ACRP Problem Statement No. 13-02-01   Recommended Allocation: --

Assessment of Acoustical Evaluation Methods for Sound Insulation Programs

ACRP Staff Comments: The proposed research may complement and/or benefit from ACRP Project 02-31, Assessment of Sound Insulation Treatments. The proposed research overlaps with Problem Statement 13-02-11; recommend 13-02-11 as the primary problem statement.

TRB Aviation Group Committees Comments: ENVIRONMENTAL IMPACTS OF AVIATION: Do not support. As described in the problem statement, there may soon be an urgent need for the assessment of acoustical evaluation methods for sound insulation programs; however, it is not known if the need will develop or what the need may specifically be. The contents and timing for release of the FAA Program Guidance Letter regarding sound insulation eligibility is unknown. It would be premature to move this project forward without the need for the research having been firmly established. Further, if and when a need is established, it may be more appropriate for the FAA themselves to directly fund the development of a testing protocol.

Review Panel: Not recommended — This is a good research idea; however, it is premature. It should be delayed until the FAA’s sound insulation program guidance letter is issued. FAA is already conducting research in sound insulation measurement analysis.

AOC Disposition: No funds allocated. No discussion.
I. PROBLEM TITLE

ASSESSMENT OF ACOUSTICAL EVALUATION METHODS FOR SOUND INSULATION PROGRAMS

II. RESEARCH PROBLEM STATEMENT

The FAA is currently developing a Policy Guidance Letter (PGL) to clarify the eligibility of noise-impacted structures around airports for acoustical treatment. Future eligibility for each structure would be based on interior noise exposure in addition to location within an eligible noise contour. Specifically, if interior DNL noise levels are less than 45 dB, the structure would not be eligible for acoustical treatments typically provided by sound insulation programs (SIPs) funded under the FAA’s Airport Improvement Program (AIP).

Currently SIP’s measure and/or compute the noise level reduction (NLR) of selected rooms within the impacted structures using one of several methods. However, these methods provide no assessment of measurement accuracy or reliability, and no comparison of measurement results among the various methods employed. The absence of such information would make it impossible to determine definitively whether a structure is eligible for acoustical treatment.

Owners of impacted structures deemed ineligible may be expected to challenge the acoustical measurement techniques and results used to determine eligibility. Acoustical testing methods require a degree of standardization, and an assessment of their accuracy and reliability for qualification eligibility measurement to be used on future SIP’s.

III. OBJECTIVE

The proposed research program has the following objectives:

- Description and evaluation of 1) acoustical testing using an exterior loudspeaker sound source, 2) acoustical testing using aircraft flyovers for the noise source, and 3) computation of NLR from composite transmission loss and interior acoustical absorption calculations.
- Quantitative assessment of the repeatability of acoustical testing and computational methods for determining NLR. This will be presented statistically relating the tolerance in NLR measurement results.
- Establishment of acoustical testing guidelines to improve consistency of NLR results.

IV. RESEARCH PROPOSED

The research project will select two rooms in each of one hundred noise-impacted structures for assessment of the NLR by 1) acoustical testing using an exterior loudspeaker sound source, 2) acoustical testing using aircraft flyovers for the noise source, and 3) computation of NLR from
composite transmission loss and interior acoustical absorption calculations. The results of the three assessments will be compared statistically along with construction type.

Results will be evaluated and compared statistically to quantify the consistency of NLR results by the three methods. Additionally, modifications to measurement techniques will be made to determine if certain methods render more consistent and uniform results.

V. ESTIMATE OF THE PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: $400,000

Research Period: 2 years

VI. URGENCY AND PAYOFF POTENTIAL

Due to the importance of acoustical treatments, ineligible property owners may be expected to launch legal challenges based upon the techniques used to assess the NLR for their disqualification. This would result in considerable legal expense and additional costs from program delays. Additionally, adverse publicity from disparaged assessment programs may be expected to further exacerbate homeowner dissatisfaction with the Airports, FAA and others involved in the nationwide SIP effort.

VII. RELATED RESEARCH

ACRP 02-24, Guidelines for Airport Sound Insulation Programs (currently under final Panel review) discusses the various testing and computational methods in some detail, and further elaborates on the limitations of each.


VIII. PERSON(S) DEVELOPING THE PROBLEM

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IX. PROCESS USED TO DEVELOP PROBLEM STATEMENT

This is an individual problem statement.

X. DATE AND SUBMITTED BY

Submitted by: John C. Freytag
29 February 2012