

Attitudes Toward Noise Barriers Before and After Construction

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To obtain the most reliable indication of the effectiveness of noise barriers in terms of the reactions of community residents to highway noise, comparable surveys should be conducted before and after barrier construction. Two questionnaires designed for this purpose are presented and discussed. The questionnaires are based on discussions held at the 1978 Conference on Highway Traffic Noise Mitigation and on additional field experience.

One of the concerns raised but not answered at the 1978 Conference on Highway Traffic Noise Mitigation in Los Angeles was the problem of how best to collect information on community opinion about noise-barrier effectiveness. At the conference, several state representatives reported on their experience and on the difficulties they encountered. Others voiced their concerns during formal or informal discussions. This paper attempts to summarize those concerns and, from them and our own field experiences, to suggest the most effective procedures for obtaining information on community opinion about noise barriers.

Florida experience (1) is a good example of the problems inherent in obtaining appropriate information about community attitudes when a noise barrier is built as part of the construction of a new roadway [type 1 project (2)]. In such cases, some residents may be dislocated by the construction, which makes follow-up interviews impossible. Residents who were there both before and after construction of the new road may confuse barrier and highway effects. In the worst case, they may rate the barrier negatively because the area is noisier after construction of the new road than it was before. The unavoidable difficulty is that they are being asked to compare a hypothetical situation (a new road with no barrier) with a new and possibly unpleasant situation (a new road with a barrier). In such a case, it is next to impossible to obtain valid information, since most people are not able to make such a hypothetical comparison realistically. As a result, the most practical suggestion for type 1 projects is to avoid attempting to evaluate the community's attitude toward the barrier in before-and-after terms.

For barriers built in locations where an existing highway already affects existing residences (type 2 projects), these difficulties do not exist, and it is an excellent idea to attempt to obtain information on community attitudes both before and after barrier construction. In Minnesota (3), the State Legislature has required such an evaluation of noise barriers.

The remainder of this paper deals with the problems of data collection for type 2 projects.

DATA COLLECTION REQUIREMENTS

The underlying objective of a data collection effort such as that discussed in this paper is to obtain information that accurately describes the opinions of owners of abutting property on "the effectiveness and desirability of acoustical barriers" (3, pp. 60-61). On the basis of discussions at the Conference on Highway Traffic Noise Mitigation, five specific requirements were identified to ensure that this objective is met:

1. The data should be as representative of the af-

ected community as possible. This means that the data collection procedures should be constructed to ensure a high percentage of completed responses and that the procedures should try to minimize any bias that might be introduced by the way the questions are worded.

2. The first survey, at the inception of the project, should identify the severity of the problems caused by highway noise in the specific project areas and the potential for public participation during project design selection.

3. The second survey, after barrier completion, should obtain information that is as comparable as possible to that collected in the first survey.

4. The cost of collecting and processing the data should be kept to a minimum.

5. It should be possible to identify which person in a household answered the first survey so that the same individual can be interviewed in the second survey. This is strongly recommended, since otherwise the differences in the responses may distort the results.

In some respects, these requirements all lead to similar conclusions for the questionnaire. Keeping the questionnaire brief and asking only those questions that are essential help to keep costs low and response rates high. Personal questions, such as age, should be kept to the minimum necessary to meet requirement 5 above and should be asked only at the end of the questionnaire. Respondents sometimes refuse to participate when personal questions are asked first. When they know why such information is needed, they are more likely to provide it.

In other respects, these five requirements are contradictory or incompatible. With regard to the procedures for administering the questionnaire, requirements 1 and 4 conflict. Door-to-door interviewing is probably most effective for the first requirement, in terms of response rate, ability to control for male and female participation, and ability to recognize and overcome misunderstandings. It is, however, the most expensive approach. One way to reduce costs is to use people already on staff. For example, the New York State Department of Transportation (NYSDOT) was able to use office secretarial staff among others in their door-to-door interviewing. An added advantage of using these people is that the same personnel will usually be available for the follow-up surveys. There has sometimes been an increase in the number of refusals to participate when men have done the interviewing, although this may not be generalizable. The expense of door-to-door interviews is usually offset by the fact that they generally achieve close to an 80 percent response rate.

Other procedures rely on mailed questionnaires that are to be mailed back, or on a mailed notice followed by a telephone call in which the actual interview is conducted, or on a telephone call alone. If the mailings are followed up with a second request, they can also obtain better than a 70 percent response rate [based on Minnesota experience (3)]. A potential difficulty with a mailed survey, however, is its inability to overcome language or literacy problems. Telephone surveys overcome these problems and often produce almost as good a response rate as door-to-door surveys. The Urban

driver performance for type A versus type B markings at this location. At AA I the hypothesis was rejected on weekdays, but could not be rejected on weekends. Hence, at this location, we concluded that there was significant difference in driver performance on the weekdays, but no significant difference on the weekends for type A and B markings.

Next we needed to determine which type of marking produced the better driver performance. According to the function of the street the vehicle turned into, the four locations were put into two corresponding categories (locations AC I and AC II were categorized as the collector streets and locations AA I and AA II as arterial streets). Comparison of daytime and nighttime driver performance for the two categories was examined.

The tabulation below shows that the new marking produces significantly better performance during the night; during the day, it produces significantly better performance only for category II.

| Street | Day | Night |
|-----------|---------------|---------------|
| Collector | No difference | Type B better |
| Arterial | Type B Better | Type B better |

In order to draw an overall conclusion from the selected study locations, a chi-square test was conducted for the number of successes or failures (driver performance as proper or improper). The data consisted of the number of observations falling into either the collector street category or the arterial street category.

We concluded that driver performance with type A markings is independent of the location but that driver performance with type B markings is dependent on the location (i.e., whether the turn is made from an arterial street to another arterial street or to a collector street).

CONCLUSIONS AND RECOMMENDATIONS

After analysis of the data obtained in this study, the

following primary conclusions were made:

1. Driver performance did not differ significantly between the two types of markings for locations where turns were made into collector streets;
2. Driver performance differed significantly between the two types of markings on weekdays but not on weekends at AA I;
3. Driver performance differed significantly between the two types of markings at the AA II location;
4. When turning movements were executed into a collector street, driver performance during the day did not differ significantly between the two types of markings;
5. When turning movements were executed into an arterial street, driver performance differed significantly between the two types of markings, and type B marking produced better driver performance;
6. Driver performance differed significantly between the two types of markings at night, and type B marking produced better driver performance; and
7. Driver performance with type A markings were independent of the location chosen.

In general, the results of field observation show that type B marking produces better driver performance and is therefore recommended for use over type A.

Although no accidents occurred during the study, we believe that the type B marking conveys an immediate understanding of the situation that will provide for more uniform traffic flow, will reduce the potential accident rate, and will add to roadway safety in the long run.

REFERENCE

1. Manual on Uniform Traffic Control Devices. Federal Highway Administration, U.S. Department of Transportation, 1971.

Publication of this paper sponsored by Committee on Traffic Control Devices.

Accident Experience With Right Turn on Red

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The right-turn-on-red traffic signal, once used only in the western states, is now permitted in some form in all but one state and the District of Columbia. However, its adoption was slow primarily because of the concern over its safety aspects. As part of a comprehensive study for the Federal Highway Administration, six separate studies on accidents associated with right turn on red were conducted in Virginia and Colorado and in the cities of Denver, Chicago, Dallas, and Los Angeles. In Virginia and Chicago before-and-after studies were performed; in the other locations records were analyzed to determine both the number of accidents and the causes. From the results of the accident analyses, it appears that the accidents related to right turn on red are very infrequent compared with all intersection accidents (0.4 percent versus 3.3 percent). The Chicago and Virginia studies do not reveal a statistically significant increase in intersection accidents, nor do accidents related to right turn on red appear to be less severe than the average intersection accident; no fatalities were found in the entire accident data base. The general con-

clusion is that right turn on red does not significantly degrade the safety of signalized intersection traffic operation.

Right-turn-on-red (RTOR) signals, previously used only out west, are now permitted in some form in all but one state and the District of Columbia. Use of this control came slowly, primarily because of the concern over potential for causing accidents.

Presumably no collisions should occur if the motorist makes the RTOR maneuver safely by stopping and yielding to the appropriate vehicles and pedestrians in the intersection. However, not all drivers drive safely all the time, and accidents do happen as a result of a host