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Traffic-Induced Vibration Study On Residential Structures In Suburban Washington, D.C.

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ABSTRACT

Based on residents' complaints of traffic-induced vibrations in single family dwelling units, vibration measurements were evaluated in terms of annoyance and structural damage. The study included 15 residences and measurements were made under a variety of traffic conditions. Measurement points within each residence included the foundation and utility popes for determination of transmission path. Real time, 1/3-oct measurements were made in the range of 0.8-80 Hz and compared with criterion set forth by the Federal Highway Administration. It was found that all the residences were on local bus routes and that buses were the major cause of structural vibration. It was shown that vehicle suspension characteristics had greater influenced on structural vibrations than gross vehicle weight. Pavement smoothness was the one controllable factor capable of reducing traffic-induced vibrations. Recommendations were made for decreasing the vibrations to a level lower than the threshold of annoyance.