ACRP Problem Statement: 15-04-03

Wingtip Collisions on the Ground

Recommended Funding Amount: $400,000

ACRP Staff Comments

No staff comments.

TRB Aviation Group Committee Comments

AIRCRAFT/AIRPORT COMPATIBILITY: The research seems useful, and a distinction should be made between hardstands and contact gates. It is timely in that wingtip collisions are continuing to make news, but this may be more of an operational question than a geometry question.

Review Panel Comments

Recommended. Some of these incidents could potentially shut down operations at airports. Costs of damage and loss of life could occur. This is currently a very significant issue. The value of the proposed research may extend beyond large aircraft. The duration of the project could be reduced to 18 months.
Wingtip Collisions on the Ground

ACRP Problem Statement

Developed from Focus Group Session on February 6, 2013
Revised March 2014
TRB Aircraft/Airport Compatibility Committee (AV070)
Hosted by: Institute for Transportation Research and Education
ACRP 11-05 Project Team
1. **Problem Statement Title**
   Wingtip Collisions on the Ground

2. **Background**
   During the past years, several aircraft taxiing on the ground at airports have experienced wingtip collisions. This issue has become a key concern to the aviation industry due to risk, operational disruptions, and associated costs. Airports can experience major operational disruption when one or more large aircraft are involved. Also, airframe damage typically results in significant costs and operational issues for air carriers, due to the expensive and lengthy repairs. Finally, airport operators and air carriers may have liability issues and increases in insurance costs. As airlines modify their fleets as a result of a renewal process or a merger with another carrier, and/or as a result of adding fuel-saving winglets and sharklets, wingtip collision risk increases. At least three such incidents have been recorded in the past few years, including an incident involving an A380 and a regional jet at New York JFK; an Airbus A330 and a Boeing 777-300ER in Miami; two Boeing 777-200’s at Washington Dulles; and a B747 striking a building at Johannesburg. Whether these incidents are a precursor to a trend that should concern safety planners should be verified by this research study.

   This proposed research should identify and address airport design factors and operating conditions which may provide opportunities for wingtip collisions. For example, aircraft separation standards in airport areas with high wingtip collision risk, including parking areas, gates, taxiways and taxilanes. Also, other factors such as parking striping responsibilities, terminal area configuration, reduced separations, aircraft type, congestion, mixed or overlapping taxiways/taxilanes of different gauges, obstructions, and other potentially causal factors that can be controlled by airport operators, planners, and air carriers. In addition, this study should evaluate the potential impacts of inclement weather conditions, especially low visibility, on wingtip collision risk. Following this evaluation, mitigation strategies should be developed to prevent wingtip collisions. These are expected to fall into two categories – operational strategies and design strategies. A review of best practices adopted by airports, operators, and pilots are expected to provide useful information about typical conditions for wingtip collisions, areas for improvement, and potential mitigation strategies. These mitigation strategies should include operational and design aspects that can be implemented by key stakeholders.

3. **Objective**
   The objective of this research is to identify causal and contributing factors to aircraft wingtip collisions and provide guidance for airports and operators, airlines, and airport planning and design practitioners about implementing design and operational strategies to mitigate risks associated with wingtip collisions in airport terminal areas, including taxiways, taxilanes, parking areas and gates.

4. **Proposed Tasks**
   The research plan should include the following tasks:
   - Collection of data regarding incidents involving aircraft wingtip collisions with other aircraft, fixed objects or moving objects in the terminal gate area of an airport
• Review and assessment of current Standard Operating Procedures related to preventing the occurrence of terminal area wingtip collisions, including those engaged in by airports, air carriers, operators, and pilots
• Identification of causal and contributing factors to aircraft wingtip collisions from individual incident reports
• Characterization of factors that can provide opportunities for wingtip collisions, including:
  o Weather conditions
  o Aircraft parking striping responsibilities and quality control
  o Terminal area configuration
  o Aircraft type
  o Gate characteristics and aircraft compatibility, also considering adjacent gates, MARS gates
  o Gate parking aids for pilots (automated versus traditional)
  o Driver training programs and authorization criteria
  o Retrofit addition of winglets / sharklets to existing fleet
  o Mixing gauges of taxiways / taxilanes
  o Other conditions
• Assessment of current practices adopted for terminal area design and
• Assessment of current Standard Operating Procedures used by airports and air carriers to operate aircraft and vehicles at gates and in the airport terminal area (non-movement area)
• Evaluation of current practices for airports of various sizes and types, and hosting a variety of air carriers
• Identify and consolidate the best practices for implementing operational and design mitigation strategies for preventing terminal area wingtip collisions

5. Estimated Funding
This project is expected to require $400,000 to complete the state research objective.

6. Estimated Research Duration
This research project is expected to require 24 months to complete the stated research objective.

7. Related Research
Existing work in this topic area exists at many airports across the US in standard procedures for safety operating an airport terminal area. However, wingtip collisions continue to occur and need to be addressed through specific evaluation and recommendations, which is currently not available in a consolidated document for practitioners. Other related research includes:

• ACRP Synthesis 29, “Ramp Safety Practices”, prepared in 2011 for the Transportation Research Board by Joanne Landry (Landry Consultants LLC) and Shane Ingolia (University of Southern Illinois)
8. **Process Used to Develop the Problem Statement**
A problem statement was developed from a focus group webinar session held on February 6, 2013. Participants in the focus group session included members of the TRB Aircraft/Airport Compatibility Committee (AV070). The session was hosted by the Institute for Transportation Research and Education (ITRE). The problem statement was not accepted in the 2013 cycle. The AV070 Committee reviewed the problem statement again in January and March 2014 and concluded that the issues presented in the original problem statement continue to be valid, given the frequency of such incidents. The sponsors of the prior Problem Statement are resubmitting it in revised form.

9. **Person Submitting Problem Statement and Date**
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