

마을버스 이용 실내소음에 의한 성가심도 저하에 관한 연구

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A Study on Annoyance Degradation to Indoor Noise in the Village Bus

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● 요약 ●

오늘날 도시의 규모가 커지고 도시의 기능이 점점 복잡해진다. 또한, 도시에는 사람들이 많이 살고 있으며, 계속해서 도시로 사람들이 모이게 된다. 그러므로 도시에서의 삶은 서로 간에 점점 더 가까워지고 많은 부분에서 이웃 사람들과 연결되고 공간과 시간을 공유하게 된다. 특히, 사람들이 대중교통을 이용하면서 원하던 원치 않았던 많은 소리에 노출 되며, 그 소리에 대한 영향으로 서로 피해를 보기도 한다. 서울은 세계에서 가장 혼잡한 도시 중 하나이며, 이런 서울의 대중교통 중 마을버스는 좁은 골목길을 포함해 도로를 다니며 시민들의 공공의 이동을 담당하고 있다. 이 마을버스를 사용하는 사람들은 일반적으로 차량 내에서 좋은 승차감, 높은 공기질 및 적은 소음에서 이용하기를 원한다. 본 논문에서는 마을버스의 실내 소음에 대한 성가심도를 소음도 및 혼잡도에 관하여 분석한다. 그리고 이러한 상황별로 어떠한 경우에 성가심도가 높은지를 판단하고, 저감하는 방법을 마련하도록 하고자 한다. 분석결과 마을버스 내부 소음은 새 차와 오래된 차에서 큰 차이를 보이지 않았고, 성가심도 또한 도로 상황에 따른 소음의 정도에 민감한 반응을 보임을 확인하였다. 그래서 저감대안으로는 차량의 소음이 적게 발생 시키는 운전과, 차량의 정비 등을 제안하고자 한다.

키워드: 마을버스(Town Bus), 버스 소음(Bus Noise), 소음성가심도(Noise Annoyance)

I. Introduction

In these days, the size of urban is growing and the function of city becomes complicated. And also, in city, people lives a lot. The public transportation is required to a lot of place. Seoul is the most crowded and large place in Korea. And also Seoul is one of the busiest cities in the world. The town buses in Seoul are on the road, including narrow alleys, that are responsible for the public transport of the citizens. Those who use the town bus generally want to use it inside the vehicle with comfort ride, high air quality and low noise and vibration. The average noise level of interior vehicle is 73dB or bigger. This dB does not cause damage to the legal regulations or hearing loss. However, passengers want more comfortable ride. So, in

this study, we classify the size and type of riding noise, to improve annoyance. In this paper, the degree of annoyance of indoor noise of a town bus is analyzed in terms of noise level and congestion degree. And I would like to find out how much the annoyance is high and how to reduce it by these situations.

II. Noise

Noise is sound that is not wanted by the perceiver, because it is unpleasant, loud, or interferes with hearing. This results in the subjective discretion between sound and noise, where any sound may be considered noise depending on the perceiver. From a physics standpoint, noise is indistinguishable from sound

as both are vibrations through a medium, like air or water. The difference arises from how the brain receives and perceives a sound. By extension, in experimental sciences, "noise" refers to any random fluctuations of data that makes more difficult the perception of an expected signal.

III. The Annoyance Study

In this study, we evaluate to measure the stress level that humans receive about noise pollution in interior bus. We simulate peoples who are aged around 20 and healthy and 5 men and 5 women, in noise condition using monitor speaker. The noise volume is moving from 70 to 90 dB, we make score the stress ratio which degree is from 0 to 10. In that condition, all of testee groups stress are increased in 3 min. Even though, reduce the noise, the stress ratio is not reduce. However, in similar test, 1 min. noise cannot occur the stress increase.

IV. Conclusions

In this paper, the degree of annoyance to the indoor noise of the town bus is analyzed in terms of noise level and congestion. In addition, we propose measures to reduce the degree of annoyance in each case by such situation. As a result of noise analysis, it was confirmed that the noise inside the town bus did not show much difference between the new and old vehicle, and the annoyance was also sensitive to the degree of noise according to the road conditions. Therefore, as an alternative to mitigation, we propose a method of reducing the noise of the vehicle and maintenance of the vehicle. In addition, it was confirmed that the method of reducing the degree of annoyance by proceeding with consideration of the method of inspecting the vehicle and the vibration of the vehicle.

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