

Analysis of the providing environmental safety supervision in construction and reconstruction of facilities in the urban territories

Vadim Bespalov¹ and Ekaterina Kotlyarova^{2,*}

¹Don State Technical University, Department of Environmental Engineering, 344022 Rostov-on-Don, Russia

²Don State Technical University, Department of Urban Planning and Building Design, 344022 Rostov-on-Don, Russia

Abstract. Economic development of the urban territories supposes preservation of industrial enterprises and industrial complexes in the infrastructure of populated places which connected with the decrease of the ecological safety level of the urban territories. The solution of the problem of ecological safety supervision in this areas is connected with the providing the optimized balance between economic development and comfortable environment conditions. On the first stage of solving this problem the authors carried out factor evaluation of the negative influence level caused by relevant sources on the environment based on complex consideration of three groups of factors: nature-oriented, social and economic.

Modern economic urban territories development inseparably connected from the one hand with production sphere development which means preserving industrial enterprises and industrial complexes in the infrastructure of the populated areas and from the other hand it is connected with the maximum level provision of environmental safety in the urban territories focused on ecological norm. We shouldn't forget about the postulates of steady ecological and rational development of the urban areas where the particular place is taken by the problem of environmental safety provision of the built areas including built-up, recreational and industrial areas [1-4].

It is necessary to point out the fact that over the recent years urban environment formation, including its architectural peculiarities, is connected both with designing stages and further building of the new urban elements and sites in built-up, industrial and recreational zones and also with the existing sites reconstruction. These include separate industrial enterprises and industrial complexes which are significant by their land area included into the urban areas structure. In spite of the cost-effectiveness of preserving industrial sites in the total urban areas structure, they are losing their function of city-forming centers every year as we could see several decades ago. Particularly striking examples are the large settlements in the second half of the nineteenth century in England, France, Germany, and others. At that time such functions of industrial enterprises led to the fact that many medium-sized towns and large cities transformed into the places of the concentration of different industrial enterprises of various industries. They in total negatively affected the environment, polluting the air of surrounding areas, soil and water sites, significantly lowering the environmental safety

level and the level of comfortable living in urban areas. This situation caused the necessity of reducing environmental stress in urban areas by the means of large industrial sites and industrial complexes dispersal. They were moved outside built-up and recreational zones to the external borders of urban areas.

Beginning approximately from 1960s industrial zones formation in urban areas and placing into urbanized zones large industrial sites and then creating industrial clusters began to be carried out by other principles. More and more careful considering of ecological factors and negative effect level measurement on the environment of such sites in regional schemes of the territorial planning of populated areas began to be held on a regular basis. With this we can confidently claim that was the beginning of ecosystem orientation in the city planning in our country. However a newly-formed or reconstructed industrial zone somehow should be placed in maximum possible accessibility for the staff and next to the main highways for delivering raw materials, marketing and other. In this regard it is necessary to consider that with the urbanization development which now could be expressed not only in particular settlement expansion but also in area's strengthening by the means of urban agglomerations forming, the situation could happen when earlier free from industrial sites built-up and recreational areas could again come close to already replaced industrial sites and separately formed industrial zones.

Providing an efficient balance between economic development and comfortable condition of the environment is from our point of view the key problem of environment safety supervision in such territories. On the first stage of solving this problem is necessary to

* Corresponding author: ekkot.arch@gmail.com

complete factor evaluation of the negative influence level of relevant sources on the environment.

Long-term observation analyses related to the impact of different sources to the negative influence on the environment allow to conclude that the industrial enterprises and industrial complexes mentioned above take the second place after motor transport. However these questions of sustainable transport infrastructure development currently draw the attention of the large amount of native and foreign scientists, and also professionals in designing and building fields, as the most urgent problem. For its solving "road maps" are created in many Russian and foreign cities. But collaborative environmentally safe running of the industrial sites with other elements of urban areas hasn't been examined up to the end.

In present conditions of cities' development along with the industrial enterprises as substantial sources of the negative effect on the environment large shopping centers (malls, retail parks etc.) appeared. As among premises of such complexes apart from directly trading spaces there are more over decades all around the world a large number of feeding points, enormous outdoor and indoor parking spaces, cinemas, bowling, ice skating rinks and many other shopping and entertainment and supporting infrastructure objects, aimed at an endless attracting of the customers.

For negative influence evaluation of the industrial enterprises and modern shopping and entertainment malls on environment of urban territories they use different scientific approaches which are characterized by a certain level of monopolarity. We have offered the approach based on a complex recording of three basic groups of factors: nature-oriented, social and economic [5].

For the nature-oriented group we offer to consider [6]:

- Peculiarities of industrial enterprises and modern shopping and entertainment malls location as the objects of man-made impact on the environment. They can be determined by using the electronic topographic map of the area with coordinates, enterprises location and relevant to each sources of negative influence: pollutants emission (hard, liquid spray and gaseous), discharge of sewage waters, noise, vibration, electromagnetical, radioactive and terminal radiation,
- Characteristics of the water-supply resources, water disposal systems, electric power system providing exploitation of these enterprises, and also minimum distance between the borders the enterprises and the nearest residential areas and buildings,
- Characteristics of each source of negative influence on the environment of each considered enterprise, including kinds of pollutants ended in the environment, their mass emissions, the efficiency of clearing of the relevant engineering and ecological systems of the enterprises,
- The condition of each component of the environment (air basin, water resources, soil) of the considered urban territory including factors defining severe weather conditions for the area.

Factor evaluation of the environmental safety of the industrial enterprises according to nature-oriented factors

should be completed in accordance to the algorithm given below.

On the electronic map of the examined area it is necessary to highlight the borders of the industrial zone, location of the main sources of negative influence on the environment, borders of buffer zone, waste collection site and others. It's desirable to update the map with the available monitoring or given information about physicochemical and quantitative characteristics of all pollutant kinds (declared, rated and real).

For the air basin evaluation it's necessary:

- To define the main sources of air pollution,
- Classified the sources in accordance to the amount of emissions and priority of carrying out air protection measures,
- To elicit the air pollution level,
- To define the level of maximum one-time and average daily pollutant concentration from each elicited source of pollutant emission.

Finding over limits zones of standard measures of relevant substances concentration on the bases of using the following basic methods:

- Instrumental, based on using automatic econometers, constantly measuring pollutant concentration in emissions. More often this method is used for controlling the main and the most spreading pollutants,
- Instrumental and laboratory, when previously exit gas sample collection is taken in the pollutant source, then their analysis is carried out in a lab environment,
- Calculation, which is based on mass pollutant emission in accordance with the data of feed composition and fuel in processing method etc.,
- Indicative, concluding the using of the indicative elements which measure their color depending on pollutant concentration in the worked out gas sample,
- Controlling, which is the defining the real pollutant level from enterprise emissions in reference points beyond its borders. After that the real pollutant level must be compared with reference value. The comparison is carried out in accordance with wind streamline for the particular area. This method is implemented controlling the large amount of emission sources both controlled and uncontrolled.

For the evaluation of water resources condition in the considered area it's necessary:

- To define sanitary and hygiene characteristics of water objects providing exploitation of the considered enterprises,
- Waterworks conditions in the considered area, including water-economic balance,
- To define for each considered enterprise the main water pollution sources (waste water disposal).

Water objects observation points is firstly organized on basins and drains which have primary domestic value and also subjected to large pollution by industrial and domestic sewage. Background observation points are organized on not apparently polluted by water waste water objects and drains.

In evaluation of soil condition we can include:

- The defining soil pollution level and sum characteristics of chemical elements data concentrated in soil,
- The defining of natural and recreation resources in an area (the presence of parks, gardens, mini-parks, boulevards, internal landscape gardening),
- The calculation of nature and recreation resources (which are available) rational using level,
- The defining of functional value of the examined land,
- The defining of characteristics of the soil loss level.

At that it's necessary to take into account that nature and recreational resources have three functions: pollutant assimilation, filling the air basin with oxygen, satisfaction of aesthetic needs of people. All these functions can be defined as the components of a single main function of the environment – the function of providing the life.

Characteristics consideration of the land functional value is necessary to know the borders of the negative influence from the enterprises on the environment and to limit this influence on the bases of using either technological or special engineering and ecological measures. In work [7] methodical bases of the defining the severity of landscaped urban areas functional value are given. Nature and recreational resources of the area include recreational landscapes, hydro and mineral resources, bioclimate. Favorable environment condition is the necessary factor for natural recreation resources availability.

For natural and recreational resources evaluation different methods are applied. At that the most spreading and appropriate to the common recreational analysis of the area is the evaluation of the level of landscape usefulness, bioclimatic and ecological characteristics for recreational using.

For the physical factors (vibration, noise, magneto-electric, ionisable and heat radiation) evaluation influencing on the environment it's necessary:

- To define the sources of negative influence on the environment and find out their intensity,
- To define discomfort zones within which the tolerated level of the physical factors negative influence is exceeded.

In the group of social factors we offer to include [8]:

- The number of population in the area,
- Density of population,
- Children and adult population state of health,
- Children and adult number of death,
- Infrastructure of urban area and its planning,
- The living level of comfort in the examined area,
- Conveniences of urban territory,
- Availability and the list of social objects in the examined area.

Listed social factors can be used for the living environment quality evaluation in the considered area [9,10], and their violation leads to global health and social threats for the population [11,12].

It's known [11,12] that population health is the main indicator of social wellbeing and proper economic functioning of the society. The raised level of ecological danger in the considered area firstly affects the health

condition of people living on the territory which is affected by negative influence of the territory. The results of numerous researches proved that with the influence of negative environment the quantity of diseases raises sharply especially among children, also there is the raise of lethal level.

Under the conditions of health decline of the population which is explained by stressed conditions of which living conditions and environment condition demands towards the organization of ecological safety of the urban territories are toughened.

Man-made influence on the population living and working in the examined area leads to the raise of pathology and others factors of human health: from common physical and psychical development to peculiarities of age progress and death rate and also all forms of diseases. This idea is the main form of monitoring the health of the population in social and hygiene system which is necessary to consider as the basic instrument for the health evaluation of the population and the revealing of environmental factors defining its forming. Important integral index recommended by WHO as the characteristic of the health condition of the population and its living standards of one or another region is the life expectancy.

The main difficulty is in defining the level of influence of each factor on the health condition of the population.

In a group of economic factors we offer to include:

- Taxes, payoffs, contributions and other cash flows into municipal treasury,
- Liabilities of investment nature aimed at the social sphere development and economic development of the city and consequently the region in all,
- Building and ground rent,
- Economic damage caused by limit-exceeding environmental pollution.

From one hand economic factors define the profit and the efficiency of the industrial objects, large shopping and entertainment malls, power stations and others located in the examined area and allow to analyze the financial opportunity of the area but from the other hand reflect the economic loss caused by environmental pollution.

Thus in the result of carried out analyses we can define the main factors of economic, social and ecological nature defining the level of ecological security of the industrial enterprises and modern shopping and entertainment malls in the urban territories. This will allow us on the next stage of the research to develop and describe relevant criteria of the ecological safety of industrial areas and separate enterprises in the urban territories.

Industrial zones as a part of urbanized territories are one of the main resources of the city development. However it would be mistakenly to think that the main task of them – the maximum launch of these sites for further profiting. Each industrial complex should have its own model of the development, based on its location, demands and considering the interests of the residents of nearby areas and future consumers. Aspects of creating comfortable and attractive urban environment also have

considerable importance. In addition, it is necessary to conduct a detailed analyses of building influence or reconstruction objects of this type on the further running of the city in the whole and also, which is importantly, with necessary preserving and enhancing environmental safety of urban territories.

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