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I. Rasuleva, D. Kudasheva

Ufa State Petroleum Technological University, Russian Federation, Ufa, Kosmonavtov 1
e-mail: schemaju@gmail.com, dilara_kudasheva@mail.ru

THE IMPLOSIVE APPROACH IN RESEARCH AND URBAN ENVIRONMENT DESIGN

Abstract. *The article is dedicated to revealing the features of the implosive approach to solution of urban problems of different scale and implementation of implosive techniques in the traditional algorithm of architectural design, through which it can acquire additional stages.*
Keywords: *implosive design method, research of urban territories, contextual design.*

Introduction

Current problems of urban morphology are linked with questions of adaptability of the projected spatial structures in the dynamically changing field of urban cloth. The city exists in a variety of constantly updated ideas and views that are growing in a chaotic order and, on the basis of the information received, puts forward new demands in architecture. Architecture has to adapt to the environmental changes, otherwise it quickly loses its sustainability. Today it is reasonable to turn to the contextual direction in design, focused on a high degree of "embedding" of the architecture in the environment. Among different contextual methods there can be distinguished an implosive approach that extends opportunities of working with the context by implementing original project models.

In the general scientific view the phenomenon of implosion is formulated as an explosion directed inwards. The proposed implosive approach develops an architectural version of this phenomenon. Implosion is represented in the form of an open system of interconnection between external and internal project contexts that shift the design boundary into the pre-project analysis of the initial situation. As a result, architect gets the opportunity to reify the territory processes and work with them as an abstract form.

Methodology

Traditional pre-project analysis (Barkhin, 1982) in implosive design is divided into the step of pre-project analysis and the step of project development. During the pre-project analysis stage in the external project context, the initial situation is synthesized as a "virtual simulacrum" of contextual interrelations with environment (*a schemeform of the context*) (Rasuleva, 2016) that are conditionally built in horizontal and vertical planes.

The vertical plane is linked with history, genius loci, vernaculars and morphological features of the natural and human-made landscape that have developed on the territory for a long time. The horizontal plane reflects the actual urban processes of local and global levels: the current processes of vital activity of people characteristic of it. The internal project context is associated with the work of an architect's individual creative laboratory, forming a new type of territory emotional experience and the opportunity of its resource potential, formalized through the prism of personal appropriation. In the implosive approach the result of external and internal contexts interaction becomes the creation of the initial situation model.

A pre-project analysis result is the creation of *the contextual target specification (CTS)* (Rasuleva, 2017) that is formed as a scenography of processes, activities and potentials of the examined territory, working as a project strategy open for the context changes.

During the project development stage in the implosive method there can be discerned improved conditions of the CTS adaptability to the context reality. The CTS gets special supplements that let the resulting architectural form be open for changes, keeping its invariant. For this the CTS passes through three stages of sustained update in selected layers of context: historical, infrastructural and anthropogenic.

This article is dedicated to the description of the CTS upgrading layers on the basis of formed implosive design models.

Measurement and analysis

The upgrade phase in the historical layer provides the future project decision communication with the cultural and historical potential of the territory by means of revealing its artifacts. The project gets the opportunity to introduce historical monuments into a new construction harmoniously, making them the main structure-forming elements of the transformational activity.

In this regard based on the world design experience in the implosive laboratory, a *conceptual model of cultural-historical urban environment activation* (Rasuleva, Mukhamadullina, 2015) was developed. This model is the same for monuments, both included and not included in the unified state register of cultural heritage objects and its aim is to preserve the orientation of each architectural plan for reconstructing and consolidating the vertical links with the examined territory without entering into conflict with the opinion of experts. The developed model consists of three stages. The first stage is the identification and analysis of historical monuments. In this case, historical monuments are understood not only as individual monuments of architecture, but also as the historical natural and technical system as a whole, which includes historical events, memorial sites, cultural landscapes.Since each object or event in the implosive model is always a contextual thought – in its interrelations with the environment, each of the artifacts is analyzed not only for its physical conservation to a certain degree (from 0 to 100%), but for the evaluation in the context of historically established and relevant links.

Within the framework of the proposed model the estimate of artifacts contextuality is made according to five developed conditions which in some cases do not separate the object/event and its environment, while in other cases they consider the following characteristics separately:

- "memory of the place" (historical event preservation in the memory of citizens)
- historical function (safety and importance of the historical function of the object)
- type of the environment
- functional saturation of the object and its territory
- "behavioural motives" (integration of the object into actual social interrelations).

At the second stage of the model's work, depending on the preservation degree, the necessary design methods from the world's experience with cultural and historical potential are selected (Fig.1).

- (0-25%) *Method of taking* works with monuments as historical artifacts and is used for creation of "museum" urban spaces in territories, not possesing cultural and historical memory
- (15-45%) *Method of energy* works with a mythologized environment and reifies the traces of non-material culture that the territory stores
- (35-65%) *Method of revitalization* works with undestroyed or partially undestroyed historical monuments in order to recreate the historical environment without obligatory following the original function of the structures
- (55-85%) *Method of renovation* suggests a set of activities, aimed at preventing subsequent destruction and achievement of the optimal conditions for the continuous conservation of monuments
- (75-100%) *Method of conservation* suggests a set of activities, aimed at preserving and maintaining the monuments in their original form. This method does not require a complete restoration of the monument and does not provide for additional interference in its structure
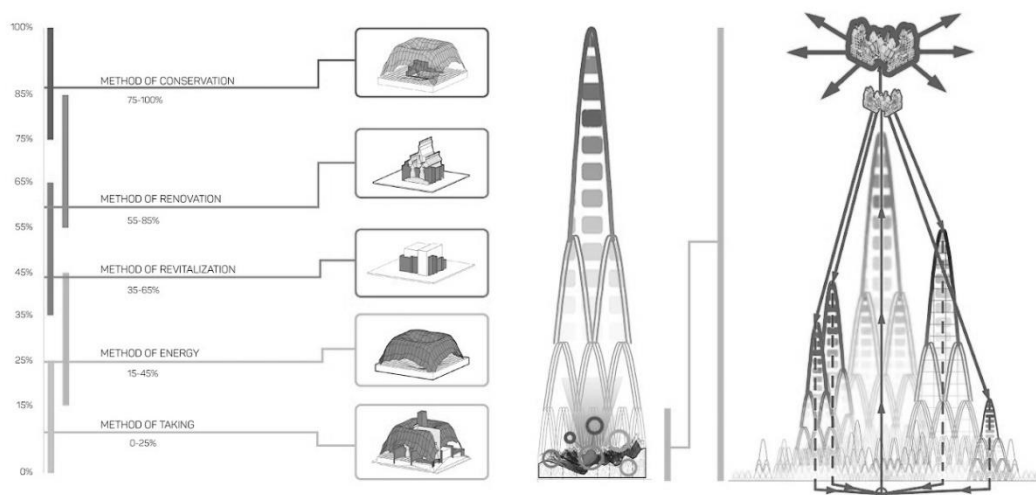
Figure 1. Methods of working with cultural and historical potential

Within the framework of the proposed model the presented methods complement each other on the "matryoshka" basis; they work together, taking into account the mobility and dynamism of the cultural and historical landscape in which the historical monument plays a role of a retaining mechanism.

At the third stage of the model's work, the chosen method is estimated from the perspective of revealed contextual links, gets a "binding" to the territory and in this form is added to the formed CTS.

The model of cultural-historical potential activation implies a possible methodological conflict between the chosen method and current project conditions. As historical monuments in implosive approach are taken as the most sustainable elements of cultural and historical landscape, the condition of identifying the monument's preservation becomes the most sustainable and dominant in relation to others. That is why in case of conflict it is recommended to change the method towards the highest degree of the cultural-historical potential conservation.

The upgrade phase in the infrastructure layer is oriented to work out the "horizontal" links of the future project solution and assumes consideration of the initial territory in terms of the parameters of stability and instability of its development. The reference at this stage is *a complex model of 3D-parcelling of infrastructure on the territory*. The model consists of conceptual approaches developed within the framework of the implosive methodology: "designing the city as a resource" (Rasuleva, Volchik, 2015), "corporal urbanism" (Rasuleva, Akhmadinurova, 2016), (Vysokovsky, 2015) "tutorial landscape" (Rasuleva, Islamova, 2016), (Zambelli, 2005). These methods explore different aspects of the territory's infrastructure through citywide processes. Within each approach there lays the identification of unstable urban areas and a scenario of their stabilization. The division of the city into stable and unstable territories is connected with the dynamics of city-forming processes of various scale level and the formation in this connection of various conditions for sustainable development. The understanding of stability / instability in these approaches depends on the viewpoint of addressing urban problems. In particular, the "designing the city as a resource" approach considers the city from the perspective of general planning as if from above. "Corporal urbanism" connects the vision of the city as if from below from the positions of mental maps of the citizens. "Tutorial landscape" examines the natural potential of urban areas from the outside and from inside prespectives. For each of the approaches within the framework of the integrated model, variants of "germination" are proposed as regards the infrastructure layer of the artifacts identified at the previous stage.

Designing the city as a resource. According to this approach, stable territories are defined as territories with a stable form of people's livelihood in terms of functional ties, socium and

mentality, the so-called "cities in the city" (Aureli, 2015). In them, as in the exemplary "outbreaks" of life, there is the maximum possible concentration of the internal processes taking place on the territory that feed it and which are connected to the common "city bloodstream". All other territories are regarded as unstable, being affected by more spontaneous development with changes in the pace of "transformative project activity".

According to the model, stable territories are supposed to be strengthened, while unstable territories are to be developed in conditions of self-regulation taking into account ecological requirements. Ecology is understood in this case as a combination of favorable physical characteristics of human life conditions, social practices of good neighborliness and preservation of the cultural and historical landscape as a whole.

The strategy of stabilization of unstable territories in this approach involves the creation of a special urban laboratory that initiates the study, development and implementation of new methods of design, construction and urban management. This laboratory becomes a specially integrated "island" of stability in the city, which should "revitalize" the unstable territory as a whole.

If the territory is defined as stable, then the artifact (or a system of artifacts) integrated into it at the renewal stage in the historical layer should work to enhance the stability and attractiveness of the territory, both for residents and for the city as a whole. In this case, it can play the role of a museum of the place, thus securing the resources and potentials of the territory. If the artifact is on the border between a stable and an unstable territories, then it should become a part of the public space project, its brand. If the artifact is found on an unstable territory, it becomes an experimental polygon for an urban laboratory.

Corporal urbanism. A feature of considering the city within the framework of corporal urbanism is the discreteness of the sense of stability-instability of urban areas. The sense of stability is associated with the process of interiorization (appropriation) of a person by the city space. In this vein, the territory of the courtyard, the vernacular area and the historic centre of the city are stable. The yard scale is defined as the primary, root scale of interiorization, giving rise to a sense of security and belonging to one's environment. It is in the yard where one's own way of life is formed, with the yard being a bulwark of stability for the person living in it.

Vernacular areas have fuzzy boundaries. Therefore, at the level of the vernacular areas, stable centres are their centres, defined by the citizens as a source of the identity of the urban space. The centres of the vernaculars are the already existing event sites of the city, a unique "internal" space, fixed by the physical parameters of the environmental environment (Rasuleva, Akhmadinurova, 2016).

For the level of the city as a whole, the stable territory is its "heart" (Vysokovskiy, 2015), the historical centre of the city, which is realized by residents as a priori harmonious, comfortable and stable environment.

Within the framework of this approach, the unstable territory begins where the yard space, the centre of the vernacular area and the urban "heart" end. Unstable territory as a whole is represented as something alien – external, in contact with the internal – its own location. The process of stabilization is associated with the development of a fabric and a skeleton of contact-butt zones between stable and unstable areas.

Within the framework of this approach, the identified artifacts fall into the field of project initiatives that originate in studies of environmental factors in nearby courtyards, centres of vernacular areas and urban "heart".

If an artifact is germinating on the stable or borderline territory, then the methods of its integration into the urban environment coincide with the methods of "designing a city as a resource". If the artifact is found on the unstable territory, then the method of its integration will be in close contact with the methods of designing courtyard sights and demo versions of the centres of the vernacular areas. The artifact combines the quality of the navigation node, reflecting the local color of the environment, and may become a demo version of the centre.

Urban "heart", being the custodian of the main idea of the city, in this case will fulfill the role of the regulator of the project process as a whole.

Tutorial landscape. This approach is defined as stable recreational areas in which the city and nature meet in extreme conditions ("mountain-pit", "water-land"). These territories have clearly expressed vertical and horizontal links to the context and are included in the urban infrastructure by the function of contemplation.

All other territories within the model are conditionally accepted as unstable. The stabilization scenario in this case is deployed within the stable territories and is connected with the revealing of their training potential. Stable territories are presented here as examples of harmonious interaction of natural and anthropogenic urban landscapes, strategies and tactics of a reasonable balance of nature management and nature conservation in cities.

To prevent risks associated with the imbalance of natural and man-made origins in stable areas, it is proposed to convert them into landscape neo-monuments, which are additionally fixed by specially designed eco-markers (natural objects, eco-engineering). Such a procedure makes it possible to assign to the place the status of the operating laboratory for the improvement of the environment, and to let the landscape and recreational framework created on its basis become a base for intra-urban tourism. In the concept of the tutorial landscape, work with artifacts on stable territories is determined by its physical parameters. The artifact can coincide in size with the allocated extreme territory, be larger or smaller. In any case, the historical features of the territory are combined with the natural ones in the process of shaping the neo-monument. Here, obligatory regulators of its formation are methods of land morphology, which allow preserving the landscape character of stable territories. If an artifact hits the border of "stability", it becomes a public space for the needs of the resource potential of the territory. If the artifact is found on the unstable territory, it becomes a new neo-monument and is formed as a node of the urban landscape-recreational skeleton.

Infrastructural 3D-parcellation. In this approach, the unstable territory is the design territory, and the stable territory is its environment with the so-called vertical and horizontal portals of the city. Under vertical portals implosive artifacts are meant, while horizontal portals are infrastructural entrances to the project area. The process of stabilization of the unstable territory involves the development of the relationship between vertical and horizontal portals on the projected territory, as well as the strengthening of the infrastructure connection of implosive artifacts in general. In the context of this universal design model, all implosive artifacts "germinate" on the stable territory and their stability is enhanced by linking to horizontal portals, working as attractors of the territory. If the artifact was inside a horizontal portal, then it would work as a navigation node with a contemplative function. If it was on the border between the stable and unstable territories, it would be projected as a public space by analogy with previous approaches.

The upgrade phase in the anthropogenic layer assumes the development of communication between the resultant architectural form with the users of the projected area, experts, investors and the city administration. At this stage, *a universal prototypical model of shape formation* developed in the implosive laboratory (Rasuleva, 2017) is used, in which the project area, all the participants and the world experience in architectural design are united. A strategy of total complicity is formed, where the identified historical artifacts become triggers of the project activity. This stage consists of two stages and corresponds to two modes of the model operation. The first step of this stage can be called a design research: polls, design games, media meetings, workshops with residents and other similar events, which are the tool of participatory design in its classical version (Sanoff, 2000) and which clarify the architect's vision of the initial project context. The result is a clarification of the identified cultural and historical potential of the territory and the configuration of the archipelago of islands of stability. Further, *an ideal design solution (IDS)* is developed, which, in the logic of the developed special additions to the CTS, involves problem-oriented world experience and offers a specific solution.

At the second stage of the renewal of the design strategy, the IDS again becomes the object of public expertise, as it clarifies the problematization and relevance of the world experience of shaping methods used in the project.
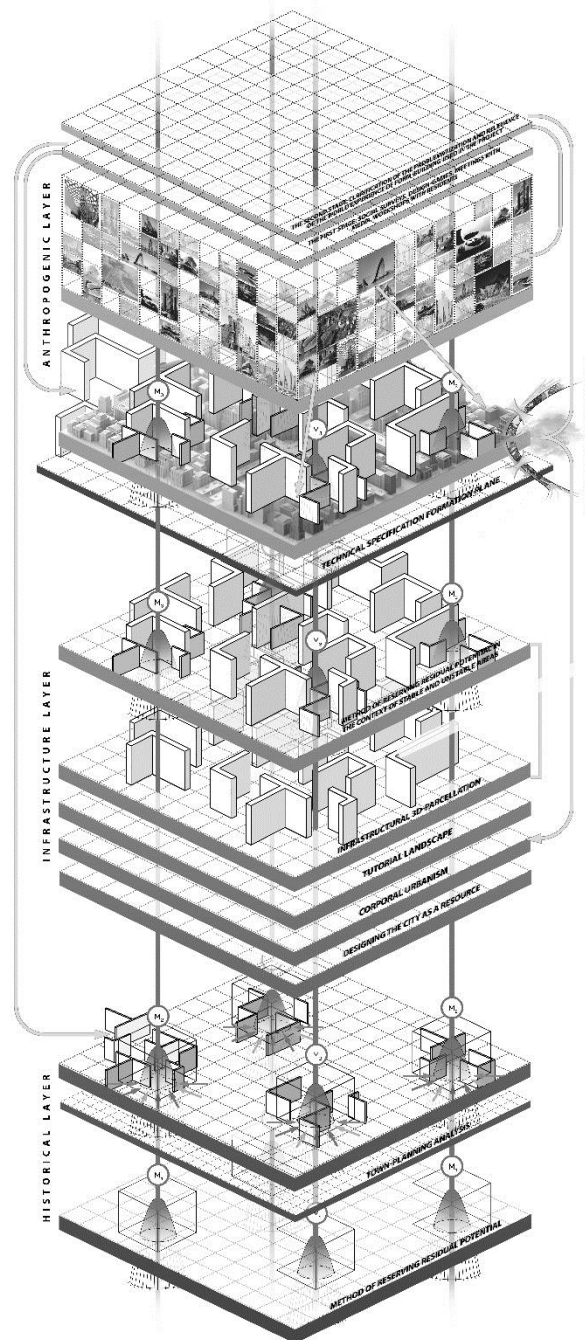

Figure 2. Combined scheme of historical,
infrastructural and anthropogenic layers

The peculiarity of this design stage is that the IDS, which in the traditional design crowns the design process, is initially conceived as an intermediate design state and the way of existence of the architectural form as an open system constantly in the process of "becoming".Therefore, the IDS can trigger the implosion of the implosive design process as a whole and restart it not only during the upgrade stages, but also at the stage of the pre-project analysis. In this case, the design process will return to the restructuring of the context schema and trigger the chain reaction of the

rearrangements along the layers of the CTS update. Also, a feature of updating the design strategy in the anthropogenic layer is the implosion technique developed within the implantation technique of implosive particle-forming. They expand the methodological boundaries of participatory design by connecting to it the individual creative laboratory of the architect. The world experience of shaping is represented in four types of involving it in the design process: "classical", "environmental", "communal" and "demo version" (Rasuleva, 2017).

Conclusion

The proposed implosive approach in the pre-project analysis of urban areas allows us to expand the traditional design process intra-structurally, opening up the possibility for the design solution to be developed for problem-oriented interaction with the world experience in the stages of updating the CTS. In each of the allocated stages (historical, infrastructural, anthropogenic), the CTS passes the procedure of layer-by-level structural updating of the "file".

The renewal stage in the historical layer allows us to articulate the vertical context links by integrating the cultural and historical potential of the territory in the form of artifacts in the CTS. The upgrade phase in the infrastructure layer allows us to integrate the identified artifacts into the infrastructure of citywide processes as triggers for stabilizing the territories. The renovation in the anthropogenic layer provides the CTS with "total complicity" through communication with the users of the territory and world experience.

Thus, the implosive approach in the pre-project study of urban areas can enhance the adaptability of design solutions, increasing the parameters of their spatial connectivity with the context (Fig.2). Such contests can become an effective tool for studying and developing the spatial structure of urban forms.

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