

Progress Report on Noise Abatement

WILBUR H. SIMONSON

Chief, Roadside Branch, Highway Standards and Design Division,
U. S. Bureau of Public Roads

•THIS IS a report of progress on noise abatement from 1962 to 1964. It supplements information previously presented to this committee and published by the Highway Research Board in the separate Reports of the Committee on Roadside Development.

A previous progress report with 1960-1962 references on noise was printed by the Highway Research Board in 1963 (1) and prior to that report, a summary of progress on noise abatement from 1953 to 1961 was published by the Board (2).

National Cooperative Highway Research Program

In the United States, high priority has been given to research in the abatement of traffic noise on highways. The National Academy of Sciences—National Research Council has entered into an agreement with the American Association of State Highway Officials and the U. S. Bureau of Public Roads in which it is provided that the Highway Research Board will administer the National Cooperative Highway Research Program for the participating members of the Association. Project 3-7 for the "Establishment of Standards for Highway Noise Levels" was a new project recommended to the National Academy of Sciences by the Executive Committee of the American Association of State Highway Officials for inclusion in the NCHRP for Fiscal Year 1964.

The project statement issued June 25, 1963, by the Highway Research Board includes a concise statement of the research problem, particularly in urban areas, and an outline of objectives to guide the research work through its several phases of evaluation, design control, legislation and enforcement.

Noise—Prevention, Isolation, and Insulation

These are the methods of approach by which the highway engineer can tackle the problem of noise abatement. Clearly, the engineer's goal should be threefold:

Prevention.—The engineer can seek to minimize traffic noise generated by the motor vehicle at the source. Previous reports have shown that much has been accomplished by the automotive industry and the highway industry in this phase of noise research. Based on the results of comprehensive study of motor vehicle exhaust noise for the purpose of determining feasible objective noise limits, and methods for determining compliance, the December 1962 Report by Bolt, Beranek and Newman (4) recommended that (a) current practice in the State of California for citation of vehicle noise offenders should be continued, and (b) legislation should be enacted to establish maximum noise limits measured at a distance of 50 ft from the vehicle for two classes of vehicles:

- Group 1: Passenger vehicles other than motorcycles, trucks of less than 10,000-lb gross vehicle weight, and buses having capacity for 15 or less passengers.

- Group 2: Trucks of more than 10,000-lb gross vehicle weight, motorcycles, and buses having a capacity for more than 15 passengers.

The basic purpose in establishing a numerical limit on permissible vehicle noise is to limit this noise to a value which most individuals will judge acceptable. The limit should be expressed, therefore, in a measure or unit that correlates well with human reactions to noise. Unfortunately, the complexities of human hearing make a simple approach difficult to correlate. For example, a diesel truck and a motorcycle might have the same overall sound intensities, but still elicit quite different reactions from listeners.

Isolation. —The highway location engineer can separate the source of noise from the people who might be disturbed by it. This is a matter of foresight and sensible planning of highway routes when alternate locations are being studied. For example, care in location will avoid locating heavily traveled highways too near residences, schools, hospitals, churches, and other institutions. Alternate truck routes can bypass congested and residential areas.

Insulation. —The highway design engineer can shield the individual property from potential noise. For example, right-of-way will be acquired sufficiently wide for roadside buffer planting. Building setback lines will be included wherever possible to keep structures farther back from the traffic lanes. Frontage roads, where provided, will also increase the distance between buildings and traffic. Various types of barrier walls and combinations of structural barriers and buffer plantings may be used in special situations.

REFERENCES

1. Simonson, W. H., "Progress Report on Noise Abatement." HRB Highway Research Record 23, 47-49 (1963).
2. Simonson, W. H., "Progress Report on Noise Abatement: 1961." HRB Roadside Development 1961, 2-4 (1961).
3. Galloway, W. J., and Clark, W. E., "Prediction of Noise From Motor Vehicles in Freely Flowing Traffic." Fourth Internat. Congress on Acoustics, Copenhagen (Aug. 1962).
4. "Objective Limits for Motor Vehicle Noise." Bolt, Beranek and Newman, Cambridge, 68 pp. (Dec. 1962).
5. "Noise From Motor Vehicles." Modern Transport (Great Britain), 88: 2276 (Dec. 29, 1962).
6. "Taking the Bounce Out of Noise." Steelways (Amer. Iron and Steel Inst.), 19: 1, 8-10 (Jan. 1963).
7. "Truck Noise Control, Decibels, Dollars and You." Swart, Bernie, Fleet Owner, pp. 58-90, McGraw-Hill (Jan. 1963).
8. Bourget, L., "Sound Emanation From Highways." State of California, Dept. of Public Works, Div. of Highways (Jan. 1963).
9. Road Abstracts (Great Britain), 30: 2 (Feb. 1963).
10. "Preliminary Survey of Predicted Changes in Neighborhood Noise in West Orange, New Jersey, from a Proposed East-West Freeway." Prepared for Tech. Advisory Committee, East-West Freeway Committee, by Goodfriend, L. S., and Assoc., Cons. Eng. in Acoustics, 34 pp. (Aug. 1963).
11. Bourget, L., "Motor Vehicle Noise." (In California State Highway Conference), Univ. of California, Proc., pp. 187-191 (1963).