paul International Airport the day after Labor Day. My flight arrived about 10 minutes early and meeting me at the gate was my colleague Ronald Donner, editor of our sister publication, *Aircraft Maintenance Technology*, along with Paul Sichko, assistant airport director, MSP operations.

Paul gave us the grand tour for the first couple of hours and I'm pretty sure I saw all 127 gates. I also knew I was in good hands when Paul stopped his truck near a runway just to pick up a piece of paper and, later, what turned out to be a scarf.



Delta Air Lines' John Herman, senior analyst, customer service and Troy Lindell, performance leader, and editor Steve Smith on the ramp.

"You know you need a vacation when you stop on the highway to do this," he said.

What I really wanted to see was ground handling operations. Toward midday Paul turned Ronald and me over to Delta Air Lines and John Herman, senior analyst, airport customer service; Rich Benz, department manager, airport coordination center; and Troy Lindell, performance leader, below wing operations. A few weeks into my tenure, I toured the Dane County Regional Airport in Madison, WI, so it wasn't the first time I had seen the tough work that goes into ground support.

Physically demanding work, I had no doubt. But as we watched one of Troy's crews, I hadn't thought of how demanding the job is to account for turning aircraft throughout the day. Everyone

explained the notion of "ground time" – how the ground crew has 45 minutes to take care of every part of everyone's job. And in case anyone wonders, a clock ticks off the minutes.

"We certainly want to get everything turned around as quickly as we can," John explained. "But if 46 minutes go by, something went wrong and someone is responsible. We have to find out what went wrong and what to do to stop it."

That's where John's work comes into play. He'll look at data to detect troublesome trends and make the needed adjustments – and keep in mind, Delta handled more than 400 planes the day I was there.

"Almost all aspects of customer service are helped by everyone along the way striving for on-time performance," John added.

The increasing number of bags checked at the gate continues to be a headache for ground handling – and one not likely to go away since most people are doing this to escape paying a checked baggage fee. I plan to discuss this issue of ground time further in the pages of *Ground Support Worldwide*.

In the meantime, one more takeaway: I'm fascinated by electric pushbacks that can lift up the front wheel of an airplane.

Later that afternoon, I was at a gate where electric is the pushback of choice. While waiting, I noticed a glass-fronted box that contained what looked like a feedbag. Trust me on this one: I'm a farm boy who knows more about the FFA than FAA (that's "Future Farmers of America" for you city slickers) so I know what these sacks look like. This one contained "Corn Cob Factions," which are used to soak up fuel spills. Interesting to be surrounded by billions of dollars worth of aircraft parked on billions of dollars worth of real estate and find that such a humble product does an effective job. ■

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Cygnus Aviation Expo Announces SAE Alliance

Show will also include NATA's popular FBO Finance Fundamentals.

SAE International

**CYGNUS
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Cygnus Aviation Expo, scheduled for March 7-9 at the Las Vegas Convention Center, announces it has entered an agreement with SAE International to co-host SAE's first-ever SAE 2012 Aerospace & Defense Ground Support Equipment Conference in concert with the Expo, which brings together exhibitors and attendees from the ground support, maintenance, and aviation services communities.

At the same time, the National Air Transportation Association, which offers concurrent sessions via its Spring Training Week for tenant and fixed base operations, is bringing back its popular FBO Finance Fundamentals in-depth seminar, featuring long-time FBO veterans Phil Botana and Mark Chambers.

"This is a win-win-win for companies and delegates who are interested in the ground support and aviation services arena," said Rick Groth, vice president, Aviation Group, Cygnus Business Media. "Our new alignment with SAE and our long-established relationship with NATA promise to make the 2012 Expo even more valuable. Along with our Ford F150 giveaway networking event, which proved so popular at the 2011 show, we see 2012 as a show that will ignite the services sector."

The SAE initiative is headed up by Technical Program Chair John Goglia, a former member of the National Transportation Safety Board as well as a blogger for *Ground*

Support Worldwide. An emphasis of the conference will be bringing standardization to the ground support sector. At the same time, it will cover topics from deicing technologies to fueling systems to airport operations. *Ground Support Worldwide* is also currently developing seminars on the Voluntary Airport Low Emissions Program; alternative energy uses for GSE; and IATA safety audits. SAE has also already issued a "Call for Papers" from interested parties interested in participating in the forum; visit www.sae.org for more details.

The revived FBO session put on by NATA is designed to help tenant operations better understand the financial metrics of their businesses. The goal, says NATA, is to assist managers in making their operations more profitable and effective in the marketplace. Botana is a long-time FBO operator who heads up the Tampa International Jet Center and is a former NATA chair. Chambers is a veteran FBO manager now affiliated with Aviation Resource Group International.

SAE International is a global association of more than 128,000 engineers and related technical experts in the aerospace, automotive and commercial-vehicle industries. SAE International's core competencies are life-long learning and voluntary consensus standards development. SAE International's charitable arm is the SAE Foundation, which supports many programs, including A World In Motion® and the Collegiate Design Series.

For more information, visit www.CygnusAviationExpo.com.

BUSINESS BUZZ

■ Harlan Helps US Airways Express

Go Green At PHL: Harlan Global Manufacturing, Kansas City, KS, launched 20 of its new all-electric belt loaders with US Airways Express at the Philadelphia International Airport. The company also rolled out 15 all-electric baggage tractors as part of the airline's major going green initiative at its Philadelphia facilities. Both the company's Express HBLE belt loader and Charger baggage tractors use the same state-of-the-art components. The systems are 80 volt AC. Harlan manufactures everything on the machines except for the battery and controller. This includes the recently acquired integrated drive axle system from Speth of Germany.

■ Passenger traffic gets a boost; freight continues to stagnate:

The International Air Transport Association announced traffic results for July which showed that passenger travel was up 5.9 percent over July 2010. Freight markets were stagnating with a 0.4 percent demand decline over previous year levels. International passenger markets, which grew by 7.3

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percent compared with July 2010, remain stronger on average than domestic markets which showed weaker growth of

3.5 percent year over year. Compared to prerecession levels of early 2008, international passenger traffic has expanded by 12 percent. Had the industry continued to grow at the prerecession pace of 8 percent, international markets would have been about 14 percent higher than today's levels and a quarter higher than prerecession level. This confirms that the global financial crisis has cost airlines about two full years of growth. Load factors for the total market (domestic and international) have improved by half a percentage point over July 2010 to 83.1 percent. This is equal to the highs recorded in the third quarter of 2010. North American carriers and European carriers were in the lead. Latin American carriers saw the biggest improvement (from 76.5 percent last July to 79.6 percent this year).

■ Finnair in discussions with Swissport for Helsinki Airport:

Finnair is in negotiations with Swissport International, Zurich, Switzerland, about baggage and apron services at Helsinki Airport. The aim is to conclude negotiations before the end of the year. "Developing partnership networks is part of Finnair's key strategy," said Ville Iho,

Go Green

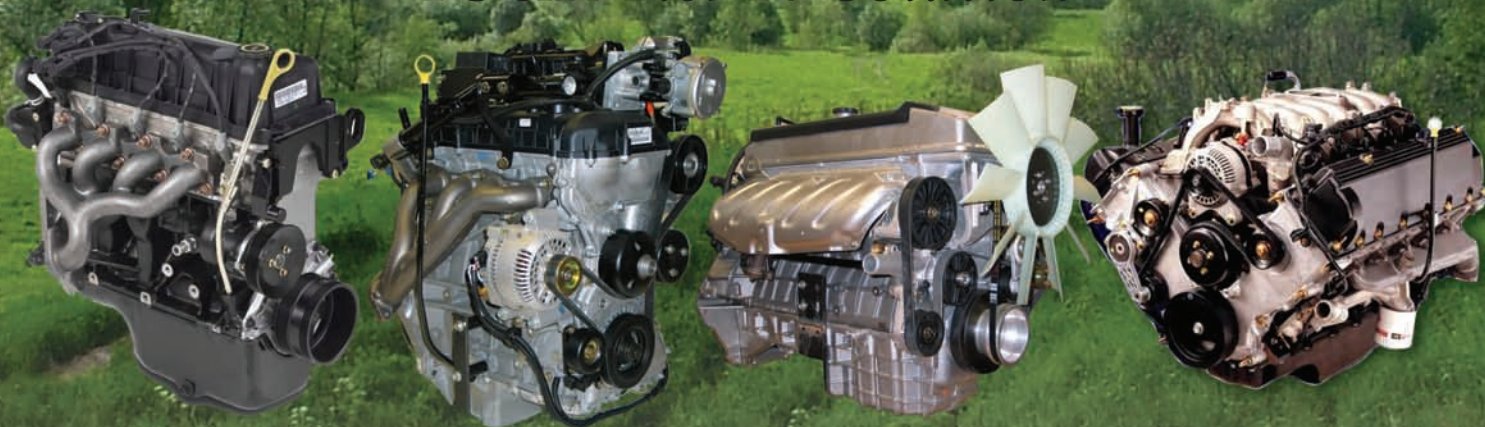
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Finnair's COO. "We aim for even better quality and cost-efficiency." Employees working for Barona Handling, currently executing Finnair's ramp handling activities in the Helsinki hub, would transfer to the service of Swissport under their present terms of employment if the Swissport and Finnair reach an agreement. Swissport International plans to establish a ground handling organization in Helsinki to be able to offer the full range of ground handling services to all airlines operating at Helsinki airport.

■ **ALTA member airlines passenger traffic increases 2 percent in July:** The Latin American and Caribbean Air Transport Association announced that its member airlines carried 12.7 million passengers in July, up 2.1 percent from the previous year. Traffic grew 1.5 percent and capacity declined 2.8 percent, raising the load factor to 79.4 percent, 3.3 percentage points higher than in July 2010. "The July results are significantly affected by Mexicana's exit from the market," said Alex de Gunten, ALTA's Executive Director. "Excluding Mexicana, passenger growth in July would be 11.2 percent with an increase in traffic of 11.6 percent and capacity at 6.8 percent." The number of passengers carried

year-to-date (January to July) increased 4.1 percent versus the same period of the previous year, reaching 80.4 million passengers. During the aforementioned period traffic rose 5.3 percent, capacity increased 0.3 percent and the passenger load factor reached 75.6 percent.

■ **NATA updates de/anti-icing training module:** The National Air Transportation Association's Safety 1st released its updated De/Anti-icing training module this month. Winter weather training programs like NATA's Safety 1st De/Anti-Icing module are designed to familiarize line service specialists with the responsibilities of their job and give an overview of the skills necessary to ensure safe aircraft departures. The De/Anti-icing training module was first released in 2010. Updates include supplementary documentation of different types of contamination; communication section between crews and deicing techs; and anti-icing and deicing section to clarify the sequence of procedures.

■ **ATS receives first ISAGO registration in Las Vegas:** Airport Terminal Services, St. Louis, MO, announced that it had received the IATA Safety Audit for Ground

Operations registration for its corporate office in St. Louis and is the first ground service provider to be registered at Las Vegas – McCarran International Airport. ATS services audited by ISAGO included baggage handling; aircraft handling and loading; aircraft ground movement; and organization and management. The implementation of ISAGO aims to improve safety and cut airline costs by drastically reducing ground accidents and injuries.

■ **Lufthansa Cargo receives U.S. SAFETY Act Designation:** Lufthansa Cargo AG has been the first air carrier to receive the U.S. Department of Homeland Security SAFETY Act Designation for the screening of air cargo departing the United States. The airline has invested heavily to further improve air cargo security over the recent years. In the Americas, Lufthansa Cargo has implemented new x-ray and trace detection machines into operation and is currently increasing the number of security experts at its stations significantly. The SAFETY Act provides legal liability protections for providers of "Qualified Anti-Terrorism Technologies." The goal of the SAFETY Act is to encourage the development and deployment of new and innova-

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■ **Clariant enables Oslo Airport to recycle de-icer:** A new Clariant recycling plant for aircraft de-icer was inaugurated this month at Norway's Oslo International Airport. In the coming 2011-12 winter, it is expected that the unit will reprocess as much as 70 percent of the aircraft de-icer fluid used in Oslo. The recycled product – mono propylene glycol – will substitute an estimated 700 metric tons per year of original material in de-icing and heat transfer applications. Recycling also will reduce the airport's carbon footprint. Clariant, Mount Holly, NC, estimates that carbon emissions over the life cycle of de-icing will be reduced by an annual 2,800 metric tons of carbon dioxide equivalent. This is roughly equivalent to the emissions of 7,400 round-trip flights between London and Oslo.

Partnerships/ Acquisitions/ Contracts

■ **Cavotec acquires INET Airport Systems:** Cavotec, Lugano, Switzerland, acquired INET Airport Systems, a leader in the engineering and manufacturing of ground support equipment based in United States in August. "Our focus is directed strongly on servicing our extensive North American customer base with local North American manufacturing and sales support, while simultaneously strengthening our global presence through our extensive Cavotec sales and service network," said Ottonel Popesco, Cavotec CEO. The acquisition further consolidates Cavotec's position in North America, with nearly 200 employees and colleagues working from three manufacturing facilities and from Cavotec's own local offices in Chicago, Charlotte, Houston, Los Angeles, Pittsburgh, Toronto and Vancouver. The deal also marks a milestone in Cavotec's presence in the U.S. market, especially given INET's long list of U.S. and international clients, which include Lockheed, Boeing, NASA, Northrop Grumman, as well as many international airports such as Miami, Bangkok, Cairo, Toronto and Vancouver.

■ **Former Flightworks president acquires ADI:** Aerodynamics Inc., Waterford, MI, announced in August that the company and its subsidiary, ADI Shuttle Group LLC, has been acquired by Scott Beale, former president, founder and co-owner of FlightWorks. Terms of the acquisition were undisclosed. ADI is a full-service flight and maintenance repair firm that operates under Part 121, 125, 135 and 145

of the Federal Aviation Regulations. The company's specialties include corporate shuttles, charter services, aircraft management, and maintenance, repair and overhaul (MRO) services. ADI headquarters will remain in Michigan at the Oakland County International Airport.

■ **Matheson Flight Extenders, Inc. awarded international contract with Asiana Airlines Inc.:** Matheson Flight Extenders, Inc., a transportation, environmental and airport services company head-

quartered in Sacramento, CA, announced its first international contract last August with South Korea's Asiana Airlines to provide import/export warehousing and aircraft ground handling at Matheson's Portland, OR, facility. Asiana Airlines Inc. will initiate service with three flights per week.

■ **DOE awards grant to Boeing to study renewable jet fuel:** The Department of Energy awarded Boeing up to \$4 million to study new methods of converting biomass-based ethanol into



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jet fuel. "Investments aim to accelerate the discovery of innovative solutions that could drive down the cost of biofuels production and boost their availability in the marketplace," said U.S. Energy Secretary Steven Chu. Back in 2008, Boeing and other companies partnered to launch the first commercial aviation flight using a sustainable biomass-to-liquid fuel mixed with traditional kerosene-based jet fuel. The Virgin Atlantic 747-400 flew using a biofuel blend of babassu oil and coconut oil.

PEOPLE IN THE NEWS



Chris Dukes

Garsite names Chris Dukes to lead new Middle-East branch:

Garsite, Kansas City, KS, announces a permanent office in Dubai, UAE, scheduled to open by Jan.

1. Chris Dukes, vice president of international sales will lead the new office. The

new site will give Garsite the ability to better service existing customers in Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE-United Arab Emirates.

NBAA announces Winant Award winner: Jim Cannon, airman, author, and advocate in business aviation, will be honored with the National Business Aviation Association's John H. Winant Award. Cannon will be formally recognized at the group's 64th Annual Meeting & Convention, Oct. 10-12. The Winant Award recognizes former NBAA directors whose service to business aviation continues well beyond their tenure on NBAA's Board of Directors. Winant's association with NBAA extended over five decades.



Marcel Buelens

Swissport announces new management in Brussels:

Swissport International, Zurich, Switzerland, appointed new management to run the ground handling operations at Brussels Airport. The company named Marcel Buelens as CEO and Alex Weidmann as COO. Swissport Cargo Services will remain under the lead of Managing Director Patrick Minsart. Buelens was previously CEO of Brussels South



Alex Weidmann

Charleroi Airport from 2006 to 2009. He has extensive international experience within ground handling and logistics, including overseas assignments in Hong Kong and in the Middle East. Weidmann has 28 years of international expertise in the aviation industry. He was manager for special projects at Swissport Zurich. He has additional experience in similar roles in Los Angeles, Manila and Paris.

JetStream Ground Services

appoints new leaders: JetStream Ground Services, Inc., Jupiter, FL, recently appointed Richard "Rich" Cordell as COO. Cordell is the former senior vice president of airport customer service and a 30-year veteran of Delta Air Lines. JetStream also announced Blake W. Schultz Jr. has joined the company as vice president of sales and marketing. Schultz has more than 35 years of airline and aviation service experience holding various positions both in operations and sales during his career. The appointment of these two leaders to the executive team closely follows the company's significant technology investment in mobile resource planning solutions for its airport operations. Both Cordell and Schultz will report to Marc Desnoyers, president and founder of the company and will be based at the corporate headquarters in Jupiter, FL.

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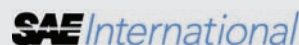
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AeroGround, a new subsidiary of FMG, employs 2,000 and will complete more than 164,000 ground handling operations for its biggest customer, Lufthansa, this year.

FMG

Munich Airport's \$2.6 Billion Expansion

By Manik Mehta

Project Includes Constructing Third Runway, Adding Satellite To Passenger Terminal And Increasing Cargo Capacity.

Bavaria's aviation experts called it a "hot summer." The reference was not just to the sweltering heat across Germany, but also to the rising tensions among environmental groups and local residents who tried for six years to stop a proposed third runway at Munich Airport (MUC), and the regional government that finally cleared the way for its construction last July.

The additional runway, when completed by 2015, will enable 120 planes to takeoff and land at MUC per hour, up from the current 90 flights per hour. Airport officials contend they should be able to handle some 58 million passengers by 2025, up from 35 million in 2010.

Besides constructing a third runway, MUC is also building a new satellite facility to meet the additional passenger capacity at the airport's Terminal 2 and increasing the number of gate positions for aircraft. The satellite facility will also go into operation in 2015.

MUC's ambitious expansion project, which also includes adding to its cargo capacity, will further bolster its position as Germany's second largest airport after Frankfurt am Main Airport (FRA).

SUBSTANTIAL GROWTH

In an interview with *Ground Support Worldwide*, Michael Kerkloh, the chairman of the board of Flughafen München

GmbH, the airport's managing agency, described the government's recent clearance of the new runway as the "most important decision" for MUC.

Kerkloh says MUC, as a prospering aviation hub, has already made a substantial contribution to the economy and employment in Bavaria. Since its opening in 1992, the airport's traffic has increased considerably. Some 35 million passengers and 390,000 takeoffs and landings were recorded in 2010, a three-fold increase in passenger traffic and a two-fold increase in the number of aircraft movements since its first year of operation. Currently, MUC maintains regular links to more than 220 destinations in 88 countries.



Munich Airport's third runway, shown in this photo illustration in orange, will enable a total of 120 planes to take off and land per hour at the airport.



Dr. Michael Kerkloh, chairman of the board of Flughafen München GmbH, Munich Airport's managing agency.

The new satellite terminal is designed as an addition to the existing baggage sorting hall on the apron to the east of Terminal 2. When work is completed, the satellite will be an operational and functional component of Terminal 2 with a 600-meter (1,968-feet) pier providing space for a total of 52 gates. Also, the creation of 27 aircraft park positions adjacent to the new facility will more than double the number of nonremote aircraft stands serving Terminal 2.

The satellite is not a standalone terminal. Passengers will use the check-in and ticket desk and the arrivals area in Terminal 2. The new facility will be linked to Terminal 2 via an underground rail system. Automated trains will take passengers to the satellite facility in less than a minute.

The construction work, scheduled to start sometime in the fourth quarter, will not be easy since the expansion measures are being carried out at the airport in the midst of daily operations. Much of the building will be built not only above the baggage handling hall, but wrap around MUC's eastern control tower.

At a press conference to announce first-half 2011 business, Kerkloh had this to say: "In a sense, this amounts to open-heart surgery on the airport. The various subprojects, with their tightly intermeshed timetables, will have to follow a tight script if we want to put a fully functional overall system into operation by 2015."



'LOOK EAST' STRATEGY AND BEYOND

FMG executives are pursuing what local aviation circles describe as the airport's "look east" strategy aimed at increasing its links with Asia.

Kerkloh has recently visited a number of Asian countries with the intention of luring Asian airlines to Munich and intensifying his contacts with Asian airports and governments.

"Traffic to Asia has grown in an impressive manner in the past years because of Munich Airport's development as a hub," Kerkloh explains. "We have, for example,

The airport's new satellite terminal will be built on top of the existing baggage hall and even wrap around one of the airport's control towers.

about 135 weekly departures to Asia, five times as many as 10 years ago."

The latest newcomers are Singapore Airlines and ANA, which have been operating from Munich since last year and have daily flights to Singapore and Tokyo, respectively.

"Also of key importance for us," Kerkloh adds, "is the increase in

frequencies by Lufthansa which, meanwhile, operates all its long haul flights on a daily basis."

Kerkloh is also interested in attracting carriers from the Gulf.

"Qatar Airways has increased its connections this year to Doha to 11 weekly frequencies," Kerkloh adds. "Emirates will use the Airbus A380 aircraft from January next year for one of its two daily flights to Dubai."

MUC is also not neglecting other important regions. North America, for example, "continues to be a very important market," Kerkloh emphasizes. MUC offers 107 weekly takeoffs to 14 destinations in the United States and Canada though Kerkloh is also keen to get other airlines and destinations in the airport's flight plan. He confirmed that he is in "active contact" with some airlines in North America, but would not reveal their names.

"We were very pleased when Lufthansa recently announced that it will have a new connection from Munich to Mexico City next year," Kerkloh adds.

In related news, FMG also noted in a press release last July that MUC saw particularly strong gains in the number of travelers on flights to and from the "BRICS" countries: Brazil; Russia; India; China; and South Africa, all of which are seeing their countries' economies growing at a 5 percent to 10 percent clip. Each of the BRICS countries, which together represent 40 percent of the world's population, is the destination of at least one flight per day from MUC. The passenger volume on routes to these five growth markets increased by an average of 26 percent during the first half of the year to a combined total of more than 900,000 passengers.

CARGO INITIATIVE

Recognizing the business potential inherent in cargo traffic, MUC is

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EXPANSION COSTS

Government authorities considered 31 different proposals for the runway location as well as not building it at all and transferring some of the air traffic to other airports. In the end, the regional government stated in its approval that MUC had proven the need for an additional runway given its recent growth rates.

The third runway will be the same length and breadth as the other two runways – 4,000 meters (13,123 feet) long and 60 meters (197 feet) wide; it will be located 1,180 meter (approximately 3/4 of a mile) north of one of the current runways and run parallel to both.

Most of the opposition for the runway, originally proposed in 2005, centered on noise and other environmental issues. As a result, the planning approval by the District Government of Upper Bavaria includes a number of restrictions and requirements.

To assuage tempers of opponents of the third runway, the airport will not allow flights before 6 a.m. and after 10 p.m. MUC is also obliged to potentially

also building up the cargo segment. Kerkloh believes cargo traffic offers even greater growth opportunities than passenger traffic.

During the first half of 2011, the airport handled nearly 145,000 metric tons (159,000 tons), a 14 percent increase over the year-earlier period – an all-time record for the time frame. In order to keep pace with the steadily rising cargo volume, MUC will construct a new building for forwarding agents on an 18,000 square meter (59,000 square feet) parcel, which will be used by five major forwarding companies by next summer.

The future development of the cargo business at MUC would certainly be stimulated by specific trends in passenger traffic because a large part of the airport's cargo business is transported in passenger aircraft belly.

FIRST-HALF 2011 TRAFFIC FIGURES AT MUC

Figures for the first-half of 2011 show that MUC handled almost 18 million passengers, a 13 percent increase over the year-earlier period. Cargo traffic at MUC posted even more robust growth than passenger traffic. The new record cargo volume reached nearly 145,000 metric tons (159,000 tons) during the first-half of 2011, a 14 percent increase over the year-earlier period.

	2011	2010	Change
Passenger (commercial traffic)	17,935,800	15,818,300	+ 13%
Aircraft movement (total traffic)	202,720	185,700	+ 9%
Cargo volume (metric tons)	144,600	126,900	+ 14%

purchase up to 100 private properties near the new runway at 2007 market prices. This is on top of the estimated cost of one billion euros (\$1.37 billion) to build the third runway.

FMG also earmarked 100 million euros (\$137 million) to advance infrastructure projects in the region and compensate for other hardships related to the third runway.

Meanwhile, the 650 million euros (\$890.5 million) price tag for the construction of the satellite building will be jointly financed with 60 percent of the money coming from FMG and the remainder from Lufthansa. (FMG and Lufthansa jointly designed, built and operate Terminal 2.) The new cargo facility is expected to cost 13 million euros (\$17.8 million).

Finally, FMG also plans to invest another 150 million euros (\$205.5 million) into other related construction, such as building a third fire station, general aviation facilities, a new helicopter landing pad and snow-dumping areas.



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Reorganizing Ground Handling Operations

LABOR REGULATIONS RESTRICTED PROFITABILITY UNTIL RECENT RESTRUCTURING

By Steve Smith

Executives at Munich Airport management company Flughafen München GmbH doubted the company would continue to be in the ground handling business at MUC.

FMG essentially faced two challenges:

- The operating company's three major shareholders are all government entities – the state of Bavaria; the Federal Republic of Germany; and the city of Munich. In other words, FMG sits squarely in the public sector. As a result, pay scales of so-called

“public-law entities” are subject to collective agreements for public services referred to in Germany as the TVöD.

- Meanwhile, European Union directives first issued in 1999 opened up ground handling operations at European airports to include at least two ground handling companies. Over the years, FMG had to compete with private operators to provide baggage handling, passenger transportation and other handling services on the apron. (Airlines also have the right to perform their own handling services, but none currently do so at MUC.)

“Other service providers incorporated under private law are not bound by TVöD pay rates,” says Siegfried Pasler, CEO of FMG's new ground handling division AeroGround. “Compared with other compensation rates, the TVöD is a much heavier burden on the employer, in particular due to the automatic wage

“Since we expect an over-proportional rise in long-haul passenger traffic,” Kerkloh says, “an over-proportional growth in cargo can also be expected.”

The airport chairman declared that traffic in the first half of 2011 had been the best marks achieved by MUC in any first-half period.

“Never has Munich Airport clocked so many passengers in the first-half of a year,” Kerkloh claims.

Of Europe's 10 leading airports, only Barcelona had surpassed Munich's growth in passenger traffic.

“Creating quantity and safeguarding quality,” Kerkloh says, “that will be our task for the coming years.” ■

ABOUT THE AUTHOR: Manik Mehta is a New York-based journalist with extensive experience covering aviation, including ground support, airports, airlines, infrastructure, and passenger/cargo traffic. From his New York base, Manik travels frequently to Europe and Asia.



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increases that are solely linked to the age of the employees." What's more, the EU's liberalization of the ground handling market contributed, Pasler says, to an overall decline in ground handling prices at other German airports.

"In this imbalanced situation, the FMG ground handling division accumulated massive losses, resulting in cumulative deficits of several hundred million euros over the past 10 years," Pasler adds.

By the beginning of 2010, Air Berlin, a major customer, did not extend its contract with FMG. More importantly, its main customer Lufthansa, which holds a commanding 65 percent market share at MUC, told FMG that it intended to give a quarter of its ground handling services to a competing company by 2011. (The market share is even greater factoring in the airline's Star Alliance partners.)

Here's how management put the future of its ground handling services in

its 2009 annual report: "Our executive management has stepped up its efforts to keep the division with the FMG Group. However, if we are to succeed in securing all of the jobs in the division in the longer term, it is essential that we transform it into a profitable and competitive business unit with rate of pay typical for the industry. If we cannot succeed, we may have to withdraw from this area of business."

On Jan. 1 of this year, however, FMG launched AeroGround, a spin-off of its former ground handling services into a separate subsidiary, albeit 100 percent owned by FMG. As a result, the new subsidiary operates under a less restrictive collective agreement – "TVöD light," as Pasler calls it.

Pasler says the new subsidiary is now earning profits and will be able to compete with other providers. He also says the 2,000 employees of AeroGround are particularly skilled in handling hub traffic

from the growing Terminal 2.

"Transit passengers in Terminal 2 can change planes with their luggage within just 30 minutes," Pasler explains, "which can be credited to our ground handling expertise. This key area is strategically important because a solidly positioned ground handling operation is crucial for the further expansion of the hub traffic at Munich Airport."

Contracts with more than 100 airline customers such as Singapore Airlines, Emirates, and United Airlines have been transferred to the new operation. Other significant new contracts signed with AeroGround include a five-year deal with Condor and a two-year agreement with TUIfly.

And its largest customer, Lufthansa, signed a six-year agreement with the newly restructured handler. This year, FMG says AeroGround will complete more than 164,000 handling operations for Lufthansa.



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Reducing Ground Support Emissions

Electric GSE certainly helps minimize ground handling's carbon footprint. But hydrogen offers another alternative power source.

By Steve Smith

New electric or electric conversions of GSE have helped minimize the ground support fleet's contribution to carbon emissions at airports throughout the world. Hydrogen-fueled internal combustion engines offer one other less publicized way.

Technology for GSE developed by Canada's Can-Am Modev, for example, had its beginnings in 2002, but wasn't seriously considered until 2003. And it didn't reach the in-service test stage until 2010, and those tests continue today at Montréal-Pierre Elliott Trudeau International Airport (YUL) on a fleet of hydrogen-powered tractors.

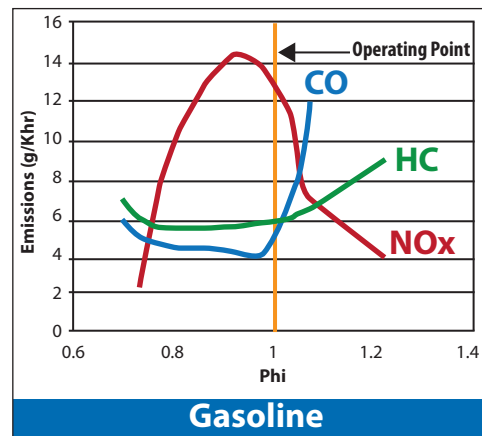
The company first paired its engine technology with another power source – fuel cells – before settling its energy on a hydrogen-fueled internal combustion

engine. By 2004, the Canadian government considered for the first time to fund a study of three types of hydrogen-powered ground vehicles for the so-called "H2Port" project:

- Baggage tractors
- Transit buses
- Taxi cabs

For a few years, the project spent more time derailed than on track, before contracts for a number of baggage tractors were finally issued in 2009. The other two vehicles failed to make the cut.

The reputation for dependability and safety in aviation-related equipment comes from data-driven designs. No airline or ground operation would consider equipment unless it had been proven in testing or by use in a similar application elsewhere. Recognizing



this, the Canadian government funded the test case at YUL. Air Canada continues to run the test.

The plan was for these tractors to gather usage data for fuel consumption, fueling cycle, maintenance, utility, ease of use, and other items. This data may give airlines and baggage handling operations a clearer picture of this alternative technology.

Currently, three baggage tractors have been converted to use hydrogen at YUL. Operating data continues to be collected and the results will eventually be shared with airlines and baggage handling companies. Approval from the Canadian Ministry of Transport is the next step.

One unexpected benefit, however, is already apparent. Internal combustion engine-powered tractors are not permitted inside the airport terminal building due to emissions.

Currently, such tractors are unhooked and electric-powered tractors are connected to complete the transfer of baggage from the ramp to the baggage conveyor. The time required to move baggage between aircraft and conveyor is obviously increased.

Since hydrogen-fueled tractors emit only water vapor, they can proceed directly to the conveyor from the ramp. It is estimated each test tractor saves 1.3 hours per day in unnecessary hooking/unhooking.

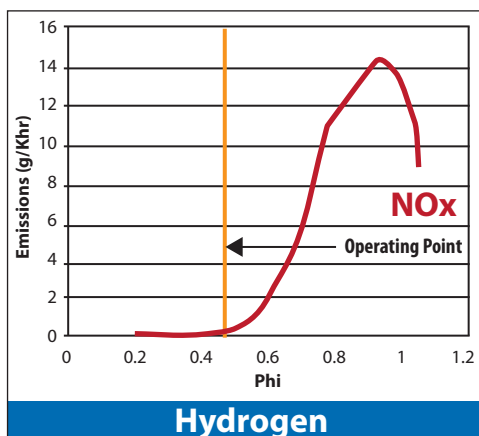
THE CONVERSION PROCESS

Since hydrogen is less dense than other fuels, storing it takes up more room and special provisions had



Can-Am Modev

Three test tractors, like this one, powered by hydrogen are currently being tested at Montréal-Pierre Elliott Trudeau International Airport



Can-Am Modev

Charts show the undesirable emissions curves for gasoline and hydrogen and the target operating points for both engines.

to be made for on-vehicle storage. Can-Am Modev selected two Dynetek high-pressure vessels, locating them behind the seats and in front of the hitch pin. Fuel piping and delivery to the engine had to be designed for the new fuel, but the company adapted fuel injection control schemes used for gasoline engines. There were other differences, such as injectors and sensors.

Other than the new fuel system for the tractor, the company says the conversion is very similar to an engine replacement for a worn-out engine. The engine bolts directly to most tractor transmissions with no adaptations, since, in most cases, the block is the same as what came from the tractor manufacturer. The "gas" pedal is electronic rather than mechanical, just as in many cars today. The engine controller mounts to the firewall or inside fender, depending on the tractor manufacturer.

The company says finding a zero-NOx operating point and staying there under variable loads and speeds took a fair amount of work. The engines themselves were higher compression than for unleaded gasoline, but nothing that required new science.

Shown above in the charts are the undesirable emission curves for gasoline and hydrogen, as well as the target operating points for both

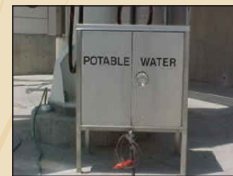
engines. Those operating points are the minimal emissions points. Note that hydrogen is usable as a fuel at a much lower Phi (fuel-air percentage). Electronic engine control is essential to maintaining operation at those points as load and speed change.

Fuel cells require laboratory grade fuel. Hydrogen internal combustion

engine systems, on the other hand, will operate with industrial grade.

Impurities in the fuel may contribute to emissions increases, but a few percents of impurities should not affect performance. A central fueling point at the airport and/or rolling tankers are the expected fuel resupply scenarios. YUL has a central fueling station. Refueling takes only a few minutes.

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Is Hydrogen Safe?

Think "hydrogen," and the Hindenburg disaster comes to mind and is often cited as an example of "dangerous" hydrogen. However, an electrical discharge ignited the aluminized skin of the airship, which rapidly set fire to everything else, including the hydrogen bladders. The paint used on the Hindenburg had nearly the same chemical composition as a military ordnance accelerant.

As with any fuel source, hydrogen has some degree of danger and precautions should be taken. The current ANSI standard for hydrogen safety guidelines is AIAA G-095-2004. The world's largest user of hydrogen, NASA, uses NSS 1740.16 (8719.16) and the ANSI standard borrows heavily from it.

In a well-known case within automotive circles, a car manufacturer wanted to know how hydrogen compared to gasoline for safety before they put hydrogen-fueled vehicles on the road. Two cars were deliberately ignited at their fuel filler necks. One was a gasoline-fueled car. The other was an identical model using hydrogen as fuel.

Following the gasoline fire, a few pieces of engine, drive train and brakes stood in a melted asphalt pool. Post-fire, the hydrogen car was singed, but for the most part intact. The primary reason for that is how rapidly hydrogen dissipates, quickly reducing combustible volume. It has the fastest dissipation rate of all gases. It doesn't pool like gasoline or LPG.

HYDROGEN'S COST

Hydrogen is available from a number of industrial gas companies in North America. However, green sources of energy such as wind, solar or at least off-peak traditional electrical power can produce hydrogen via electrolysis.

The cost of hydrogen varies, depending on its source. The current retail price of hydrogen ranges from \$8 to \$16 per kilogram, but that is at small volumes. That price is expected to decrease with increasing volume. U.S. gasoline production, for example, is at a scale of several hundreds of millions of gallons per day, while U.S. hydrogen production is less than 125 metric tons per day.

It's difficult to make direct cost comparisons between the two. A hydrogen engine is 10 percent to 20 more efficient than a gasoline engine. Gasoline engines on the ramp are also frequently left idling because restarting them is sometimes a challenge whereas hydro-

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gen engines have near-instant starting capacities – even in very cold weather.

The difference in how to precisely measure the fuels makes comparison difficult. Gasoline, of course, is measured in gallons or liters. Meanwhile, hydrogen is measured in standard cubic feet – the volume at sea level pressure, or in kilograms.

To create an apples-to-apples comparison, a new measure has been developed, based upon the energy content of each fuel. One kilogram of hydrogen is approximately one “gasoline gallon equivalent” in energy content.

What's Old Is New Again

The idea of a hydrogen-fueled engine is not new. The first hydrogen internal combustion engine was demonstrated in 1807 in Switzerland. The first truck to use hydrogen was converted in 1933.

However, gasoline and diesel were cheap and plentiful at the time so there was little incentive to commercialize hydrogen power.

As reducing emissions became a higher priority, however, the interest in using hydrogen was revived because engines using hydrogen emit no carbon by-products.

But hydrogen engines still emitted one emission: NOx. Nitric oxide and nitrogen dioxide are formed as a result of combustion and can be significant causes of air pollution.

The goal of near-zero emissions became a reality only in the late 1990s when electronic engine control reached an advanced stage of development and common use in gasoline engines. Likewise, precise metering of fuel and spark via electronic control minimize NOx for hydrogen engines.

The elimination of emissions and ease of conversion remain the primary benefits initially, with declining operating costs later as the price of hydrogen comes down. Gasoline and diesel costs, on the other hand, can be expected to continue to rise.

Can-Am Modev expects more tests on larger numbers of tractors and perhaps other equipment in the

future. Toronto's Pearson Airport (YYZ) and Vancouver International Airport (YVR) have been mentioned as probable next sites for testing, as well as increasing the number of test tractors converted at YUL. Several U.S. airports have also shown interest, but await the test results. Not every tractor is a good fit for the hydrogen engine, the company says, but the majority would work with it. ■



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Collecting 'Predictive' SMS Data

Line Operations Safety Assessments require employee involvement to identify safety threats to 11 areas of ramp operations.

By Dr. William Johnson

Safety Management Systems (SMS) is an important new three-letter word from the International Civil Aviation Organization (ICAO). Federal Aviation Administration and national aviation authorities are following the ICAO guidelines and requiring SMS. For most airline and airline-related service organizations, an SMS can be a formalization of the many safety programs already in place.

This article describes a system that helps provide "predictive" safety data for SMS. The system involves employee participation to formally recognize not only safety threats, but also good processes within the company.

The system is called the Line Operations Safety Assessment (LOSA). There are two LOSAs for ramp personnel and maintenance, but we'll focus on the ramp in this article. (By the way, the term "assessment" was

purposefully chosen since the industry wanted to separate LOSA from the traditional "audit.")

WHAT IS LOSA?

LOSA is a way for employees to observe one another's work. Although it is peer-to-peer observation, it is a formal process. LOSA is not new. Since the late 1990s, LOSA has evolved in flight operations and is widely used today. Line pilots, for

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example, trained to be LOSA observers, fly jump seat and observe the crew. The observer looks for excellent performance, but also observes whether threats and errors are present.

The LOSA observer does not record pilot names or information that could compromise anonymity. They merely observe and record threats, errors, and recovery from errors during normal operations. The observer is trained not to interfere with normal operations unless there is grave danger to people or property.

Those being observed know that the LOSA is not a classic “audit” and that LOSA data cannot attribute actions to an individual or crew. LOSA is a formal employee system that does real-time risk assessment using the threat-and-error management model.

The LOSA system for ramp is very different from that used on the flight deck. The philosophy and principles are the same, but the flight deck relies on open-ended text to record the observations. Pilots wrote complicated paragraphs that could be difficult to decode.

The ramp LOSA, on the other hand, uses structured observation checklists. (See “More On LOSA Process” sidebar.) The system for ramp comes complete with ready-to-use database



Figure 1. Characteristics of a LOSA Program

and data analysis tools that are kept with the operator. There is no need for outside data storage and analysis. This ensures that company data are secure and that analysis does not require external consultants.

Figure 1 shows the characteristics of the LOSA system. It is a systematic means for observation of normal operations. The peer-trusted observers, as well as those observed, participate in LOSA as volunteers. All are trained to understand that LOSA data do not include names and the data are confidential.

LOSA is a joint effort by company management and labor to recognize early indications of threats and errors. Sometimes LOSA can be targeted to assess known challenges. In any case, the standards for confidentiality always apply. The results of LOSA are also distributed to the workforce.

IMPLEMENTATION REQUIRES SUPPORT

LOSA implementation requires strong support from corporate leadership and from the workforce. It requires resources for personnel, training, data



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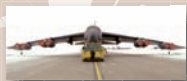
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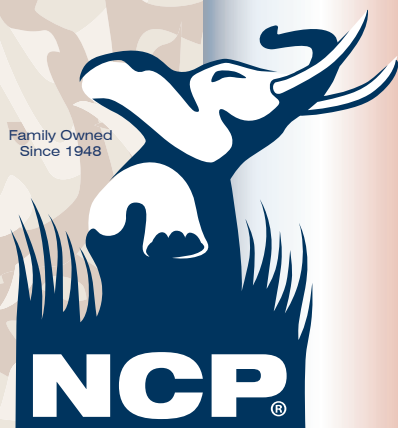
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More On The LOSA Process

SAFETY MANAGEMENT SYSTEMS COLLECT "REACTIVE," "PROACTIVE," AND "PREDICTIVE" DATA:

- Reactive data come from an investigation of a serious event. Personnel identify the contributing factors to an event and develop corrective actions accordingly.
- Proactive data, on the other hand, are usually collected on a daily basis. The proactive data come from quality assurance audits and hazard reporting systems, including the Aviation Safety Action Program in the United States.
- Predictive data are the trickiest to collect and to process. To predict error, you must have an accurate understanding of daily operations on the ramp and elsewhere in the organization. Employee involvement is the way to gather predictive data for the LOSA process.

THE LOSA PROCESS INVOLVES CHECKLISTS THAT ACCESS, IN THE CASE OF RAMP OPERATIONS, THE FOLLOWING 11 COMPONENTS:

- Arrival
- Downloading
- Lavatory/Potable Water Service
- Catering
- Cleaning Service
- Fuel Service
- Uploading
- Departure
- A/C Maintenance
- De-Ice/Anti-Ice
- Pilot Walkaround

analyses, etc. The return on these investments includes an enhanced SMS program, new knowledge of daily risk, an increase in efficiency, and continuing safety. A return on investment tool is under development for use with the LOSA systems.

The development team of government and industry has developed and tested all necessary materials to support the implementation of LOSA for ramp.

That includes training documents and manuals, data collection and analyses forms and software, and materials to promote LOSA to the workforce. Figure 2 shows one example of the many posters available from the www.mrlosa.com website. This site also offers ways to obtain implementation support from participating industry and government partners. ■



Figure 2: Promoting LOSA At Work

ABOUT THE AUTHOR: Dr. William Johnson is the FAA chief scientific and technical advisor for human factors in aircraft maintenance systems. He spent more than 30 years as a senior executive and scientist for engineering companies specializing in technical training and human factors before joining the FAA in 2004. He is also an aviation maintenance technician and a pilot for more than 45 years.

1. ARRIVAL ☐ Did not observe this section

Ramp LOSA Observation Form
Observation Number: _____

	Safety Risk N/A, Safe (S), At Risk (AR), Did Not Observe (DNO)	Error Code	Threat Code	Threat Effectively Managed Y/N	Error Outcome 1 Inconsequential 2 Undesired State 3 Additional Error	General Remarks
Pre-Arrival						
1 Pre-flight briefing (a.k.a. huddle) held	N/A	S	AR	DNO		
2 Ramp crew ready prior to A/C arrival	N/A	S	AR	DNO		
3 Arrival FOD/trash walk complete	N/A	S	AR	DNO		
4 Gate area cleared (clean and orderly)	N/A	S	AR	DNO		
5 Loading bridge staged/stowed properly	N/A	S	AR	DNO		
6 Equipment staged properly outside clearance area	N/A	S	AR	DNO		
7 Marshaler/wingwalkers in position for A/C arrival with proper wands	N/A	S	AR	DNO		
8 Stop line identified	N/A	S	AR	DNO		
Arrival						
9 Proper hand signals used or automatic guidance system set up to marshal A/C on arrival	N/A	S	AR	DNO		
10 Tow-in/tow-on procedures followed	N/A	S	AR	DNO		
11 A/C was "safe to approach" (e.g., engines spooled down, rotating beacon off)	N/A	S	AR	DNO		
12 A/C properly chocked	N/A	S	AR	DNO		
13 Wing tie/line markers properly placed before GSE approaches A/C	N/A	S	AR	DNO		
14 Arrival walkaround performed within required time	N/A	S	AR	DNO		
15 GPU tongue disconnected from tractor prior to connecting to A/C	N/A	S	AR	DNO		
16 Fixed GPU properly connected to A/C	N/A	S	AR	DNO		
17 Conditioned air properly connected	N/A	S	AR	DNO		
18 Tail post (or nose tether) used as required	N/A	S	AR	DNO		

Errors
E/A - General Safety
E/B - Driving/Parking Errors
E/C - Errors Usually Occurring During Pre-arrival and Arrival
E/D - Errors Usually Occurring During Download/Upload/Service
E/E - Errors Usually Occurring During Pushback/Departure

2. DOWNLOADING ☐ Did not observe this section

Ramp LOSA Observation Form
Observation Number: _____

	Safety Risk N/A, Safe (S), At Risk (AR), Did Not Observe (DNO)	Error Code	Threat Code	Threat Effectively Managed Y/N	Error Outcome 1 Inconsequential 2 Undesired State 3 Additional Error	General Remarks
Beltloader, Cargo, & Baggage						
1 Beltloader approach procedures followed	N/A	S	AR	DNO		
2 Beltloader positioning procedures followed	N/A	S	AR	DNO		
3 Cargo door/sills/locks checked prior to GSE approaching A/C (e.g., frame, sill, depressor strips)	N/A	S	AR	DNO		
4 GSE operated properly (e.g., speed, safety zones, reckless)	N/A	S	AR	DNO		
5 Baggage/package, including specials, properly handled	N/A	S	AR	DNO		
6 All cargo properly transported	N/A	S	AR	DNO		
7 Cargo hold/handling systems visually checked for damage after downloading	N/A	S	AR	DNO		
8 If A/C left unattended, all security procedures followed	N/A	S	AR	DNO		
Container & Container Loader						
9 Container loader approach procedures followed	N/A	S	AR	DNO		
10 Container loader positioning procedures followed	N/A	S	AR	DNO		
11 Container loader (main deck) approach procedures followed	N/A	S	AR	DNO		
12 Container loader (main deck) positioning procedures followed	N/A	S	AR	DNO		
13 Loader/ULD operating procedures followed	N/A	S	AR	DNO		
14 Dolly ULD locks checked during offload	N/A	S	AR	DNO		
15 Dolly locks are properly set prior to approach to container loader	N/A	S	AR	DNO		

Errors
E/A - General Safety
E/B - Driving/Parking Errors
E/C - Errors Usually Occurring During Pre-arrival and Arrival
E/D - Errors Usually Occurring During Download/Upload/Service
E/E - Errors Usually Occurring During Pushback/Departure

3. LAVATORY/POTABLE WATER SERVICE ☐ Did not observe this section

Ramp LOSA Observation Form
Observation Number: _____

	Safety Risk N/A, Safe (S), At Risk (AR), Did Not Observe (DNO)	Error Code	Threat Code	Threat Effectively Managed Y/N	Error Outcome 1 Inconsequential 2 Undesired State 3 Additional Error	General Remarks
Lavatory Service						
1 Lavatory vehicle operating procedures followed	N/A	S	AR	DNO		
2 Lavatory servicing procedures followed	N/A	S	AR	DNO		
3 PPE worn	N/A	S	AR	DNO		
4 Personnel exhibit appropriate work behavior (e.g., no "horseplay")	N/A	S	AR	DNO		
5 Personnel use correct manual handling, ergonomics (e.g., proper lifting techniques)	N/A	S	AR	DNO		
6 Personnel avoid walking where not authorized (e.g., under the fuselage, stepping over towbar, or between carts)	N/A	S	AR	DNO		
7 All traffic regulation procedures followed	N/A	S	AR	DNO		
Potable Water Service						
8 Water vehicle operating procedures followed	N/A	S	AR	DNO		
9 Water servicing procedures followed	N/A	S	AR	DNO		
10 Potable water units kept away from lavatory units or other sources of contamination	N/A	S	AR	DNO		
11 PPE worn	N/A	S	AR	DNO		
12 Personnel exhibit appropriate work behavior (e.g., no "horseplay")	N/A	S	AR	DNO		
13 Personnel use correct manual handling, ergonomics (e.g., proper lifting techniques)	N/A	S	AR	DNO		

Errors
E/A - General Safety
E/B - Driving/Parking Errors
E/C - Errors Usually Occurring During Pre-arrival and Arrival
E/D - Errors Usually Occurring During Download/Upload/Service
E/E - Errors Usually Occurring During Pushback/Departure

Threats
T/A - Aircraft
T/B - Ground Equipment
T/C - Communications/Interactions
T/D - Documents
T/E - Ground Based
T/F - Human Factors
T/G - Environmental Threats

Examples of checklists

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Water, Water Every Where

Providing a supply of fresh water onboard sounds like a simple idea – until it gets complicated.

By Tony Vasko

People can't walk five steps without hydrating themselves with some bottled water. We pay exorbitant prices for water thawed from glaciers or that has bubbled up from the deep. Or so it says on the label. Much of it is just plain tap water, which is – at least I hope – filtered and treated before bottling.

Every catering truck has flats and boxes of bottled water to be loaded on each flight. I remember when it was only the international airlines that carried Evian water and the like – and only then for their first-class passengers.

SIMPLE ENOUGH

Water systems on aircraft were sort of an afterthought. But it seemed simple enough to put a tank in the overhead and run some lines down to feed the faucets. Simple enough – until it gets complicated.

First, we have to fill the tank and that means a fill line and fill valve somewhere on the outside. Easy, right? Then again, airplanes fly to places where travelers are warned to never drink the tap water. So those same travelers might also be skeptical of what is put into the tanks at these remote locations.

On that note, water carts and water trucks are sometimes neglected. There are procedures for disinfecting them that need to be followed.

MORE COMPLICATIONS

So now we have to service the system and make sure the water remains free of contaminants. More complications.

One airplane model I worked on

back in the 1950s that sported triple fins had its water tank located inside the sidewall of the aft baggage compartment. It was fitted with an electric pump to pressurize the tank – high-tech indeed. Lockheed had thoughtfully provided an access panel in the fuselage skin through which you could change the pump. Of course, the door was sized so the pump only fit through the hole at one precise angle, which took some time to discover.

What was more interesting was the algae growth I found when I pulled it out. It would have done an aquarium proud. I found no fish in the tank though. We disinfected the system, but the representative for the South American carrier who owned the aircraft thought we were just running up his bill.

Disinfecting and flushing this water system was no joy. It meant repeatedly filling a tow-around, 100-gallon cart. Since the cart was only fitted with a hand-operated diaphragm pump I spent a lot of effort pumping the water into the tank. Fortunately, it was only going into the belly tank, not up to the ceiling of the aircraft like some other models. Those took some real effort to service.

So if we're going to be disinfecting and flushing, the tank better have a drain line, too. Besides, aircraft also spend a lot of time sitting around waiting – and airports tend to be among the coldest spots on earth. So draining was a must for overnighting in cold climates.

Our simple idea just became really complicated.

SERIOUS PROBLEM

Not draining an aircraft in freezing weather where it cannot be kept heated overnight can have serious consequences. I was called over to LaGuardia to debrief a captain who had made an emergency return due to jammed flight controls. He also had difficulty in lowering his landing gear to boot.

He was rightfully irritated after I brought him out to the aircraft and showed him the cause. A water line under the mid-cabin floor froze during the night and split. There was no evidence of leakage because the line was frozen.

In the morning the APU was cranked and the cabin-heated air began to circulate under the floor. After takeoff, the line thawed and leaked. The water pooled on top of the pressure bulkhead that formed the top of the main gear wheel well. It then, under cabin pressurization, drained through the seals around control cables leading into the wheel well. The water quickly froze around the cables and aileron/spoiler mixer mechanisms and, for good measure, the landing gear control valve.

The captain said he had detected jamming and had to use considerable force. Fortunately, he kept the ailerons moving; ice an inch-thick eventually coated the cables and the mechanism. Not a good thing at all and made for some old-fashioned strong arm piloting to move the controls. The gear was finally lowered by repeatedly jamming the landing gear control handle up and down. Good piloting and luck prevented a more serious incident.

On investigation, I found a ground heater had heated the airplane all night, but the heated air did not circulate under the floor as it does in flight. We ended up installing heater wires inside critical water lines that required running an extension cord from the loading bridge to the aircraft. Nice if you were parked at one; not so good if it was on a hardstand. We bought a lot of extension cords, they regularly got run over by servicing vehicles to their detriment. Overall, it must have worked as I never heard of another incident.

AN INTERESTING THING

One interesting thing is that water did not always flow downhill on aircraft that used gravity feed systems. It used to amaze me that water would not flow from a tank located six feet above in the ceiling that should have flowed down to the faucet in the lavatory. It defied Newton, but usually was caused by airlocks in the system. Pressure systems are not

immune to this either. After an overnight in freezing weather where the system was completely drained it takes a bit of knowledge to put all the valving under the sinks and in the galleys back to the operating position.

There is another reason for no water to flow. My company sent me to the Paris Air one year and allowed me to take my wife. The cargo airline I was working for by then had bought a lot of maintenance from Pan American for our B747 freighters. We got passes from them to fly New York to Paris.

Pan Am was unfortunately in its final death spirals. The aircraft scheduled for our flight went unserviceable, but not to worry. They would combine flights, and because of our priority we got the last two seats. They had to quick turn the B747, which was evident due to the lack of cabin cleaning. We sat in the last row on the port side.

Being in back put us next to the galleys and, of course, the lavs but I

could not complain – we were going to Paris! Reluctantly, the service started and I was resigned to no choice of meals for the service started forward in our cabin. It was going to be the chicken. They were halfway back when I heard the flight attendant in the galley being verbally unhappy.

It seemed the water had run out. During the quick turn, they had neglected to service it. Want to hear pax complaints? Go on a long, fully loaded flight and have the water run out two hours after departure. No coffee, no tea, no hot towels, no washing your hands in the lavs. The bottled stuff ran out quickly as did the wet wipes. The loud complaints did not. ■

ABOUT THE AUTHOR: Tony Vasko worked for 54 years in maintenance. He earned his A&P at the Academy of Aeronautics in 1954 and held his first job at Lockheed Air Service at JFK.



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Extendable Belt Loaders Offer Relief To Baggage Handlers

Incidences of lost time due to back and shoulder injuries in the airline industry are some of the highest in all of private industry.

By Ben Reeves, vice president of sales and marketing, Power Stow Americas

Airlines, airports and ground handlers are increasingly turning to extendable belt-loader technology to improve labor efficiency, reduce turnaround times and lower shoulder and back injuries inside the hold. Several concepts for extendable belt-loader technology have been around for nearly 10 years, but acceptance and demand for extendable belt loaders has increased dramatically over the last few years.

To understand the trend, we have to look deeper at the business case for investing in extendable belt-loader technology. Extendable belt loaders produce their highest rate of return in any one of the four following scenarios.

1 Narrow-body aircraft gate utilization: The majority of narrow-body

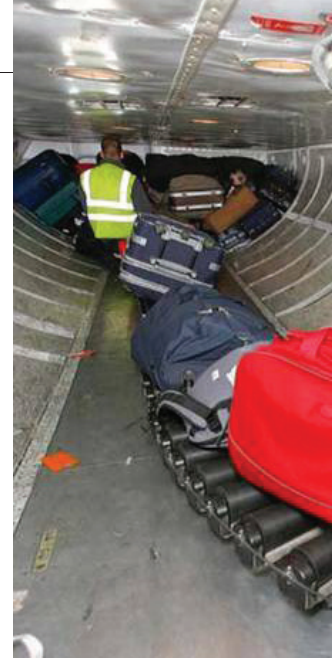
aircraft in use today at major airports require two baggage-loading personnel to be inside the hold to unload and load. Using extendable belt-loader technology eliminates the need for the doorman and, therefore, only requires one person to enter the hold. Highly utilized gates will have two doormen that can be eliminated from the cost structure of the operation.

2 Tight turnaround time combined with heavily loaded aircraft: Airlines and ground handlers that currently use certain types of extendable belt loaders experience as much as a 35 percent decrease in their baggage unloading/loading time. This decrease in time allows operators to provide a quicker turn of the aircraft with the added benefit of doing so with one less person.



A baggage handler and a coal miner have more in common than you might think.

3 Aircraft with onboard loading systems: With the cost of aircraft fuel ever increasing, most airlines have come to the realization that reducing the aircraft weight to a minimum is a



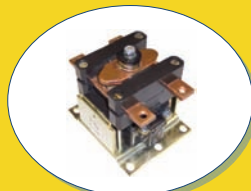
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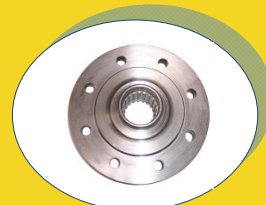
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Extendable belt loaders can improve labor efficiency, reduce turnaround times and lower shoulder and back injuries inside the hold.

key component to cost reduction and profitability. Onboard aircraft loading systems can add more than 1,000 lbs to the weight of the aircraft. Studies have shown that removing such systems can save more than \$100,000 per year per aircraft in fuel cost. In addition, onboard systems have to be maintained by aircraft maintenance personnel and if a system issue is serious enough, could cause an aircraft to be grounded. Extendable belt loaders provide the same benefits as the onboard systems, but are ground-based and eliminate the costs associated with extra fuel burn and aircraft maintenance issues.

4 Heavy cargo, injuries and an aging workforce: Operations that routinely handle heavy or overweight baggage/cargo experience much higher rates of on-the-job shoulder and back injuries inside the hold. Add to that the fact that the average age of ramp personnel continues to increase due to less turnover related to the current employment market. As we all know, the older we get, the more prone we are to hurting ourselves. Extendable belt-loader technology greatly reduces the stresses placed on the human body during unloading/loading inside a hold.

Let's look at this last information and further discuss injuries. Airline

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baggage handler injuries cost millions of dollars annually. Incidences of lost time due to back and shoulder injuries in the airline industry are some of the highest in all of private industry.

A baggage handler in a typical airplane is akin to a coal miner. In fact, according to the U.S. Bureau of Labor Statistics, the incidence of back pain injury for "air transport, scheduled," (in other words, "airline passenger service") exceeded that of coal mining and almost all other industries for which the bureau maintains statistics.

The ceiling height for a Boeing 737 cargo hold is 44 inches, which naturally forces baggage handlers to work continuously in squat, stooped, kneeling or seating postures and often handle luggage at or above shoulder level. On average, a piece of luggage weighs 33 lbs, but many bags weigh more than 70 lbs. This load exceeds the National Institute for Occupational Safety and Health's lifting equation limit for working in optimum working postures and conditions.

What Types Of Work Are Most Likely To Pose Ergonomic Hazards?

A report by the Occupational Safety & Health Administration says musculoskeletal disorders occur most frequently in jobs that involve the following:

- Manual handling,
- Manufacturing and production,
- Heavy lifting,
- Twisting movements, and
- Long hours of working in awkward positions.

With the exception of "manufacturing and production," baggage handlers do everything else all day long.

Other researchers examined the option of enforcing a specific weight limit for luggage, but unless this was adopted by all countries and airlines simultaneously, those that adopted such a rule



would be at a competitive disadvantage.

A literature review published in 2009 by the Health and Safety Executive, an organization in the United Kingdom similar in some cases to this country's Occupational Safety & Health Administration, presented a litany of information related to alternative methods of loading narrow-bodied aircraft that reduced injury to baggage handlers.

HSE surveys provide plenty of evidence that baggage handling is physically demanding:

- 73 percent of baggage handlers reported trouble with their lower back.
- 51 percent reported trouble in their knees.
- 43 percent reported trouble in their shoulders.

The report highlights a range of existing and emerging devices providing mechanical assistance (and manual handling risk reduction), to the baggage handling process.

"There is good evidence for the benefit of mechanical assistance devices in terms of reducing physical workload, manual handling and musculoskeletal risks associated with baggage handling work on the ramp," the report concluded.

Most of the definitive work in this area was done by researcher G. Dell. Dell reviewed the manual handling activities of ramp-based workers and presented evidence that each item of passenger baggage is typically manually handled up to 10 times for each journey (up to five times at each end.)

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Extendable belt loaders reportedly reduce the amount of manual exertion and lifting involved in stacking and unstacking luggage.



Interestingly, the HSE notes, in a section on the history of the airline baggage handling, Dell presents images of operations from 1926; 1940; 1955; and 2000. "The nature of the *manual* operation has not changed significantly, although the amount of air travel, and, hence, the extent and frequency of the baggage handling operation has increased," the report says.

When adverse work conditions exist, engineering means of changing the condition should be explored.

Extendable beltloaders reportedly significantly reduce the amount of manual exertion involved in the stacking and unstacking of luggage. No system does away with the fact that the baggage handler needs to kneel, sit or squat in the confines of a hold. However, it is the combination of heavy handling and twisting while in a kneeling posture that presents the greatest risk of injuries on the job. ■

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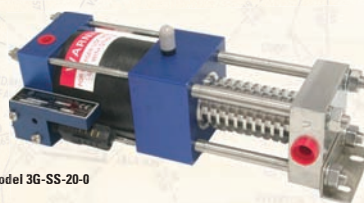
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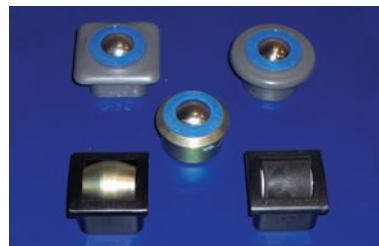


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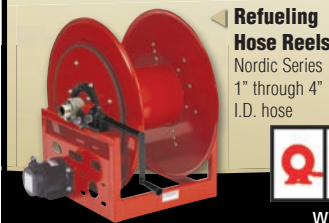
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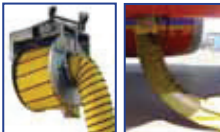
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Ford 4.2 L Tips And Tricks

Our motto for these systems needs to be the old Snap-on Tools pitch: 'Test ... Don't Guess!'

By Scott Strong

The 4.2L Ford fuel-injected gasoline engine has done a lot to make GSE easier to start and more reliable. They start just like the vehicles our ramp workers drive every day – no pumping the pedal to set the choke or take the choke off. All of this is now done electronically.

Emergency cut-off features that can be programmed into the unit's computer also help maintain the equipment. When the engine hits 220 degrees, for example, the computer can limit the amount of throttle the operator can use in an attempt to keep the unit from overheating. If the engine still overheats or the oil pressure drops, the engine shuts off to protect itself. This keeps us from having to rely on the operator to look at and understand the gauges on the dash.

That's all good news. The not-so-good news is that for those of us who have spent a long time working on carbureted Ford 300s, these new fuel systems can be a real puzzle. I cannot tell you how many phone calls I have with GSE techs around the country that start with "Well, the code was for 'X' so I replaced the fuel pump, the fuel filter, the throttle position sensor, the oxygen sensor"

I can only imagine how many parts were replaced that never needed to be replaced. We really have to take a look at how we are diagnosing these systems and stop guessing. The old Snap-on Tools diagnostic sales pitch really needs to be our motto when it comes to repairing drivability problems on 4.2L systems: "Test ... Don't Guess!"

A NEW SERIES

This is the first in a series of "Maintenance Matters" columns that will delve into how this fuel delivery system works and provide some tips for diagnosing the problems associated with some common drivability issues.

As we all know, information is the key to being able to diagnose problems with this system. There is no substitute for the proper description and operation articles, wiring diagrams and trouble code charts.

If you've spent a long time working on carbureted Ford 300s, these new fuel systems can be a real puzzle.

Most manufacturers include a subsection on the 4.2L and related diagnostics information in their equipment manuals. The good news is that this system is almost universal no matter the manufacturer. Although power supply wiring may differ, for the most part, the codes, operation and engine wiring harnesses are all the same. If you have the diagnostic information in a manual from one GSE manufacturer, it will certainly help to figure out the issues on a piece of equipment made by another.

Remember, the trouble codes and internal Engine Control Module programming all come from Ford. The equipment manufacturer is able to customize features, such as max engine RPM, governed vehicle speed and whether the engine will be protected from low oil or overheating.

Other than these differences, the system works the same in all types of GSE. Once you learn how to work on a Tug 660 beltloader, you will be able to apply this knowledge directly to a Harlan cargo tractor.

The only real additional information that you need is to determine where the code switch is located. Here's a tip: Check the operation of the code switch. Because of where these switches are located and the weather that they are often exposed to, it's common to find these toggle switches not working electrically anymore. This results in an erroneous "no code" situation.

Remember, if the engine light is not doing what you think it should, remove the switch from the circuit and perform a resistance check on it. If the switch has gone bad, simply jumping the two wires together will put the ECM into diagnostic mode and allow you to use the engine light to determine what if any trouble codes are stored.

Next issue we will talk about the theory behind how these systems work and what the sensors' jobs are. After that we will delve into how to pull codes and diagnose problems. Throughout this series I will also try to include some quick common failure repairs you can mentally file away just in case they come in handy when working on one of these units. ■

ABOUT THE AUTHOR: *Scott Strong is the national manager, Global Aviation Services LLC, a GSE and facilities maintenance service provider with 15 locations throughout the country.*



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