



Environmental impact assessment of road noise with noise map in Korea

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ABSTRACT

The environmental impact assessment of road noise is performed to evaluate the noise influence from the development project including a road in Korea. Recently, the noise impact assessment with a noise map is increased in order to describe the real noise environment according to a development project. In spite of this trend, the detailed guideline for the application of a noise map in the environmental impact assessment of a development project is deficient in Korea. Therefore, this paper suggests the application guideline of a noise map with a noise prediction program in order to perform the real noise impact assessment of a development project.

Keywords: Noise map, Road noise, Environmental impact assessment I-INCE Classification of Subjects Number(s): 76.1.1

1. INTRODUCTION

The environmental influence evaluation of development business evaluates effect of noise on tranquility facilities around the business district. In case of road noise estimation model and modification factors by floor depending on the road type are applied for evaluation. However, due to the expansion of road traffic facilities and generalization of high floor tranquility facility the existing noise estimation method has limitations. Therefore, there should be a new approach method for the accurate realization of noise influence along with the implementation the development business. In this perspective, application of noise map is rising as an alternative.

Recently, the application of noise map to the environmental influence evaluation in development business is increasing. However, there is a possibility of calculating different noise evaluation result depending on the commercial program (SoundPLAN) for creating noise map and verification of input variables accordingly. As this is the case, for road noise, this paper has proposed guideline for applying commercial program in the creation of noise map when evaluating environmental influence of development business.

2. CAUSE OF ROAD NOISE

For the evaluation of road noise influence by commercial program in charge of noise map creation information on cause of road noise has to be entered. The input type by cause of road noise by commercial program for making noise map is showing the similar pattern. Among the estimation formula of road noise that are included in the commercial program for creating noise map, in terms of German RLS90, it has induced input variables of cause of road noise as road data (width, etc), traffic, speed, ratio of large vehicles, road gradient, road pavement, and multiple reflection. For road data it requires to utilize data by road type or input width of road. For traffic, the input method is to fill out traffic volume by day, evening, and night and the ratio of large vehicles. The vehicle speed is divided into small and large cars. For road pavement it asks to select by pavement type or input modification value. The road gradient can be entered directly or use road information grafted to the geographical data. The multiple reflection considers effect of noise reflection between the buildings located on each side or the road. This estimates modification value by distance between the buildings and building height. Among the input variables of cause of road noise, looking at the noise

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distribution by traffic, speed, and changes in large car ratio, there was clear noise changes in the distance with less traffic and as it increases there was trend of convergence. Moreover, as speed increases, road noise went up as well. Similar to this, as ratio of large vehicle increases there was also trend of convergence. As a result of reviewing noise estimation result by changes in road data among input variables of cause of road noise, there is a difference between traffic in up and down roads and also, there is a possibility of installing median and soundproof wall in the center of road. Therefore, it is appropriate to divide up and down roads and make cause of road noise including road line. For the precondition of measuring traffic, speed, and ratio of large car, it is necessary to define method to divide small and large cars. In this case, one should refer to the standard of division by type of estimation formula of road noise included in the commercial program for creating noise map.

3. SOUNDPROOF WALL

For the input variable of soundproof wall included in the commercial program for the creation of noise map there are soundproof wall data (position, height, length, etc), characteristics of soundproof wall (absorption rate, etc), and broken and bridge walls. Input method of soundproof wall by types of commercial program for creating noise map showed similar pattern. For position and length of soundproof wall coordinates are indicated at the two ends of walls and constant value is entered for the height of soundproof wall. For the characteristics of soundproof wall level of absorption rate by material has to be entered. The broken soundproof wall means type which has a shape of being bent at a certain angle in a certain height and its vertical and horizontal lengths have to be entered. For bridge soundproof wall it is materializing soundproof wall installed in road bridges and it includes information on relative position of wall compared to the ground. As a result of reviewing effect of noise reduction of soundproof wall by changes of road data the effect varies depending on the cause of road noise, soundproof wall, relative position of receiving point. Therefore, it is appropriate to form cause of road noise by dividing up and down lanes and forming cause of road noise. For the result of measuring noise by characteristics (absorption rate) of soundproof wall depending on the material, effect of noise reduction may vary by types and features of wall material. Therefore, effect of noise reduction has to be calculated by considering these perspectives.

4. CONCLUSION

In this research it has proposed guideline for applying commercial program for creating noise map when evaluating environmental influence of development for road noise. For this, it has looked into types and contents of input data for cause of road noise with German RLS90 road noise estimation formula. Furthermore, it has studied changes in noise by input variables for cause of noise, traffic, speed, ratio of large vehicle, road data, and division of small and large vehicles. Lastly, this research has looked into types and contents of input data for soundproof wall and reviewed changes in noise by road data and characteristics of materials used in soundproof wall.