

FHWA TECHNICAL ADVISORY

SUBJECT: Analysis of Highway Construction Noise

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1. PURPOSE. To provide information on the analysis of highway construction noise to ensure that potential construction noise impacts are given adequate consideration during highway project development.
2. BACKGROUND. The Federal Highway Administration (FHWA) noise directive, Federal-Aid Highway Program Manual 7-7-3, contains requirements for the evaluation of highway construction noise. While the impact of highway construction noise does not appear to be serious in most instances, consideration must be given to construction noise during project development.
 - a. In 1977, the special report, "Highway Construction Noise: Measurement, Prediction, and Mitigation," was published. This report presented a simple, logical approach to the evaluation and control of highway construction noise from individual highway projects.
 - b. As a result of a symposium on highway construction noise held in 1977, a research study was initiated to learn more about highway construction noise sources, measurement techniques, modeling, mitigation, and impact assessment. The study was completed recently, resulting in an extensive survey and assessment of existing literature on highway construction noise, especially regarding equipment emission levels and source control strategies and other abatement methods. In addition, the study has produced a new highway

construction noise model (HICNOM) to predict construction site noise levels with three methods for its use: charts, programmable calculator, and computer program.

3. CONSTRUCTION NOISE ANALYSIS. The following items should be considered to ensure that potential construction noise impacts are given adequate consideration during highway project development:
 - a. Calculation of construction noise levels is usually not necessary for traffic noise analyses. If a construction noise impact is anticipated at a particular sensitive receptor, use of the model contained in "Highway Construction Noise: Measurement, Prediction, and Mitigation" to predict construction noise levels should be sufficient. The newly developed prediction model HICNOM is quite sophisticated, requires considerable input, and, therefore, should be used only on highly complex or controversial major urban projects.
 - b. Potential impacts of highway construction noise should be addressed in a general manner for traffic noise analyses. The temporary nature of the impacts should be noted. An indication of the types of construction activities that can be anticipated and the noise levels typically associated with these activities can be obtained from existing literature and presented in the noise analysis.
 - c. Utilizing a common sense approach, traffic noise analyses should identify measures to mitigate potential highway construction noise impacts. Low cost, easy to implement measures should be incorporated into project plans and specifications.
 - d. Major urban projects with unusually severe highway construction noise impacts require more extensive analyses. Sensitive receptors should be identified, existing noise levels should be measured, construction noise levels should be predicted, and impacts should be discussed so as to properly indicate their severity. Mitigation measures likely to be incorporated into these projects may be quite costly and should be

thoroughly discussed and justified in the analyses.

4. CONSTRUCTION NOISE MITIGATION. There are a number of measures which can be utilized to mitigate highway construction noise. These measures may be grouped generally as follows:
 - a. Community Relations - early communication with the general public is vital. Inform the public of any potential construction noise impacts and measures that will be employed to reduce these impacts. Establish and publicize a responsive complaint mechanism for the duration of the project. The establishment of good rapport with the community can provide high benefits for low cost. Instill an awareness of public attitudes and reactions in construction equipment operators so that unnecessary annoyances may be avoided.
 - b. Design Considerations - early coordination and communication with project designers can greatly aid in locating and sequencing construction operations to minimize potential construction noise impacts at sensitive receptors. Noisy elements i.e., compressors, haul roads, etc., can be located in less sensitive areas making use of any existing natural or artificial features that can shield the construction noise. Permanent noise barriers included in a project should be constructed as early as possible to reduce potential construction noise impacts. Alternate construction methods can also be employed to lessen potential construction noise impacts (i.e., cast-in-place piles rather than driven piles, rubber-tired equipment rather than steel-tracked equipment, etc.).
 - c. Source Control - new construction equipment is generally quieter than older equipment. Special, very quiet types of new equipment are also available. However, specification of the exclusive use of new, quiet construction equipment on a project can be very costly and is usually justifiable only in cases of extremely severe noise impacts. Control of noise from existing construction equipment is usually limited to requirements for mufflers and continued good maintenance on all equipment. Additional modifications to construction equipment for noise reduction are

usually not reasonable due to large increases in cost.

- d. Site Control - measures to abate highway construction noise can modify the time, place, or method of operation for a particular noise source. The measure most often utilized is the limitation of work hours on a construction site. Careful project planning can aid in locating noisy construction activities as far as possible from sensitive receptors or in areas where natural shielding is possible. Building temporary noise barriers or special equipment enclosures is usually quite expensive and limited to use only in instances of severe construction noise impacts.
5. SUMMARY. The impact of highway construction noise does not appear to be serious in most instances. The information outlined above provides guidance on the appropriate level of analysis for construction noise and on the measures that can be utilized to mitigate the identified impacts.

/Original Signed by/

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