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A REVIEW OF COMMUNITY ANNOYANCE CAUSED BY ROAD TRAFFIC NOISE

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Abstract

Road traffic noise is one of the most widespread sources of environmental noise in urban areas and represents a growing challenge for community health and quality of life. With the continuous increase in traffic volume and urban density, long-term exposure to road traffic noise has become unavoidable for a large proportion of the population. This review examines the hazards of road traffic noise on residential communities and synthesizes current knowledge on its health impacts, assessment approaches, influencing factors, and mitigation strategies, with a particular focus on community noise annoyance as an integrative response indicator. The review first summarizes the adverse effects of road traffic noise on physical and mental health, including sleep disturbance, cardiovascular and metabolic disorders, elevated stress responses, and psychological outcomes such as anxiety and depression. In addition to health-related effects, traffic noise significantly interferes with daily life by impairing work and learning performance, reducing communication quality, limiting window opening and ventilation, and decreasing residential comfort and satisfaction. These impacts demonstrate that traffic noise functions as a complex environmental stressor extending beyond purely acoustic exposure. Subsequently, the paper reviews and compares methods used to assess community responses to traffic noise. Both objective noise indicators and subjective evaluation approaches are discussed, with emphasis on socio-acoustic surveys, standardized annoyance scales, exposure–response relationships, and community tolerance level models. Psychoacoustic-based metrics are also examined as complementary tools that capture sound characteristics such as loudness, sharpness, and temporal variation, which are not fully represented by conventional equivalent noise levels. The review further analyzes key factors influencing perceived annoyance, including noise source characteristics (traffic intensity, vehicle composition, temporal patterns, and source visibility), individual-related factors (noise sensitivity, attitudes, and coping capacity), and contextual factors such as housing orientation, façade exposure, distance from roads, and indoor–outdoor conditions. Regional, cultural, seasonal, and temporal differences are also shown to modulate annoyance responses.

Finally, current intervention measures are summarized, including noise barriers, roadside vegetation, building-level acoustic treatments, traffic management strategies, pavement design, and urban planning approaches aimed at reducing exposure and improving acoustic comfort. Overall, this review provides a comprehensive synthesis of community annoyance caused by road traffic noise and offers a scientific basis for future research and evidence-informed noise management practices.

Key words: annoyance, community response, noise, road traffic noise

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