

Noise protection of an automobile scrapyards with car crushers – a case study

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Abstract. The paper presents a procedure for design of an appropriate noise protection system for an automobile scrapyards. The influenced object is a residential area that borders the scrapyards. The noise impact was estimated by measurements of noise levels in the residential area. Since the measurements revealed that the noise level is above the allowed limits in a wide part of the residential area, a noise map was assembled. The noise maps enabled determination of critical points, with the highest noise levels. Based on calculated noise levels in critical points, characteristics of sources of noise and the relevant noise regulations, a sound barrier was designed as a noise protection mean that will provide a sufficient noise protection of the plant.

Introduction

In this paper are presented activities that are necessary for successful noise protection of an urban area close to an industrial zone. Assignment of such urban areas to a certain legal acoustic zone in Serbia represents a hard task. Therefore, a definition of a new type of acoustic zones, urban areas close to industrial zones, appears as a natural idea. Such solutions, which enable better collaboration and provide easier coordination between the subjects of environment noise protection, are already known in some European countries.

Total equivalent noise level during the night in the urban area considered in this study was 53 dB(A). Such a value of equivalent noise level exceeded limitations of noise indicators for the business and residential acoustic zone (the zone IV). The reason for such high noise levels was twofold: vicinity of an industrial recycling plant and the absence of natural or artificial sound barriers between the urban area and the plant.

The residential area endangered by the noise lies along the industrial zone, with approximate length around 200 m. The average distance between the closest buildings and the noise sources is around 130 m. The key problems for the design of an efficient noise protection system in this case were comparatively large height of noise sources, variability of the noise with time, and inability to construct massive fixed barriers due to the necessity to provide transportation corridors through the industrial plant.

With the idea to resolve the problems, the measurements of the noise were performed. Based on the measurement were determined the dominant noise sources and the type of the noise sources and characteristics of the noise. On the other hand were calculated the attenuation of the noise by possible noise barriers. Based on the previous calculations was determined mathematical model that enabled calculation of noise field and selection of the optimal solution of the noise protection system.