SUBSTANTIATION OF THE STRUCTURE OF NOISE-GAS-DUST PROTECTION OF ROADS

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The road network as a complex of engineering structures is the object of natural-technogenic construction of a certain ecogeosystem and leads to disturbance of the natural landscape, changes the regime of surface and groundwater runoff, which intensifies erosion processes and soil degradation, etc. The change of natural landscapes due to road construction leads to a violation of the average wind speed and change of its directions, which causes changes in the microclimate, and hence the structure of the elements of the ecosystem adjacent to the road. The road violates the traditional seasonal migration routes of insects and certain species of animals. The use of local building materials, industrial waste, and in the process of road operation - various anti-ice materials in the construction of roads, leads to pollution of roadside areas and adjacent reservoirs with toxic substances. Engineering structures of the road network (bridges, pipes, road junctions, tunnels of various foundations and purposes, retaining walls, protective structures, etc.) have their own specific effects on the environment. Thus, during the construction of bridge crossings, the contour of the shoreline of reservoirs is reformed and the cross-sections of watercourses are changed, the hydrological regime is disturbed, erosion appears, and so on.

Thus, the main cause of landscape disturbances of areas adjacent to highways and road engineering structures is the dissection of the natural environment by the highway and the road network in general, which causes artificial fragmentation of natural and man-made landscape structure.

One of the significant factors in the pollution of land through the atmosphere is the emissions of vehicles. In some regions of Ukraine, such as Kyiv and Sumy, they account for more than 50% of total emissions.

The width of the roadside pollution strip is influenced by a number of factors. These include: weather and climatic conditions of the territory (humidity,

precipitation characteristics, frequency and strength of wind); the ratio of the main types of vehicles; traffic intensity.

The degree of air pollution by car emissions in local areas depends on the possibility of transport of pollutants, the level of their chemical activity, meteorological conditions of distribution in the area, the characteristics of the underlying surface.

The most effective method of protecting the roadside area is to create forest protection strips that shield the spread of gas-dust mixtures formed by vehicles. During the vegetative period, forest protection strips, depending on the type of plants, absorb different amounts of harmful substances. Deciduous trees can catch an average of 9-11%, and conifers - 13% (in some cases up to 30%) of dust and aerosol. The degree of this absorption depends on many factors: mechanical and convective redistribution of air flows, the ability of plant tissues to accumulate, physicochemical characteristics of gas absorption, and others. Plants, catching part of the emissions, localize them in a narrow strip, scatter the unabsorbed part of the pollution over a large area, which prevents the accumulation of pollutants in dangerous concentrations directly above the road surface.

On the territory of Ukraine, the most effective method of protecting the roadside area is the creation of forest protection strips that shield the spread of gas-dust mixtures formed by vehicles.

The main tasks of landscaping are the protection of roads and their structural elements from the effects of adverse weather and climatic conditions, protection of areas adjacent to the road from traffic pollution, the creation of elements of improvement and architectural and artistic design of the road.

In accordance with the requirements of comprehensive protection of the relevant roadside areas, the following main parameters of protective greenery are set:

- width of the strip not less than 10 m;
- the height of the trees should be at least 7-8 m;
- height of bushes not less than 1,5-2 m.

The shape of the transverse profile of the protective strip should have a shape with a flatter side facing the source of contamination (to the carriageway).

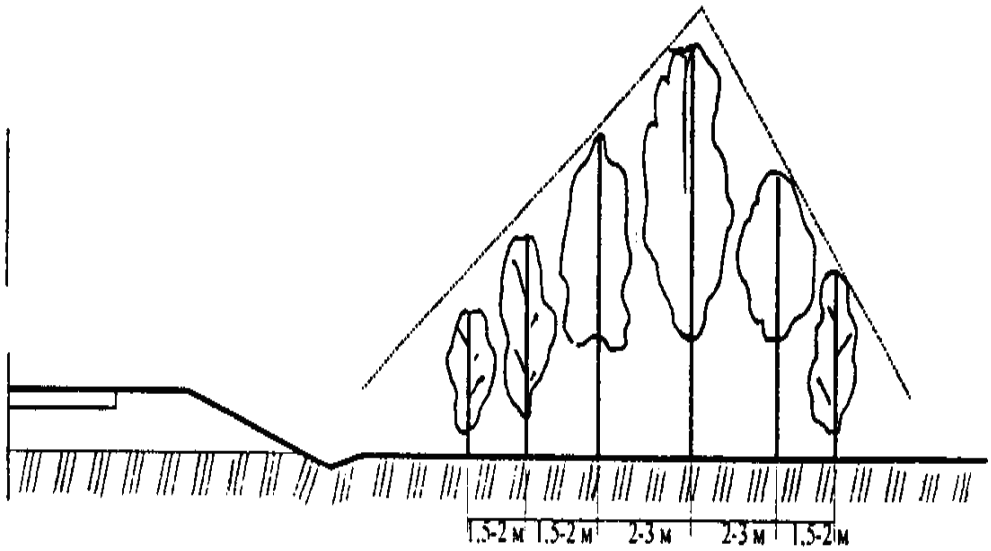

Fig. 1. Scheme of noise-gas-dust protection plantings

Noise-gas-dust protection plantings can be used in combination with earth shafts and noise protection screens.