CENTENNIAL PAPERS

Standing Committee on Transportation-Related Noise and Vibration (ADC40)
Hugh Saurenman, Chair

Transportation-Related Noise and Vibration

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This paper is a compilation of comments from past and current committee members looking back to the inception of the Standing Committee on Transportation-Related Noise and Vibration, the committee's current interests, and looking forward to the future of the committee's focus. The committee's areas of interest include transportation noise and vibration from all modes, but specifically focused on highway, rail, and aviation. The focus includes not only operational noise, but also construction noise and vibration control, criteria, monitoring protocols, and public participation.

YESTERDAY

The committee began as a subcommittee of the TRB Transportation Environmental Review Process Committee in September 1974 and was officially established as a full committee in January 1975. The committee was renamed the Standing Committee on Transportation-Related Noise and Vibration in 2003. The committee's work was motivated by environmental concerns that were amplified by publication of the EPA Levels Document ("Levels of Noise Requisite to Protect the Public Health and Welfare with an Adequate Margin of Safety") in 1972 and state departments of transportation (DOTs) needs to address highway noise per the Federal-Aid Highway Act of 1970. The committee organized its first workshop on vehicle noise control in December 1974 and has been organizing sessions and workshops at TRB Annual Meetings yearly. The committee also held its first major national conference in Los Angeles in 1978.

Early on, the committee created an annual Best Paper award that has been presented annually at a committee dinner held during each TRB Annual Meeting. Since the formation of the committee in 1975, the areas of interest expanded to include ground borne noise and vibration from rail transportation, and aircraft noise. In 1979, the committee created three subcommittees reflecting highway, rail, and aircraft noise. Currently, this has resulted in three subcommittee meetings and one overall committee meeting at each TRB Annual Meeting, providing ample opportunity to discuss noise and vibration issues related to respective areas of transportation. The committee has addressed a variety of diverse topics, such as transportation infrastructure construction noise and vibration impact prediction, monitoring and control, and GIS methods for noise impact assessment. Underwater noise impacts on fish and marine mammals from pile driving are relatively new topics within the last twenty years. Maintenance and operational noise and vibration issues beyond just environmental impact concerns have been topics of interest to the committee. Diverse examples include rail corrugation, pavement life, and sound barrier wall architecture.

The committee has actively collaborated with other committees to expand the opportunity for paper presentation. An example is its collaboration with the Standing Committee on Rail Transit Infrastructure to both sponsor joint sessions and organize workshops on transit noise and vibration. The committee has organized summer meetings each year since inception, hosted by state DOTs. The meetings cross the United States from Washington to Florida and California to Maine, including one in Hawaii. These meetings have provided substantial opportunity for attendance by local DOT engineers and consultants to interact with international professionals and those from other parts of the country. The committee collaborated with the International Workshop on Railway Noise to organize a meeting in 2003 in Portland, Maine. The committee has collaborated on multiple occasions with the Institute of Noise Control Engineering (INCE) to organize joint conferences and its summer meetings. Internationally known experts from Europe and Asia have presented papers regarding road traffic noise and guided intercity high-speed ground transportation. Topics include porous pavements and acoustic intensity characterization of tire/pavement noise, rail corrugation, prediction and control of ground borne noise and vibration from high-speed trains and transit trains, aerodynamic noise from magnetically levitated vehicles, and wayside noise from high-speed trains. These collaborations provide excellent opportunities to share information and international participation in research projects.

TODAY

The committee is actively exploring research topics for possible funding by National Cooperative Highway Research Program, Transit Cooperative Research Program, and Airport Cooperative Research Program. Some of these involve joint sponsorship with other committees where noise and vibration may be of concern. Current topics in highway noise control include porous asphalt pavements, long-range sound propagation, rumble strips, sound barrier reflections, impact criteria, noise abatement measures, and wildlife impacts. Rail topics include the state of good repair, rail corrugation control, wheel/rail interaction, guideway design, and high-speed train wayside noise impact assessments and control. Better understanding of noise impacts from emerging aviation noise sources as well as from current aircraft fleet and improvement of impact assessment methodologies are under consideration. Aircraft noise has been reduced through enhanced engine designs and aerodynamic improvements, mitigation through management of flight profiles and operation, and through noise compatibility planning. With the urbanization trend continuing and with the emerging transportation development such as Urban Air Mobility (UAM), noise issues from multiple transportation modes will become increasingly important. The Standing Committee on Transportation-Related Noise and Vibration is in a unique position to address multi-modal noise issues and provide a venue for discussion and a magnet for drawing industry and other stakeholders concerning these current and emerging noise issues. An example of a current topic of concern is the noise impact, or lack thereof, on pedestrian traffic by electric vehicles; these relatively “noise-less” vehicles provide less warning, and some sort of noise is needed to alert pedestrians at intersections.

The committee continues its leadership role in organizing presentation and poster sessions at the TRB Annual Meetings and focused summer meetings around the country, including those held in conjunction with INCE. Its members and friends are active in preparing presentations and papers, and members continue to volunteer to review papers for publication.

The committee maintains an active web site for dissemination of transportation noise and vibration related information, and has an email list of nearly 500 members and friends, including

representative from nearly all state DOTs. The committee's web site, http://www.adc40.org/, includes a variety of past presentations, papers and reports concerning highway noise, construction noise and vibration, pavement design, conferences, and other noise-related information.

TOMORROW

In general, community noise, and transportation noise in particular, are of increasing concern as population densities increase and transportation noise issues become not only more acute, but more multi-modal as well. Ground-borne noise and vibration receive increasing attention as transit corridors exploit abandoned rail corridors in suburban and urban areas or pass close to or even beneath highly sensitive buildings. Air transportation noise issues have already created a lot of public attention as we face emerging air vehicle types and airspace redesigns that have narrowed or shifted flight tracks as seen in the recent NextGen implementation. High-speed trains are gaining traction and will likely introduce a new dimension to wayside rail transportation noise in the United States. Introduction of high-speed trains in urban and suburban communities presents particular challenges that drive impact mitigation costs. Noise impacts of high-speed trains in rural areas or semi-rural areas are also of concern.

A new traffic noise model will soon be released by the Federal Highway Administration, and committee members will be active in implementing it and conducting research with it. Highway traffic noise policy changes are likely to be pursued and will benefit from the collective wisdom and experience of committee members and state DOT representatives. Research in cost-effective traffic noise abatement and quieter pavements will continue.

The challenges facing the transportation planner and noise control engineer are increasing; not decreasing. Committee members and friends have been and will be exploring these issues and providing a venue for discussion of current and future transportation-related noise and vibration problems. In addition, the Committee will continue to actively invite European and Asian rail transportation engineers to participate in its activities at TRB annual meetings and summer meetings; will continue to facilitate participation in its meetings by state highway agency noise specialists; and will continue to be the focal point in the United States for transportation noise and vibration research, development, implementation, collaboration, and information dissemination for the foreseeable future.