ACRP Problem Statement 16-02-19

Recommended Allocation: $100,000

Industry Forum Discussing Reducing Emissions from Taxiing Aircraft

ACRP Staff Comments

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TRB Aviation Committee Comments

ENVIRONMENTAL IMPACTS OF AVIATION: Do not support. Reviewers felt this value was unwarranted, and the study would be more appropriate for a synthesis. This forum could occur in a conference panel or FAA stakeholder meeting.

Review Panel Recommendation and Comments

Recommended. Some reviewers felt there was value in having this discussion; however, others questioned whether ACRP was the appropriate vehicle, as this could be hosted by FAA or an industry association. It was noted that related research is being undertaken by PARTNER and ASCENT COE. This could help facilitate the ICAO initiative to reduce emissions. Perhaps the focus could be on exploring what airports can do to support the reduction of overall aircraft emissions, instead of just taxi emissions. Participants would need to include all relevant stakeholders, including ATC and airlines. This also involves policy issues.

AOC Disposition

This problem statement received an average rating of 1.3 points out of a possible 5 points among voting AOC members. There was no discussion. No funds were allocated.
Industry Forum Discussing Reducing Emissions from Taxiing of Aircraft

Research Idea/Sub-topic: Reducing emissions from taxiing of aircraft

Background: Airport managers, environmental agencies, and others in the aviation industry are becoming increasingly aware of the contribution of airport-related activities to local air quality, greenhouse gas emissions and noise. In addition, fuel costs and fuel price volatility add pressure on already low profit margins for airlines. While the majority of aircraft fuel is consumed while the aircraft is cruising, there is very little an airport or airline can do to reduce the fuel burnt and associated emissions. However, there are a number of ways in which fuel use and associate emissions can be reduced in other phases of flight and while on the ground, including:

- Reduced takeoff and climb thrust (this is covered by ACRP 02-41 Estimating Takeoff Thrust Settings for Airport Emissions Inventories).
- Increased efficiency during aircraft taxiing (e.g. reduced engine taxiing, which results in the remaining engines operating at a higher thrust which tends to be overall more efficient and/or better management aircraft ground movement resulting in a reduction of taxiing times).
- Improved operational efficiency through programs such as NEXTGEN (US).
- Replacing the usage of the main aircraft engines for taxiing with a tug-type piece of equipment or on-board taxiing systems (this is being covered by ACRP 02-50 Deriving Benefits from Alternative Aircraft-Taxi Systems).

As indicated above some of these potential emission reductions are already being considered, however, further consideration of potential emission reductions during aircraft taxiing due to operational strategies may be warranted. It should be noted that quite a few studies have considered the fuel burn and/or emission reduction potentials from single (or reduced) engine taxiing such as (Chicago Department of Aviation, 2011, Deonandan and Balakrishnan, 2010, Miller et al, 2001, Sustainable Aviation, 2010). Deonandan and Balakrishnan, 2010 and Miller et al, 2001 also discuss and estimate potential benefits from optimizing aircraft ground movements based on existing airport layouts. However, these studies do not suggest the types of protocols (e.g. to enable collaborative decision making) that could be used by airports to limit surface congestion (which would appear to be on the increase), in addition ACRP 04-07 research states that there is no consistent model across the US for managing aprons. A review of the different mechanisms used across airports to reduce taxiing time would be of benefit to airports to allow them to improve their own operations, which could include:

- Management of pushback and departure queues depending on the congestion levels.
- ATC procedures to reduce the incentive (e.g. airline on-time performance metrics are typically related to pushback time) to get pushback as early as possible.
- Better gate assignment/lease/ownership agreement management.
- Optimal layout and use of gates (e.g. airline partnerships versus departure sequence).
**Objective:** Convene a industry forum to discuss existing operational strategies at airports to reduce taxiing times at airports.

**Project Type:** Industry forum

**Proposed Tasks:** Invite presenters that will review of existing literature/studies Other participants may include key stakeholders (e.g. ATC at airports).

**Estimated Funding:** $100,000.

**Estimated Research Duration:** 12 months.

**Related Research:**
- Covered by ACRP 04-07 and 07-09 on ramp design and apron planning.

**Process Used to Develop Problem Statement:** Outline statement then further developed via AV030

**ACRP Environmental Problem Development Panel Comments:** Recommended, but as either a Roundtable or Synthesis. Perhaps synthesis leads to roundtable. FAA currently evaluating research which could support this; a roundtable discussion would be helpful to inform agency research.

**Person Submitting Problem Statement and Date:** Hazel Peace

**Panel Comments:** Comment from Hazel Peace (AV030) – I am not an expert in ground air traffic control (I have expertise in taxing and related emission reduction strategies) so this problem statement may benefit from someone in this area reviewing?

**ACRP Appropriateness:**
- **Has this problem been addressed by previous or ongoing research?** Yes, ACRP 04-07 and 07-09.
- **Would this research solve a discrete, near-term issue?** Probably – but see comment on ground traffic control person
- **Is this research desired by airports?** Yes, but see above.
Note: This problem statement was originally submitted, reviewed, and recommended to the AOC for funding last year. It is being resubmitted for review because the AOC did not discuss it and funds were exhausted. Below are comments from the previous review.

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COMMENTS FROM LASTS YEAR’S REVIEW

ACRP Staff Comments

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TRB Aviation Committee Comments

ENVIRONMENTAL IMPACTS OF AVIATION (AV030): Not supported. Although the problem statement addresses a subject important to practitioners, reviewers felt that this type of project (roundtable) is not the best forum. It would be better to fund 16-02-07. Proposal needs to include participation from academics to present, summarize, and review relevant academic publications (not just industry and government reports).

Review Panel Comments

Recommended by Environmental Problem Statement Panel. Each airport has to respond to local regulations which could slow adoption. A forum may be appropriate to identify issues.

AOC Disposition

This problem statement received an average rating of 1.9 points out of a possible 5 points among voting AOC members. There was no discussion. No funds were allocated.