

## Preface

The purpose of this workshop on ride quality was to summarize the technical status of ride quality evaluation as it currently exists in industrial and academic settings both in the United States and abroad. This summary provides guidance for individuals and organizations involved in the design, acquisition, or evaluation of transportation systems. The papers in this Record describe ride quality measurement and evaluation methodologies for fixed-guideway and off-road systems, marine systems, and aircraft. They provide the rationale on which these methodologies have been based and discuss problem areas where further research will be required before definitive ride quality standards can be set.

This workshop represents the final technical effort of the U.S. Department of Transportation (DOT) sponsored investigation of ride quality. The project originated in 1973 as an element of the Transportation Advanced Research Program (TARP) and was conducted by the Transportation Systems Center (TSC). Under this project research was performed in a number of areas including perceived comfort of simulated rides, acceptance of ride comfort produced by revenue service vehicles, the ride dynamics of rubber-tired surface vehicles, and the relationships between elevated guideway configuration and ride motions. The project has resulted in the development of quantitative methodologies for the following: predicting the level of comfort that will be reported by passengers (based on the vibrations experienced); estimating the percentage of users who will find the ride of a particular system acceptable (based on the level of reported or predicted comfort); and estimating the cost of guideway structures (based on level of ride motion specified for the vehicle).

The scope of the DOT project was tailored to the establishment of quantitative methods for the planning and evaluation of surface transportation systems; it was intended to be complementary to the excellent ride quality research programs under way in the United States and abroad. Among these were government-sponsored programs such as the National Aeronautics and Space Administration, Langley Research Center (NASA/LRC) program to develop mathematical functions relating simulated ride vibrations to human comfort and to develop methods of predict-

ing the acceptability of new aircraft configurations; efforts by the Royal Aircraft Establishment (Farnborough, United Kingdom) to establish standards for ride vibration; the U.S. Navy research program on the effects of low frequency vibration on comfort and work efficiency (Michoud Station); the U.S. Air Force research program to establish guidelines for human exposure to whole-body vibration; the ride acceptability research performed by Transport Canada; and the research sponsored by the various state and provincial highway departments in the United States and Canada.

The ride improvement efforts of the following industrial organizations formed another body of important ride quality research: Boeing Company; Amtrak; British Rail; Caterpillar Tractor, Inc.; United Technologies, Inc.; General Motors Company; Ford Motor Company; SABLE Company; and Bostrom Ltd. Much of the research sponsored by these organizations was performed by a select group of universities and research firms in the United States and Great Britain. Among these were the Massachusetts Institute of Technology; the University of Virginia, Charlottesville; the University of Texas, Austin; the University of Pennsylvania; the Institute of Sound and Vibration, South Hampton University; the University of Swansea, Wales, and Louthborough, Great Britain; Dunlap and Associates, Darien, Connecticut; and ENSCO Inc., Virginia.

The papers that are contained in this Record are drawn from a cross section of the sources listed above and represent a distillation of the current state of knowledge in the area. The process by which the papers were generated was relatively straightforward. First, the TRB committee on Quality and Passenger Acceptance (A3C11) solicited papers from individuals knowledgeable in the various areas of interest. Second, under the auspices of A3C11 and with DOT sponsorship, the TSC planned (and the Massachusetts Institute of Technology executed) a workshop where the papers were presented, critically reviewed, and edited. Finally, the papers were prepared for inclusion in this Record.

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