Reconstruction of Kropotkin city in Krasnodar Region in medium term perspective

Vitaliy Kasyanov and Ivan Marchenko
Moscow State University of Civil Engineering, Yaroslavskoe shosse, 26, Moscow, Russia
E-mail: KasyanovVF@mgsu.ru

Abstract. Present article provides an overview for the organization of reconstruction in Kropotkin city of Krasnodar Region in the medium-term perspective. During the research we've considered particular features of real estate development and conditions of the urban environment at the present moment. This study is relevant due to presence of city problems in the field of urban planning and reconstruction. In this regard, purpose of this article is to formulate recommendations to overcome above stated problems. Analysis and synthesis were the main methods used in the research article. As a result of the research recommendations were developed to address some of the problems in urban development and reconstruction of the Kropotkin city.

1. Article

Nowadays reconstruction became one of the main trends in the modern world, as it reduces construction costs by modernization of already constructed buildings instead of a new construction. "Any reconstruction of urban development today is a complex task" [4, p. 30]. Aim of such modernization is a solution to the following issues: nature conservation, restructuring and development of transport routes, and painless for the city integration of bordering areas.

In this research the object of research is one of cities of Krasnodar Region, which requires an integrated approach to reconstruction, namely the city of Kropotkin. As of 2019, population of the city is about 80 thousand people. [5] Of the 26 cities in Krasnodar Region, Kropotkin holds 7th position based on the population size and does not carry "resort city" status. Research of the topic on the example of Kropotkin city, will allow to avoid urban planning mistakes, save natural and material resources and to make a thought-out approach to the planning and development of small and medium-sized cities of Krasnodar Region. Consideration of recommendations and proposals on reconstruction and urban planning of the Kropotkin city makes this research relevant and practically important, as applied analysis techniques can be used in the future to work in the field of urban planning in other parts of Krasnodar Region, because the problem of reconstruction of a number of cities in the Region more relevant than ever. Novelty of the study lies in its uniqueness and primacy, as there were no previous attempts on reconstruction and urban planning proposals for the cities in the Krasnodar Region of the Russian Federation with given range of population.

The emergence of any population unit, as well as its gradual historical development is a difficult and lengthy process. In each region, these units have evolved differently, due to certain factors, which, in turn, led to their specific ways of development and planning. Over time, population units grew to
the level of cities that in process absorbed smaller rural settlements. Historically, the main type of development in these cities were low-rise buildings and structures that fulfill the primary needs of the population in housing, manufacturing, industry and priority infrastructure. However, historical process does not stand still, along with the development of the city, its infrastructure develops, its technical, engineering and transport communications become more complicated, new buildings and structures of a new era are being built, which are modern and allow people to efficiently conduct their labor, economic, social and cultural activities. Now city becomes a layered, complex in its structure, since now it intersects historical and modern parts of the city development. For its further systematic and successful development, we need to have thought-out approach to its further growth, to effectively solve problems and modern challenges. That is why today, the importance of urban development work, as well as work related to the reconstruction of buildings, is growing throughout the world. After all, these works are responsible for the spatial formation of population units. 10 – 1

Kropotkin city can be attributed to the category of "small cities" [8, p. 344]. After dissolution of the Soviet Union, "small cities underwent a socio-economic decline, which manifested in the closure of a significant part of industrial enterprises and facilities that performed city-forming functions" [7, p. 102]. This statement is fully applicable to the city of Kropotkin. Even though Kropotkin city is currently one of the “industrial centers of the Kuban” [10], some large industrial enterprises of the city underwent bankruptcy, for example, Kropotkinsky brewery and the Kropotkinsky chemical plant.

Today, Kropotkin city is a growing functioning unit with a developing infrastructure, new residential neighborhoods and preserved historical buildings. Geographical location and strong growth of the city, no doubt, brought changes in the character of the city development. Today's development features and the state of the urban environment in Kropotkin city Krasnodar Region:
- one and two-story buildings mainly with single-family houses or multi-apartment buildings no higher than 12 floors;
- irregular and spontaneous planning structure;
- abandoned and active industrial complexes located within the city;
- increased cargo load, as the city is a road and railway transport hub.

For a harmonious combination of new apartment buildings with already built objects as well as for the efficient use of housing stock and urban territories we encourage to build multi-apartment residential buildings of 6 to 7 floors. Such houses allow us to avoid overpopulation of the city district, and therefore do not create parking problems, which is extremely relevant for the city, as in the resolution of the administration of the Kropotkinsky urban settlement of the Caucasus region No. 809 dated 09/27/2017 "On holding of public hearings on the discussion of the Integrated Program for the development of transport infrastructure of the Kropotkin urban settlement of the Caucasus region for 2017-2027" development of parking space is not provisioned [3, p. 30].

An illustrative implementation of this project is a residential six-story triplex building in the residential complex "Harmony" in the Krivskoe village of Kaluga Oblast (Figure. 1).
Another suggestion to improve city environment would be to work with its industrial facilities. Since at the moment buildings of the former Kropotkin chemical plant, are located in the city borders, which are in poor condition and not operated (Fig. 2 and Fig. 3), we can recommend to dismantle these facilities with an aim to use freed up territories for social purposes. Of course, we should consider that the "renovation of industrial areas, dislocation and conversion of industrial enterprises is a complex multistep process that requires a well-developed system of interaction between city administration bodies, federal services, enterprises, investors and financial institutions" [2, p. 17].

Figure 1. Six-storey three-section residential building

Figure 2. Photograph of the abandoned buildings of the former chemical plant in Kropotkin city
In connection with these features, it should be noted that the objects of reconstruction should emphasize the importance of the city and regional center and harmonize with the reconstructed historical buildings. As mentioned above, one of the reasons for the reconstruction in the city of Kropotkin is the lack of efficient use of the housing stock and urban areas as a whole, as well as increased transport load. Transformations can produce the greatest effect in usage of urban areas and communications with minimum costs. Overall objective of this activity is aimed at creating favorable conditions for the population to live in, to limit the harmful effects of economic or other activities on the environment and its rational use in the interests of present and future generations of citizens by using urban planning tools and resources.

It is also worth noting that the city experiences an acute shortage of material and professional labor resources, which complicates the process of its planned development. As for the economic part of making profit for the city, there are also number of problems, one of which is that the city’s treasury is replenished mainly through the sale of its land plots. This process actively exerts its negative impact on private land surveying. Additionally, due to the budget deficit, a number of other acute problems arise that need to be addressed. Transition to the construction of six-story buildings mentioned above can not only make the lives of its residents more comfortable, but also contribute to the economic development of the city, since the construction of these buildings can be carried out on a metal frame, the industrial production base of which is available in Kropotkin city. This will provide city's industry with a permanent contract, and city's residents with new jobs. In addition, it is worth noting that seismic resistance of these buildings and their environmental friendliness, allows us to close another pool of tasks. During implementation of such projects, it is necessary to give preference to such "technological methods that are able to fully materialize structural connectivity of the spatial framework of the city" [1, p. 42-43].

It becomes clear that on the basis of such conjuncture of problems, it is necessary to consider the prospects of urban development on the example of a separate settlement, for which the city of Kropotkin of the Krasnodar Region was chosen.

From environmental factors standpoint, the city of Kropotkin is located in a lowland zone - the Prikuban lowland, ecological changes in which are “traced horizontally” [6, p. 169]. In this regard, when making urban planning decisions, it is necessary to take into account environmental situation in

Figure 3. Former Kropotkin chemical plant facilities in the center of the master plan fragment of district municipal formation Kropotkin city.
the city, information about which can be taken from the ecological passport of the city. That would allow us to develop industrial, transport and other facilities without harming public health and environment [6, p. 170].

To organize urban planning and reconstruction of Kropotkin city, following tasks should be solved:
1) To provide a high level of comfort, since houses on 6-7 floors are equipped with elevators in a mandatory manner;
2) Fulfill the requirements of the federal program “Accessible Environment”;
3) Achieve savings, since with a lower number of floors, cost of a square meter is cheaper than in a house with a height of more than ten floors;
4) To accelerate implementation of the urban development program, since low-rise buildings are built faster than high-rises;
5) To provision parking space development.

Implementation of these proposals for the reconstruction of Kropotkin city in Krasnodar Region will create prerequisites for the qualitative development of the urban environment that meets modern requirements.

References
[1] Volchok Yu P 2011 Gradoustroitelnyy podkhod k problemam otsenki vetkhogo fonda Nedvizhimost': ekonomika, upravlenie 2 39-43
[2] Golovin A V 2011 Integratsiya promyshlennykh territoriy v gorodskuyu sredu Vestnik Permskogo natsional'noy issledovatel'skogo politekhnicheskogo universiteta. Urbanistica 1(I) 7-20
[3] Kasyanov V F, Marchenko I A 2018 Problemy i perspektivy gradostroitelnstva i rekonstruktsii goroda Kropotkin Krasnodarskogo Kraya zhurnal BST Nauka 2.1 11 28-30
[4] Kasyanov V F 2002 Printsipnye rekonstruktsii zhiloy zastroyki s uchetom konstruktivno-planirovchnych parametrov zdaniy: dis-tsiya ... doktora tekhnicheskikh nauk: 18.00.04 / Mosk. in-t kommun. khoz-i strava 255
[5] O gorode Kropotkine. Ofitsial'nyy sayt gorodskogo poseleniya. Rezhim dostupa: http://gorod-kropotkin.ru/o-gorode/o-gorode-kropotkine/ [Date of enquiry: 13.03.2020]
[6] Sokol'skaya O N, Rabotyagov D B 2015 Ekologicheskiy pasport goroda – osnova gradoeokologicheskogo stroitel'stva v krasnodprskom krae Evraziyiskiy soyuza uchenykh. 4-9(13) 167-170
[7] Solntseva A A 2018 Prirodno-khozyaystvennaya spetsifika nebol'shikh gorodov rossi V sbornike: Ekologicheskie problemy prirodnykh i urbanizirovannykh territoriy Materialy IX Mezhdunarodnoy nauchno-prakticheskoy konferentsii 99-104
[8] Tsay S N, Solntseva A A 2018 Osobennosti prirodno-khozyaystvennoy sistemy nebol'shikh gorodov rossi V sbornike: Innovatsionnye puti resheniya aktual'nykh problem prirodopol'zovaniya i zashchity okruzhayushchey sredy. Materialy dokladov Mezhdunarodnoy nauchno-tekhnicheskoy konferentsii 342-348
[9] https://krasnodar.ru/content/587/show/49562/ Portal ispolnitel'nykh organov gosudarstvennoy vlasti Krasnodarskogo Kraya [Date of enquiry: 13.03.2020]