Road Traffic Noise Prediction Model around Signalized Intersections

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ABSTRACT

The authors previously proposed a prediction model of road traffic noise constructed by combining the model for road traffic flow in urban areas and that for the sound power level of vehicles. In this study, the traffic model has been improved to be applicable to large intersections. The vehicle running patterns in a large intersection were investigated using three types of test vehicles. Based on these data, the traffic simulation model for estimating transient vehicle behavior including right/left turn was newly developed. By combining this traffic flow model and the sound power level model, a new prediction model for road traffic noise has been constructed. To examine the validity of this model, \( L_{Aeq} \) in an actual intersection was calculated and compared with the actually measured data. As a result, it has been found that the calculated values are in good agreement with the measured results within 1.5dB.

INTRODUCTION

Noise radiation from road vehicles dynamically changes according to such transient running conditions as acceleration, deceleration, and right/left turn. Therefore, the detailed examination of driving behavior is important for the accurate prediction of road traffic noise around large intersections. We have proposed a prediction model of road traffic noise constructed by combining the model for road traffic flow in urban areas and that for the sound power level of vehicles \(^{(1)}\),\(^{(2)}\). The purpose of this study is to improve the model to be applicable to large intersections. The running patterns at an intersection were observed using three types of test vehicles and introduced into the microscopic traffic simulation. To examine the validity of this model, \( L_{Aeq} \) at an actual intersection was estimated and compared with the measured data.