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Independent Studies

During the past few years, the NBAA as well as insurance companies, ICAO and the IATA conducted Aircraft Ground Damage Prevention Studies to identify most common issues and to incentivize best practices.

Ground damage incidents (accidents in which FBO, MRO, and corporate flight department personnel cause damage to an aircraft on the ground) occur as ground crews are working on, or around, an aircraft on the ground, either on the ramp, apron, or at a maintenance facility. Each incident can be quite costly to the FBO, MRO, or flight department, with costs both tangible (significant repair costs and lost revenue) and intangible (displeased aircraft owners, passenger inconvenience, increased maintenance workload, etc.).

All FBOs, MROs, and corporate flight departments have a financial incentive to reduce the number of ground damage incidents that occur. One of the most difficult tasks has been to utilize the information collected in their existing error reporting systems (if available at all) to determine the common latent failures which contribute to typical ground damage incidents.

In the latest NBAA study conducted about this issue a few years ago, hundreds of ground damage incidents from major FBOs were reviewed to determine the active and latent failures. Twelve distinct hazard patterns (representing the active failures) were identified, with three hazard patterns accounting for 81% of all ground damage incidents. Nine major latent failures were identified, and the relationships between the hazard patterns and latent failures were examined in depth. This type of analysis provides a good foundation to develop and implement intervention strategies.

Best Practices Prevent Damage

The renowned and highly reputable Business Aviation Consulting Group VanAllen located in Peachtree City, GA pioneered the concept of “Business Aviation Best Practices”. Based on their studies and findings, the majority of business aviation service providers (private and commercial) strive to perform to Best Practice’s levels. But based on their independent observations, the vast majority do not.

Most business aviation professionals and their organizations work hard to “do things right”, and they succeed most of the time. However, they are often not doing enough of the “right things” that create “Best Practices” results, or better. Part of their challenge is there is no coherent and widely accepted definition of what it takes to achieve “Best Practices.”

A Multimillion US$ Risk for General Aviation

The overall intention is to reduce aircraft ground damage risk by providing “best practices” interventions and to recommend new technologies that can effectively assist to prevent damage. Overall, many costs are uninsured and must be paid out-of-pocket. It’s a significant risk and estimated at over $100 million/year in direct costs just for General Aviation operators in the US alone. Airlines are not included in this cost estimation.
Traditional Practices are more than often the Reason for Aircraft Tow Accidents

Based on data developed by the International Air Transport Association (IATA), the Foundation estimates that 27,000 ramp accidents and incidents occur worldwide every year. About 243,000 people are injured each year in these accidents and incidents. According to IATA those ramp accidents cost major airlines worldwide at least US$10 billion a year.

Just in the United States direct costs associated with aircraft damage on the apron (incl. all airlines), in maintenance and hangar facilities is estimated upwards of US$1.2 billion a year. Factoring in the indirect costs of the aircraft being out of service, increased insurance premiums, temporary replacement, injuries and other associated expenses, that number approaches $5 billion.

The Foundation decided this was a safety threat that had to be addressed. IATA launched the Ground Accident Prevention (GAP) program in response.

The GAP program developed information and practices intended to eliminate accidents and incidents on airport ramps (aprons) and adjacent taxiways, and during the movement of aircraft into and out of hangars. Further, much more information was compiled on aircraft damages caused by GSE; which types of GSE were involved in aircraft damages most often; which types of aircraft are most frequently exposed to damage by GSE; and the factors involved in recurring incidents.

Only those incidents which were caused by ground support equipment used for aircraft handling and servicing and for line maintenance were looked at. Damage that occurred during heavy maintenance or aircraft overhaul activity, as well as taxi incidents or accidents have not been included.

Poor equipment not suitable for the task being performed, more than often contributes to an incident. Insufficient training and mechanical problems are also reasons why incidents and accidents occur.

Case Study Falcon Business Jet

Two ground crew employees were positioning a Falcon 50 into a hangar when the left wing tip struck a golf cart. One employee was operating the Lektro tug and the other employee was acting as the wing walker. The aircraft was being nosed into the hangar. There was a golf cart being charged on the left side of the hangar and a car was parked on the right side of the hangar. As the aircraft was being pulled in, the wing walker was at the rear of the aircraft going between the right wing and left wing to monitor clearance. As the right wing cleared the car the wing walker started to move back to the left wing when the left wing tip struck the golf cart causing significant damage to the aircraft and the cart.

Case Study Cessna 425 Corsair

An employee used a Lektro tug to tow a Cessna 425 Corsair to a hangar. He installed the front gate guard on the bucket of the Lektro. The aircraft was towed to and placed in the common hangar. The operator of the Lektro unit lowered the bucket and released the winch strap prior to chocking the aircraft. The C 425 rolled backwards into the front gate guard crushing the nose wheel fender which covers the rear of the nose wheel. Both the fender and brackets were broken.

Case Study King Air 200

A tow was initiated with a traditional tug using a tow bar. The tow driver oversteered the nose wheel while maneuvering out of the hangar. Extensive damage was caused to the entire nose wheel assembly.

Case Study Hawker Business Jet

A ground crew attempted to tow a Hawker 700 with a traditional Eagle tug using a tow bar. The tow driver applied his brakes and the nose gear assembly completely collapsed causing significant damage to the aircraft.

Case Study Cessna 310

A ground crew attempted to tow a C310 with an SUV vehicle using a tow bar. The SUV driver accelerated and the nose gear assembly completely collapsed causing significant damage to the aircraft.
An independent Study provides an Insight into Aircraft Tow Accidents

The renowned and highly reputable Business Aviation Consulting Group VanAllen located in Peachtree City, GA conducted a survey covering a 24-month span, from 2014 to 2015. Eighty aviation departments & FBOs participated.

- 63% of the participants did NOT have a ground event during the study period.
- 37% participants had one or more events during the study period.
- There were a total of 64 events during the study period’s 168,810 aircraft legs.
- That is a rate of 0.04% events per flight leg.
- Business Aviation has a fatal accident rate of about 0.00001%. In other words you are about 3,800 times more likely to have a ground event than a fatal accident.
- Put another way, the study group had a ground event rate of one per about every 4,000 flight hours. That means, if you handle eight aircraft, you have a 50% probability of having a ground event every 0.5 years.

What are the most common sources of ground events? The study group indicated:

- 50% of events were “hangar rash” during hangar towing
- 33% of events were towing accidents.
- 10% of events were ground vehicle / aircraft collisions.
- 7% of events occurred during taxiing.

What is being done to address the ground event rate?

- The insurers, NATA, IBAC, NBAA, FSF, major FBO chains and numerous ground support vendors are conducting awareness, training and certification programs.
- NetJets has led the industry by creating contractual ground handling training and procedural requirements for FBOs that service their business.

Has that been enough?

- There is data that suggests the rate of events is declining. However, FBOs and flight department continue to be thousands of times more likely to have a ground event than a flight event.

The VanAllen Study concludes that modern smart robotic (remote controlled) Aircraft Tugs are helping to reduce Incidents and prevent Accidents

The threats remain very real. Contributing risks remain numerous. For example:

- Towing an aircraft is not a high paying job.
- FBO high turnover of personnel.
- Attitude: The FBO is insured, “An occasional wingtip is inevitable. It’s why I have insurance.”
- The lack of supervision. Management is spread too thin.
- The lack of capital resources (inadequate tugs, tow bars, etc.).
- There is financial pressure to squeeze aircraft into a full hangar/ramp.
- There is event crowding and time stresses.
- Ramp access is under-controlled.
- FBO training is uneven.
- FBO staff capacity is situationally inadequate.
- Facility lighting is inadequate.
- It’s too easy for crews to not take responsibility.
- Inadequate Aviation Department staffing.
- Inadequate Aviation Department Ground Operations standards and practices.

What is the answer according to the Study?

- SMART ROBOTIC TUGS

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