DEFUSING the Ramp

Progress report on FSF efforts to stem the toll of ground accidents.

BY MARK LACAGNINA

© Aircraftfire/Airliners.net

© Rogério Carvalho/Airliners.net

Airport ramps, or aprons, are busy and dangerous places, confined areas in which aircraft, vehicles and people are in constant motion in all types of weather. Turnover among personnel typically is high, training can be spotty, and standard operating procedures may be nonexistent or ignored. Often, the focus on schedule overshadows concerns about safety.

Ramp accidents happen more frequently than most people in the aviation industry realize, and the toll is astonishing.

Five years ago, Flight Safety Foundation (FSF) was asked by a member, an airline organization, for help in improving ramp safety. "A lot of people were being injured, and damage was being done to their airplanes on the ramp," said Robert H. Vandel, FSF executive vice president. "So, we set out to see what we could do to eliminate the problem."

The Foundation launched the Ground Accident Prevention (GAP) program under the chairmanship of Vandel and Earl F. Weener, Ph.D., a Foundation Fellow. The focus of the program was defined as "accidents and incidents that occur on airport ramps and adjacent taxiways, and during movement of aircraft into and out of hangars, and that directly affect airport operations and/or result in injuries or damage to aircraft, facilities or ground-support equipment."

Weener recalls that, when the program was initiated, there were various perceptions

© Marcel Drescher/Airliners.net

© Jan Einar Fardal/Airliners.net

This page: an A330 struck by a catering truck (left); a fuel truck driven into the nose of a military Falcon 20. Opposite page: an MD-82's right wing severed by a construction truck (top); a catering vehicle with stabilizers not deployed toppled onto the wing and nacelle of an A340 (bottom).

of the problem. "Most airlines had an incomplete picture of the problem because the costs were 'hidden,'" he said. "The costs of repairing airplanes damaged on the ramp were hidden in the costs of maintenance, the costs of flight diversions and cancellations were recorded in other categories, and so on. Some airlines were tracking the data, so at some level they did know about the problem — but not at a high-enough level to effect the needed changes. Very few had a true picture of what was happening on their ramps."

Multibillion-Dollar Problem

No one knew the magnitude of the problem until a rough estimate of US$5 billion a year emerged from brainstorming sessions that preceded the launch of the GAP program. The estimate was derived by extrapolation from data provided by an airline and represented the direct costs of repairing aircraft damaged on the ramp and an estimate of the indirect costs of schedule disruptions, out-of-service aircraft and associated costs. It included $4 billion for the airline industry worldwide and $1 billion for corporate aircraft operators.

Only a fraction of the losses are covered by insurance. One airline told the Foundation that of the 274 accidents that occurred during ramp operations, only one resulted in direct costs that exceeded the deductible limit of its insurance coverage. The average cost of the ramp accidents was $250,000. The airline's deductible limits were typical of the industry: $1 million for a widebody airplane, $750,000 for a new narrowbody airplane and $500,000 for an older narrowbody.

Vandel said that the $5 billion cost estimate helped focus attention on the problem. "The monetary losses were being accepted as a cost of doing business and really were not seen as stemming from a safety problem on the ramp," he said.

The initial estimate, however, did not include the indirect costs of personnel injury on the ramp. As the team refined the cost model, they found that the combined direct and indirect costs for medical treatment and related factors doubled the initial estimate.

GAP program activities, including collection and analysis of data and the development of the industry's first ramp-accident cost model, enabled the Foundation to refine its estimate and to include indirect costs of ramp accidents. The current estimate is that ramp accidents are costing major airlines worldwide at least $10 billion a year. "This is a staggering sum, yet the estimate is conservative," Vandel said. "It applies to about 90 percent of the world's airlines. We do not have the data yet to refine the estimate

The current estimate is that ramp accidents are costing major airlines worldwide at least $10 billion a year.

for corporate aircraft operators or to develop an estimate for regional airlines."

Cost Model

The GAP cost model (Figure 1) is among several e-tools now available free of charge on the Foundation's Web site.[1] The cost model provides users — air carriers and airports, for example — with estimates of their annual costs related to ramp accidents and incidents.

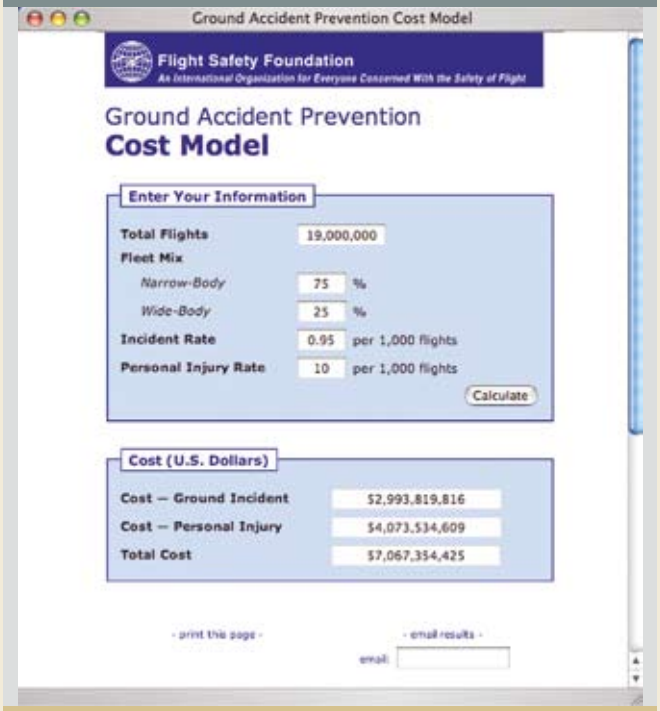
Cost-model calculations are based on the user's input of total annual flights, the percentage of narrowbody and widebody airplanes in its fleet or operation, and the accident/incident and injury rates per 1,000 flights. The user can print the calculated estimates or transfer them by e-mail.

"The calculations are automatic and remain on the user's personal computer," Weener said. "No information is transferred to the FSF Web site." The calculations are based on actual data collected by the GAP team.

Development of a standardized system for collecting and analyzing data was one of the most important tasks identified during the first meetings of the GAP program steering team. The results are data-collection and analysis tools that include a computer spreadsheet with drop-down menus for ease of use.[2]

Since 2005, the Foundation has been collecting data under legal confidentiality agreements with aircraft operators, ground-service providers and others involved in ramp operations worldwide. Efforts to secure data sources continue.

Ground Accident Cost Model



Source: Flight Safety Foundation

Figure 1

Initial Indications

Using activity data developed by the International Air Transport Association (IATA), the Foundation estimates that 27,000 ramp accidents and incidents — one per 1,000 departures — occur worldwide every year, and about 243,000 people are injured. The injury rate is 9 per 1,000 departures.

Initial analyses of GAP data collected to date indicate that contact between airplanes and ground-service equipment — baggage loaders, airbridges, catering vehicles, fuel trucks, etc. — accounts for more than 80 percent of ramp accidents/incidents.

Figure 2 shows where airplanes are being damaged by ground-service equipment. The initial indication is that damage most frequently is done to cargo doors, the fuselage and wing-mounted engines.

Ramp accidents/incidents involving contact between airplanes is a distant second, at slightly more than 10 percent, followed by contact between ground-service equipment, equipment and facilities, and airplanes and facilities.

Vandel said that the GAP team believes that as more data are collected, they will show a greater frequency of ramp accidents and incidents involving contact between ground-service equipment, and between ground-service equipment and facilities.

"The GAP team already is seeing human factors, particularly noncompliance with standard operating procedures, emerging as a dominant factor in ramp accidents and incidents," Weener said. "Malfunction and inadequate design of ground-service equipment, weather conditions

and faulty communication are other, lesser, factors indicated by the data in hand."

Vandel and Weener stress that the Foundation continues to solicit robust sources of data on ramp accidents/incidents and injuries. "Unfortunately, it is not like the Foundation's CFIT/ALAR [controlled flight into terrain/approach and landing accident reduction] projects, where we were able to gather data on virtually all the accidents and incidents," Weener said. "The GAP data on hand, although not inclusive, can readily be used for troubleshooting, to point out targets of opportunity. We need more data to really focus on this problem and understand what is going on so that we can address mitigation and intervention actions more accurately."

Tools on Line

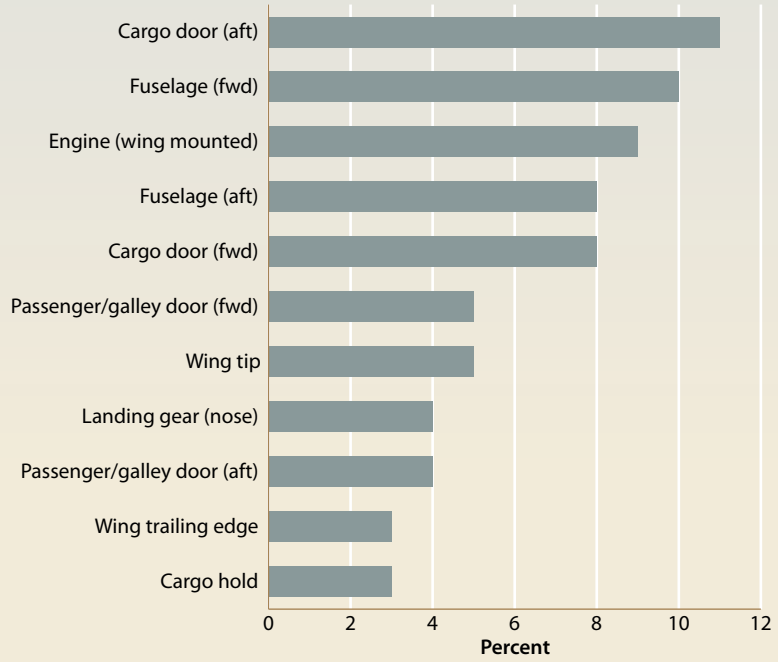
In addition to the cost model, GAP e-tools available at press time included three instructional videos, leadership tip sheets and links to articles from FSF publications related to ramp operations and safety. Several other GAP e-tools are in the works.

The videos show best practices for the safe operation of tow vehicles, for towing corporate aircraft and for general ramp safety. Each video runs approximately 12 minutes.

There are five leadership tip sheets, each a one-page briefing designed to be presented to senior managers to heighten their awareness of the ramp safety problem and its effect on the organization's operations and economic performance. "We recognized at the beginning that one of our most difficult tasks would be 'selling' ramp safety to top executives and getting them to buy into it," Vandel said. "Our cost estimates have attracted a lot of attention. The tip sheets are intended to help top executives lead their organization's efforts to improve ramp safety."

The first tip sheet includes a series of questions that senior managers should ask their staff about what is being done to prevent ramp accidents. "The important concept here is that you show interest in ramp safety," the tip sheet says. "A few simple questions posed by senior management can go a long way in preventing ground accidents."

Aircraft Damage Location



fwd = forward

Source: Flight Safety Foundation

Figure 2

The other tip sheets discuss the development of a company safety policy; the importance of including ramp operations in the company's safety management system (SMS); roles and responsibilities of senior managers, line managers and employees in an effective SMS; and the development and use of ramp safety performance metrics.

Among GAP e-tools that were being finalized at press time was *Ramp Operational Safety Procedures*, a manual template for ramp supervisors. The template, presented in Microsoft Word format to facilitate customization by the user, includes industry best practices and guidelines for a wide range of ramp procedures. "Some airlines do not have written standard operating procedures," Vandel said. "This will provide the basis for establishing them."

Other e-tools in the works included an inventory of ramp best practices; ramp-operations-oriented safety tactics and tools, such as threat and error management, safety audits, incentive and

recognition programs, training plans and materials, and the Boeing ramp error decision aid.

"We are also trying to identify and encourage technical solutions to the ramp safety problem and make people aware of them," Vandel said. "This is something that we'll be doing with our Web site." For example, he cited an automated airbridge that uses infrared sensors to prevent damage to the aircraft during deployment, advanced docking visual guidance systems (see "Graceful Arrivals," p. 42) and vacuum devices that help workers avoid injury while picking up and sorting baggage.

Program in Transition

Plans are underway for the transition of the GAP program to its third phase, which will focus on implementation. The first phase involved the sharing of experience and knowledge by industry specialists assembled as the GAP steering team and five working groups — Awareness and Industry Relations, Data Collection and Analysis, Education and Training, Facilities, Equipment and Operations, and Management and Leadership Practices — to identify the safety issues and interventions that would build on work already done by organizations including the Airports Council International, Australasian Aviation Ground Safety Council, European Regions Airline Association, IATA, International Civil Aviation Organization, National Air Transportation Association, National Business Aviation Association, Regional Airline Association and several others.

In the second phase, the GAP team's work moved from experience-driven to data-driven. The cost model was developed and data analyses refined the program's focus and work on the e-tools. "We saw the issues and how disparate they are," Weener said. "We knew that we could effect change if we explored the data and got a good understanding of the problem."

In the third phase, which will begin this year, the name of the program might be changed to the Ground Incident Risks Management Program, with emphasis on continued data collection and expansion of data sources, database refinement, preparation and distribution of data-analysis reports, and management and refreshment of e-tool materials.

"The successful implementation of the final products will depend on the involvement of everyone concerned with ramp safety," Vandel said. "We expect to see measurable safety improvements. We have a problem. By working together, we can solve this problem." ●

An A320 was being pushed back from the gate when its tail struck the right wing of a 777.

© Weimeng/Airliners.net

Notes

1. Flight Safety Foundation (FSF), Technical Initiatives, Ground Accident Prevention <http://flightsafety.org/gap_home.html>.
2. The FSF Ground Accident Data Collection Tool is available free of charge on compact disc. Contact Millicent Wheeler, FSF technical programs specialist, at +1 703.739.6700 extension 109, <wheeler@flightsafety.org>.