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THE PERSPECTIVES OF THE AIR LINE PILOTS ASSOCIATION ON STRIKES OF WILDLIFE BY AIRCRAFT

Problem

Strikes of wildlife by aircraft cause thousands of life-threatening incidents, and hundreds of millions of dollars worth of damage to aircraft every year. This hazard is largely preventable, but it has not been properly addressed to date for a variety of reasons. ALPA believes that action should be taken *now* before a catastrophe occurs.

Background

Collisions between aircraft and wildlife are increasing in frequency in North America due to growth in the number of migratory birds and other wildlife and the increased numbers of aircraft operations. This threat to human safety has manifested itself in several fatal strikes between aircraft and wildlife as at least 68 people have died as a result of wildlife-related accidents in the U.S. and Europe since 1995. In addition to these fatal events, approximately 2,300 non-fatal civil aviation wildlife strikes are reported annually in the U.S.; it is estimated that 80% of strikes are not reported. Wildlife strikes cost the U.S. civil aviation industry more than \$300 million annually according to Ms. Garvey. Ninety seven (97) percent of these strikes are caused by bird species which are federally protected under the Migratory Bird Treaty Act; birds and other animals often find habitat and refuge at and around airports because of federal protections.

The significance of wildlife hazards, and the need for effective measures to mitigate them, are not well recognized by the aviation industry, federal regulators or the traveling public. However, recent television reports on the dangers posed to aviation safety by wildlife may help build consensus on the need for prompt action in this regard (reference videotape).

Current Response to the Hazard

The FAA has a standard form (5200-7) for the voluntary reporting of bird and other wildlife strikes with aircraft. Although FAA personnel have monitored these reports since 1965 to determine general patterns in wildlife strikes, no quantitative analyses of these data were conducted until 1995. In April of that year, the USDA's National Wildlife Research Center, through an interagency agreement with the FAA, initiated a project to study wildlife strike reports. A document entitled "Wildlife Strikes to Civil Aircraft in the United States, 1992-1996," was published August 1997 as an outcome of that agreement. This report was recently updated to include data on years 1991-1997 and it points out that wildlife strikes increased 53 percent between those years. (The Flight Safety Foundation has just published a special double issue on the FAA/USDA report which is contained in Vol. 25, No. 1-2).

Federal Aviation Regulations require certificated airports to conduct ecological studies when air carriers experience multiple bird strikes, have damaging collisions with wildlife, or observe wildlife in size or numbers than could cause collisions. When such an event occurs, the Federal Aviation Administration (FAA) requires action, but does not have ample wildlife management staff expertise to assist the airports. Therefore, FAA often refers airports to the U.S. Department of Agriculture's Wildlife Services (WS) biologists who have the expertise, but are not funded, to provide these services. APHIS has developed wildlife hazard evaluations and management plans, and implemented these plans for some airports with the costs being fully reimbursed by the airports. As a result, wildlife-aircraft strikes have been reduced significantly at specific locations. For example, at John F. Kennedy International Airport, gull strikes have been reduced by over 75 percent and at O'Hare International Airport, bird and deer strikes have been reduced by 70 to 100 percent, respectfully. However, many airports have ongoing wildlife problems which have not been addressed in such a proactive manner.

Further, most airlines have not yet taken steps to safeguard against wildlife strikes. Most commercial airline pilots are not trained on wildlife avoidance and FAA guidance to pilots on this subject is not well developed.

Recommendations

1. Create a multi-year authorization of at least \$450,000 per year for wildlife hazard mitigation measures and management of the FAA's wildlife strike data base.
2. Create a multi-year authorization of at least \$600,000 per year for the federal government to perform wildlife surveys at airports.
3. Educate all pertinent members of industry and government on this problem. Formal education should be given to crew members at their annual recurrent training, along with guidance on how to mitigate this hazard (see attached ALPA-guidance for flight crews). This training should be similar to the FAA mandated training on wind shears, bomb threats, de-icing, and other aviation hazards. Airport certification inspectors should receive formal training on wildlife mitigation plans so that their inspections of airports requires evidence of an effective plan. Air traffic controllers should review, in their periodic training, FAA Order 7110.65, paragraph 2-1-22.
4. Mandatory reporting, such as is done in most western European countries, should be immediately implemented. Any party, whether pilot, mechanic, airport operations personnel or air traffic controller, with evidence of wildlife hazards should make a report. Without the data it is impossible to track and quantify the problem. An FAA wildlife strike database and reporting system is already in place and capable of handling increased reporting responsibilities. All air carriers have a safety department in place which currently collects similar data, but only two air carriers are reporting their strikes.

5. All airports should immediately conduct a survey of their airport to identify wildlife attractants on the airport. Federal funds should be made available to help mitigate these attractants.
6. The FAA should issue an Advisory Circular on mitigating wildlife hazards on airports, similar to the documents developed on this subject by Transport Canada.
7. Congress should create appropriations for wildlife hazards research. This research and its funding should be administered by the US Dept. of Agriculture Wildlife Services, which has not only the facility and experts to handle such research but view it as an urgent matter under their animal damage control mandate.
8. The FAA Technical Center should spend the \$800,000 Congress authorized for wildlife hazard research and mitigation on wildlife hazard mitigation instead of the \$200,000 the FAA has elected to spend on the hazard.
9. An intra-government agreement should be immediately entered into by the FAA, USDA, EPA, Fish & Wildlife Services and Army Corps of Engineers, wherein public safety matters can be expeditiously resolved when there are conflicting federal rules or laws, such as wetlands on airports which serve as wildlife attractants. The MOU should also designate airports and the areas around them as “wildlife incompatible” for the protection of both the traveling public and animals.
10. Engine certification standards should be reflective of the current and foreseeable threat. Some methods of increasing engine robustness in the future as aviation and wildlife populations grow should be included in the NPRM on engine certification for bird ingestion currently under consideration by the FAA.
11. The FAA Air Traffic Services should abandon its test programs for high-speed flight below 10,000 feet in areas of known bird activity. The severe damage to a Delta 727 departing Houston under this program adequately points out the huge hole in the nation's safety net with regard to high-speed encounters with wildlife. Until either aircraft and engines are strengthened or other mitigation actions are taken, such as the use of Nexrad radar or air traffic approach control radars to detect large flocks of wildlife and guide aircraft around these hazards, high speed flight at low altitude should be avoided. Note: the potential for damage to an aircraft rises exponentially with speed ($\text{kinetic energy} = 1/2 \text{ mass} \times \text{velocity squared}$).
12. The FAA Air Traffic Services should make use of all technology currently available, i.e., Nexrad radar, approach control radars, etc., to warn crews of imminent hazards. Air traffic controllers should be educated as to the threat to public safety and required to comply with FAA Order 7110.65 paragraph 2-1-22 and issue timely warnings to crews just as they issue wind shear alerts, braking action reports, etc.

ADVICE TO FLIGHT CREWS CONCERNING THE WILDLIFE HAZARD TO AIRCRAFT

Prior to Takeoff

- **If you see wildlife such as birds or deer on or near the runway, do not land or take off on that runway until the wildlife are safely dispersed** (a delay may be required which is similar in length to that experienced if thunderstorm activity were present in your flight path). In the U.S., the airport manager is responsible under FAR Part 139 to mitigate wildlife hazards on the airport. Many other nations have similar regulations or requirements of airport management to mitigate wildlife hazards. The airport manager should have a plan of action and operations people who are trained on techniques for wildlife dispersal and available to do so.
- Do not expect that birds will be responsive to actions you may take to hasten their departure. When loafing on the ground, birds face into the wind and, therefore, will probably not see your aircraft as it enters the runway or its lights. Airborne weather radar has no demonstrated effect on birds because they do not hear in the x-band frequency. While birds have acute hearing, there is no evidence that they associate noise, such as the spooling up of a jet engine, with any threat – do not expect, therefore, that the spooling up of engines will cause birds to take flight.
- U.S. pilots are responsible under FAR Part 91 to “...see what can be seen and separate his aircraft from obstructions and hazards, including birds.”¹ Therefore, prior to departure, look for wildlife while scanning the runway for other hazards and respond to sightings or verbal warnings of wildlife as you would to other aviation hazards.
- Promptly notify Air Traffic Control personnel when observing wildlife hazards on the airport or in flight. Although paragraph 2-1-22 of FAA Order 7110.65, the Controller’s Handbook, requires controllers to issue advisory information on reported bird activity, including type of birds, location and direction of flight, use the word “Pirap” in your report to ensure that controllers are aware that they should alert other aircraft of the hazard.
- When taking off in a string of departures, such as is common at a hub, be particularly cautious when wildlife are in the vicinity. The lead or second aircraft may frighten feeding or loafing birds into becoming airborne over the runway or departure area, becoming a collision risk for following aircraft. This scenario was one of the causal factors in the crash of an E-3 (B-707) in Alaska in 1995. Birds may attempt to return to the spot on the airport from which they were frightened by going into a “holding pattern” over the airport to wait.

¹ Safeco Insurance v. City of Watertown; USDC, Dist. of S. Dakota, 1981

Therefore, if the lead aircraft scares flocks of birds into becoming airborne, wait until the flock has cleared the area prior to attempting takeoff.

Inflight

- Over 90% of bird strikes happen below an altitude of 2,300 feet. If taking off in an area of high bird activity, climb as expeditiously as possible. If en route and suddenly confronted with birds, pull up rapidly, consistent with good piloting technique. Birds, when confronted with a collision risk, tend to tuck their wings and dive away from the intruder. However, expect that birds will turn in random directions to avoid a collision when they are close to the ground but they will not descend.
- Consider slowing down if confronted with bird activity. If a collision occurs, a slower speed may minimize the damage as the damaging force is determined by mass times velocity squared. Slower speeds will give the birds more time to react and avoid a collision.
- If wildlife are reported on or near the active runway, request another runway. Avoid flying over locations of known wildlife attractants. Birds like bodies of water, such as airport retention ponds, lakes and seashores. Consider requesting a different route if your assigned route carries you over or near wildlife activity.

Aircraft Certification

- Although designed to be very strong in many ways, modern aircraft are not capable of protecting the pilot from all wildlife hazards. All modern aircraft fuselages have been penetrated by birds – the B-737 and B-727 appear most susceptible to bird penetrations, especially around the nose area. In 1997, three crew members were injured in three separate events when birds struck their cockpit windows. Although the windows were not penetrated, per se, the pilots were injured when the inner pane shattered and showered the pilots with glass shards.
- No jet engine currently operating is certified to ingest even one large goose and continue operating. Geese and swans are social animals and move in flocks. The seriousness of an encounter with large wildlife such as geese, swans, eagles, vultures, etc., cannot be overstated. However, smaller flocking wildlife, such as starlings, which have high body density and often flock by the hundreds or thousands, may have the same effect upon aircraft engines. Engines are certified as a type, not as a system with a particular aircraft. If sufficient number of wildlife are encountered, they can and have damaged engines to the point that they must be shut down, or continue operating but with less thrust available than is necessary to remain airborne.

Bird Migration

- In North America, a migration of over 300 million birds takes place in the spring and fall each year. The four main flyways, namely the Atlantic, Pacific, Mississippi and Central, follow both coastlines, the Mississippi River and the central plains east of the Rockies.

Weather is the key to the start of migration – Nexrad radar can display thousands of flocks of birds headed south in the fall and paralleling strong cold fronts as they move across the country. Migrating birds will often wait on the ground for days for favorable winds aloft. During migration, waterfowl will fly both day and night, depending on weather and winds, and typically as high as 10,000 feet. This semi-annual migration creates additional hazards to aviation as migrating birds join resident airport birds and increase the likelihood of conflict with aircraft.

- Although spring and fall migrations create two peaks of unusual hazards, the other period of increased hazard is late summer as the inexperienced fledglings begin flying and the adult birds molt, shedding their flight feathers, thereby reducing their maneuverability.

Report Wildlife Hazards

If you encounter wildlife hazards or experience a strike with birds or other wildlife in the U.S., submit the appropriate company safety report and an FAA Form 5200-7 Bird Strike Report, in addition to a NASA ASRS report. Canadian pilots' wildlife strike reports should be made on the Transport Canada Bird/Wildlife Strike Report form, #51-0272 (6-97). The toll free number is (888) 282-BIRD and the Web address is: <http://www.tc.gc.ca/aviation/wildlife.htm>. Reporting can be done on the web site.

- These reports should be submitted even if no damage is done to your aircraft because they are the basis for documenting problems and for requesting action from appropriate authorities to mitigate wildlife hazards. Without the reports it is difficult or impossible to substantiate the need for improvements.

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