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THE INFLUENCE OF GREEN SPACE TO REDUCE THE ACOUSTIC LOAD ON HIGHWAY IN A RESIDENTIAL AREA OF THE CITY OF BRYANSK

Introduction

An important problem of today's large cities is noise - one of the factors of the environment, which, along with air and water pollution, has a negative impact on human health. For most large cities the need to improve the noise regime is particularly acute in the central areas. This is due to the fact that the centers of cities are saturated with intense traffic.

The predominant source of the traffic flows by motor and industrial production. With the passage of 1800÷3000 vehicles per hour average equivalent noise level in the neighborhood is of about 70 dBA. The noise level of vehicular traffic on the streets of the local movement is 55÷65 dBA, on the main streets - 70÷85 dBA.

Green areas have a significant impact on the microclimate of the city, reducing the concentration of pollutants, dust, and contaminants, are an additional means of reducing noise, since there not always is an opportunity to deal with the acoustic pollution by administrative, technical and urban planning methods.

Trees and shrubs, especially when used in combination with earthen forms and structures, can play a significant role in the management of the physical noise.

Analysis of domestic research reveals the following basic trend towards research:

– Assessment of the impact on the composition of the arboretum soundproof properties strips of green space;
– The study of the effectiveness of individual tree species in terms of acoustic anechoic chambers;
– The examination and identification of effective noise-reducing designs plantations;
– To develop some recommendations for noise-reducing landscaping of roadside territories.

1. Taking measurements

For a more complete picture it is necessary to measure the acoustic mode in winter and spring and autumn, and in the summer time. In the winter and spring of 2013, we measured the noise level at 18 sites in the city of Bryansk. Seasonal time for the measurement is selected, given the lack of leaves on trees and bushes. In the summer of 2013 measurements were taken again. All objects are adjacent to the motorways. This article shows the results of measuring the noise pollution on the example of the square named in honor of Gaidukov, because that object is situated away from the city center in an area with relatively free buildings, adjacent to the Krasnoarmejsky street on which move all types of vehicles including trucks and intercity buses. The square, rectangular in shape, is slightly elongated in the direction of the road, which gives the possibility of presence of almost all areas of acoustic comfort in its territory (Fig. 1). In addition, one half of the square is planted, the other is almost without trees, which makes it possible to compare the noise reduction in various conditions. Also there is the effect of shielding sound by a ten-apartment building on the left side of the square.

On-site measurements were made at 18 points. The points are located crosswise at 20, 40, 60, 80, and 120 meters from the road and the rows parallel to the road at a distance of 20 meters from each other in the middle of the center of the square.

2. Schemes

The following figures are the general schemes of acoustic pollution in the park named in honor of Gaidukov in spring and summer.

Fig. 1. The satellite image of the square named in honor of Gaidukov, made with Google Earth program on August 12, 2011

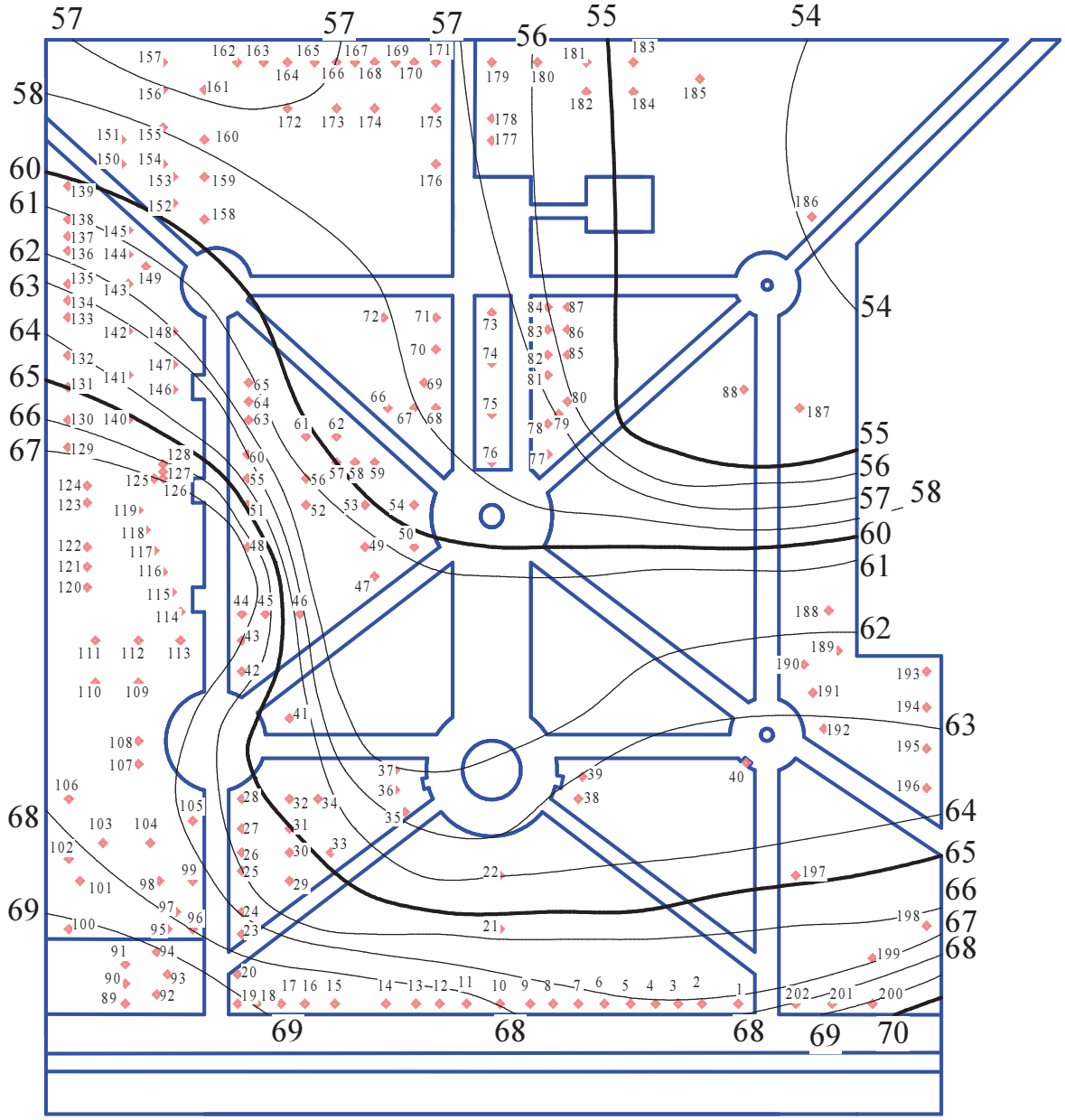

Fig. 2. Scheme of acoustic pollution of the square named in honor of Gaidukov in the leafless spring period

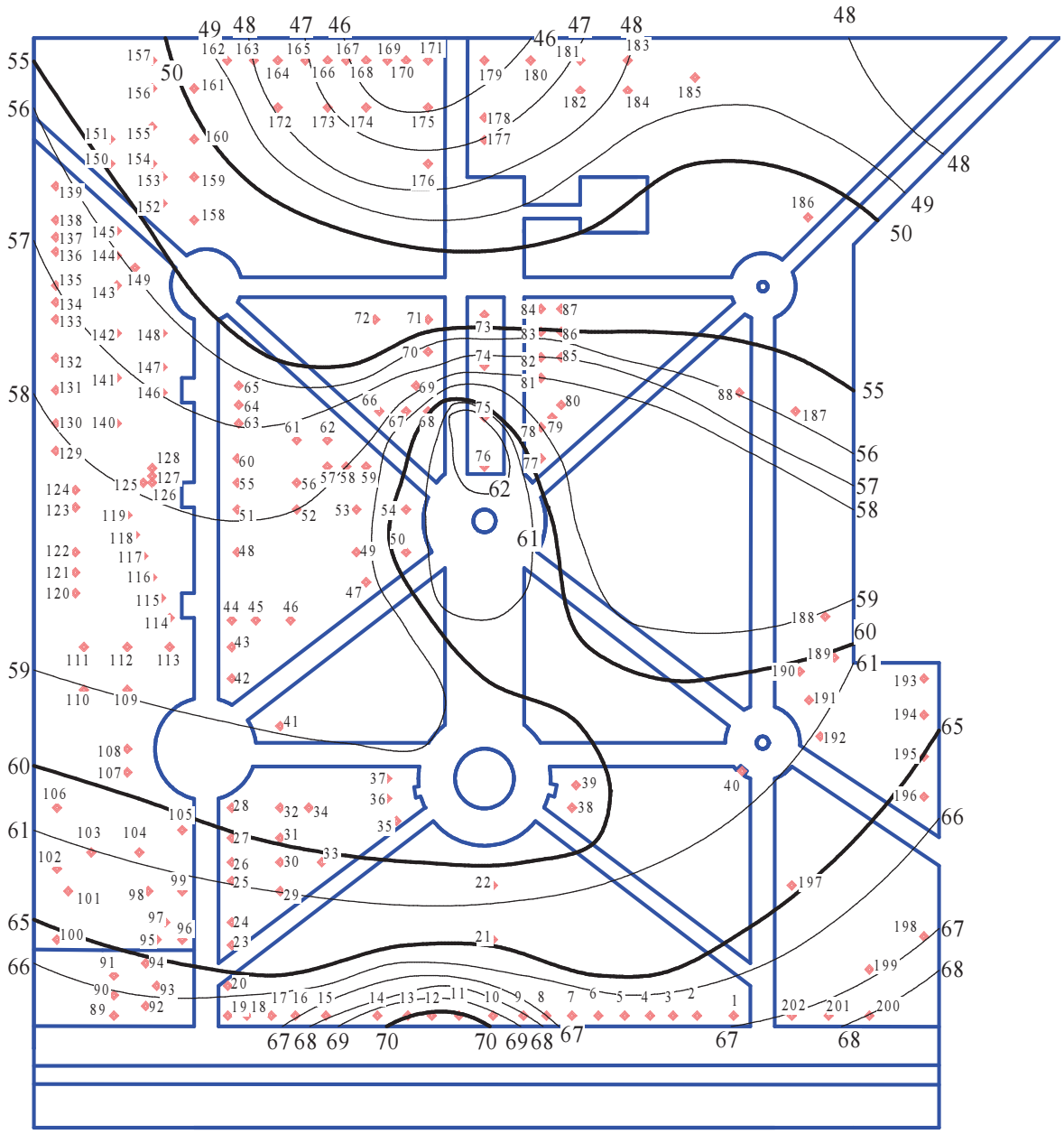

Fig. 3. Representation of the noise pollution in the square named in honor of Gaidukov in summer

3. Results

In the scheme of acoustic pollution in spring noise reduction up to 15 dBA at 120 meters, while in the left-hand side of the square noise level is higher, due to the shielding surface of the ten-story apartment building as well as the free space between the apartment building and the square. Noise levels along the road exceed 70 dBA. The most intense noise dampening occurs in the first 60 meters along the road (10 dBA at 60 meters). Approximately 80% of the park is in the area of acoustic pollution, exceeding the maximum permissible level (55 dBA) for 5 or more dBA more than half of the area of the square.

Quite a different picture is observed in the scheme of acoustic pollution in summer. Noise reduction up to 24 dBA at 120 meters, while the volume contour lines in many places follow the contours of the green array. The shielding effect of the ten-story apartment building is practically not observed. At the same time along the road noise level is still higher than 70 dBA. Quenching of sound in green arrays reaches places 10 dBA at 20 meters. In the area of acoustic discomfort is 65% of the area of the square, with only 30% of the maximum permissible level is exceeded by more than 5 dBA.

Conclusion

From the above it can be concluded that significant noise reduction by vegetation and damping of sound in urban areas along the highway with heavy traffic of vehicles occur in both the open space and green areas in the zone.

References

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Abstract

This article discusses the role of green space in reducing the noise level on the example of the park named of honor of Gaidukov in the city of Bryansk. The results of measuring the level of noise in spring and summer, as well as schemes prepared with the application of contour noise were presented.

Keywords: level of the noise, acoustic measure, acoustic pollution, green areas

Wpływ obszarów zielonych na redukcję obciążenia hałasem od autostrady osiedla mieszkaniowego w Briańsku

Streszczenie

W artykule omówiono rolę zieleni na zmniejszenie poziomu hałasu na przykładzie parku w mieście Briańsk. Pomiary poziomu hałasu wykonano w okresie wiosennym i letnim, przygotowano schemat z zastosowaniem krzywej hałasu.

Słowa kluczowe: poziom hałasu, pomiar akustyczny, zanieczyszczenie akustyczne, obszary zielone