Architectural and design approaches to creation of comfortable urban environment

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Abstract. The article reviews new approaches to the creation of a comfortable environment through architecture and design. Solutions to the problem at the global and national level in the 20-21st century were analysed. Examples are given. Reviewing modern architectural and design approaches, the authors come to the conclusion that the function of architecture is supported not only by technological capacity of modern construction, ergonomics and environmental safety. Social design is a certain scenario of the development of a comfortable environment. Some kind of a new natural habitat is created that smoothly forms patterns of modern world view and mindset. The practice part analyses global practices and modern setting in Russian cities in the context of environmentally promising area of landscape architecture using the example of the Southern Urals. Summing up the results of the research, the authors focus on the essential requirements of consumers for comfortable environment by identifying priorities for the environment of Russian cities.

1. Introduction
Creating a comfortable environment is a challenge that humans have faced since the beginning of time. Minimal amenities and austerity, extreme idleness and splendour, all these traits characterised different styles developing new forms and concepts. Today we see well-being in a special way based on meeting the basic needs of a modern man. Let us analyze the main approaches and solutions to the problem of creating a comfortable environment through architecture and design.

2. Relevance
Social design as one of the main modern design genres is oriented towards solving problems concerning the organization of a comfortable environment for our daily life. The design implemented in a spacial architecture and construction environment is aimed at creating a sense of well-being and meeting basic human needs. Conceptual design is the basis for developing social projects that solve the problems of organizing a comfortable urban environment. Modern conceptual approaches to the development of an urban environment through architecture and design should create graphic concepts that develop an image of an architecture and construction space for the consumer as part of natural and geographical territory that is comfortable to live in [1]. Performance approach provides opportunities for the environment conceptual organization and development.

Nowadays it is not enough for modern urban environment to be just environmentally friendly and ergonomic. Semiotic, architectural and cultural environments support ecology [2]. Well-being for a modern man comprises the following:
• visual well-being;
• information well-being (including information ecology and media and technological space);
• communication well-being;
• security well-being;
• sustainable development well-being;
• territory brand well-being (its unique character, exclusiveness and pertinence) [1].

Conceptual design of modern cities calls for a comprehensive approach to the development of a creative idea [3]. Architectural and design approaches are based on the systemic understanding of the design process. Associative perception of the world offered to the consumer in an author's creative concept is aimed at forming a scenario of living in an architectural space [4]. Thus this may constitute the formulation of a new vision of challenges in design and architecture.

3. Identification of objectives
The task of creating a comfortable environment through architecture and design that would meet the needs of a modern person is comprehensive. Let us consider the global and national solutions to this problem in the 20-21st centuries to identify the major approaches in the development of architectural and design creativity of the present day.

4. Theory
Global practices present us with various approaches and creative concepts in the modern architectural creative work: geometric harmony and order (Richard Meier); spacial environment organization on the basis of musical characteristics of architecture (Christian Urvoy de Portzamparc); original method of "intellectual dematerialization" (Jean Nouvel); approach on the basis of semantic communication and self-development of an architectural form (Peter Eisenman); concept of intellectual synthesis and continual scenario of spacial organization of an architectural object (Remment Koolhaas); concept of integral synthesis and "staging" of architectural environment (Jacques Herzog and Pierre de Meuron), etc. [5]. When reviewing modern architectural and design approaches we can come to a conclusion that the function of architecture is supported not exclusively by technological capacity of contemporary construction, ergonomics and environmental safety. The examples given include imaginative and conceptual basis that conveys the individual traits of the authors, their idea of the perfect in the real world. Social design is a sort of a development scenario for a comfortable environment. Such architectural and design approaches have huge potential that suggests the creation of exclusive objects, conceptual focal points in the urban environment that subdue the environment and social space. Some kind of a new natural habitat is created that smoothly forms patterns of modern world view and mindset. The initial functionality transforms in many different ways into the associated areas such as ecology, ergonomics, social well-being and logistics, metaphorical contexts, possibly historical and geographical contexts.

Looking into the contemporary Russian architectural construction it is possible to identify a few most popular approaches. Open plan and high-rise construction are very pertinent today which results from the development of such new technologies and materials as additive technologies, module construction, cast-in-place construction, etc. Green construction is also considered to be progressive and is environmentally friendly approaches and prevents pollution of the environment. We can cite the following examples: Ducat Place III business center (Moscow), FREEDOM project (Moskovskaya oblast), Russian Seasons Hotel in Sochi. If in big cities high-rise construction is popular (for example Moscow City, Iset Tower in Ekaterinburg, Gasprom Office Center high-rise in St. Petersburg, residential development "Lazurnye nebesa" in Kazan, etc.), in one-factory towns low-rise construction is gaining popularity being environmentally friendly oriented [6,7].

The long-standing problem of the interaction between humans and the environment under the conditions of urbanization is becoming more multifaceted and complex [8,9]. As before, soil, air and water pollution problems must be the starting point for architects to identify objectives. Landscape
architecture is another pertinent trend within contemporary architectural and design approaches that offers an effective solution to environmental and aesthetic problems. This is particularly pertinent for industrial cities where environmental problems are barely within the established norm.

5. Practice

Good architectural and planning organization of the living environment in the modern society is one of the main tasks of landscape architecture. Cultural (man-made) landscape does not appear by itself, independently of the natural physical and geographical landscape. It is the result of the synergy of production and technical human activity and the environment [10]. Creating a modern cultural landscape by means of vegetation must be the result of the interaction of the society and nature not only from the biological point of view, but also a manifestation of social design. Major functions of vegetation are associated with the environment and health as well as with the formation of a microclimate. Greenery as an instrument to solve environmental problems protects against smoke, gas and dust. One hectare of vegetation in an hour emits the same amount of oxygen as 200 people consume within the same time period. In a year one hectare can filtrate 70 tons of dust with the filtration surface of grass is larger than that of trees. Green space can capture 21-86% of dust and reduces air microbial pollution by 19-44%. Plants retain this ability even in winter (even without foliage) [11]. During this time dust content under tree canopies reduces up to 40%. Health protection zone reduce the concentration of sulfuric anhydride (from 0.27 to 0.08 mg/m3) and nitrogen oxides (from 0.22 to 0.07 mg/m3). For example in 2015 a fire in Karabashmed factory in the town of Karabash resulted in emissions (sulfurous anhydride constituted 95% of the harmful pollution) could end up in the town of Miass if it was not for large forest area that separates two towns. It protects Miass [12]. In 2015 the Ministry of Environment checked the air in Chelyabinsk with a portable station with a special focus on the borders between health protection zones of the factories of Chelyabinsk electrometallurgical plant and Chelyabinsk metallurgical plant. The analysis allowed to see that minimal allowed pollution norms were slightly exceeded. For example, the allowed concentration of sulphur dioxide and nitrogen dioxide was exceeded. Urgent measures were taken to improve the situation [13]. The list of major air polluters in the South Ural in the opinion of the Ministry of Environment comprises 11 plants. Five of them are situated in Chelyabinsk. These are Chelyabinsk metallurgical plant, Mechel-Koks, Chelyabinsk electrometallurgical plant, Zink Plant and Chelyabinsk pipe mill [14]. Environmental initiatives proved to be very pertinent. According to the Ministry of economic development of Chelyabinsk oblast, forest and park green belts will be planted around the most polluted towns of the region under the "Clean Air" federal project. It must be completed by 2024. Today "green shields" are planted in 35 Russian regional centres and cover the area of 800,000 hectares. A task is set to reduce the total amount of harmful emission into the air in major industrial centres by more than 20% of the emissions in 2017. Magnitogorsk and Chelyabinsk in the South Ural have also made it into the programme. Under the "Green Belt" project inviolable forest zone around Chelyabinsk will cover 23,000 hectares. These are the parks and groves of Sosnovsky, Krasnoarmeiskiy regions, Chelyabinsk town pine wood, Kashtaksky and Uzhovsky pine woods. Most popular recreation spaces in the town will also be included in the list [15].

Phytoncidal properties of plants can be yet another aspect that determines the town's microclimate. Plants release free volatile substances, the so called phytoncids that can kill protozoa, one-cell bacteria and thus impact the air microflora by changing its content. As the scientific research has shown [11, 16, 17], the cedar, Chrysanthemums, perennial ryegrass radically reduce bacterial content in the air. These plants adapt well to the climate conditions in the South Ural.

It is necessary to take into account the fact that in towns with I-class and II-class pollution industrial production the allowed level of minimum greenery must be higher by 10-15%.

The creation of comfortable microclimate in the South Ural urban environment by means of landscape architecture takes a comprehensive approach. Landscape architecture can improve environmental and health condition of the urban space. Good organization of green areas can:
• influence the intensity of sun radiation;
• solve wind protection problems;
• promote air ionization;
• reduce air pollution by gases, smoke, dust and bacteria;
• fight sound pollution.

Conceptual approaches in developing cultural landscapes [18], modern technologies for creating cultural image of a landscape and small architectural forms [19-21] allows to make unique designs and landscape architecture that can become architectural landmarks of Ural towns.

Besides pragmatic objectives, landscape architecture can conceptually form the ideological platform of social priorities of the population of the South Ural as a territory environmentally friendly and fit for living [22].

Preserving the local flora and fauna can also be proactively solved with the help of landscape architecture. Urban space environment and sustainable biocenoses under urban life conditions is directly influenced by good choice of decorative plants. Today decorative plant cultivation in the majority of regions is based primarily on one-year flower crops. Nonetheless, the local flora has a number of agrestic plants that can even be more decorative than popular garden varieties [23]. Modern landscape architecture also knows the term "new perennials" which is an imitation of natural landscape in urban environment that creates a comfortable illusion of wildlife. Landscape design that promotes well-being in urban environment is one of the main tasks of landscape architects [24]. Local flora and its natural-looking combination with introduced species will allow to diversify decorative tools used in creating green spaces in Ural cities by promoting sustainability of decorative vegetation to the climate [22].

The final stage is an important component of any architectural and design solution that makes a facility more aesthetic which corresponds to the requirements of modern design [25, 26]. Various colour and texture architectural and design solutions by means of landscape architecture allows to make space environments more unique. Indeed, plants are an eco-material that allows to create comfortable visual and emotional environment that meets the requirements of ergonomic design.

6. Conclusion

Finally, we can say that there are various architectural and design approaches to organizing comfortable urban environment. Nowadays the majority is environmentally-oriented and solves the problem of creating environmentally friendly zones that are comfortable for the residents to live in. Individual approach and "territory branding" is a promising area for Russian cities that oriented towards development under the conditions of the present day where visual, information, communication well-being as well as safety, environmental friendliness and sustainable development well-being are becoming essential.

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