To the matter of the educated development of the construction industry of recreational territories

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Abstract. Rational creation of the consumer quality of constructions, which is taking into account some cultural, historical and other, accepted for society development paradigms enters to replace mass sustainable development of the industry of a construction in case of development of the recreational territories around megalopolises, using intellectual systems in a construction, ecological, energy-saving technologies in increase in a consumer evaluation of quality. For the residential development of the recreational territories of cities it is important to provide not only complex conditions of their development, to keep their potential for future generations, providing their social-and-economic development, to consider national and climatic features, but also to use their potential opportunities and traditions of the people inhabiting them, rationally and economically. The educated development of the construction industry is the new term entered into the use of constructors, when the consumer quality of building and structures meets national preferences taking into account traditions and advanced achievements in the use of materials, architectural and project decisions, production technologies and climatic opportunities with the minimum damage to the environment. Its accomplishment assumes enhancement and introduction of local-and-standard regulation with implementation of innovative solutions.

1Introduction

Modern development of the construction industry in the competitive environment requires development and increase in the quality level of products [1,2]. In the general view, according to GOST ISO 9000-2015 [3] quality is referred to as follows: "Quality is the degree of compliance of the set of characteristics to requirements". Quality of construction is estimated as the consumer quality of construction products, production quality and quality of designs [4].

Within the consumer quality the level of similarity of construction products to the consumer's desires is the important assessment [1,4,5,6]. Development of the individual cottage construction in Russia generated the set of original architectural-and-construction

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decisions both for individual housing construction, and in case of housing construction for temporary residence of vacationers in the recreational natural territories (rest houses, campings, fisherman houses and others). In case of development of their design decisions it is necessary to take into account the requirements to the constructive-and-technological execution, regulated as at the federal level [3,7,8,9,10,11], industry and regional levels, and requirements of the consumers as well. However, this approach is not only economically costly, but does ecological harm in because of the technogenic impact [12]. The urbanization of the territories, surrounding megalopolises, also leads to loss of their recreational opportunities [13], natural and cultural and historical attractiveness [14,15]. The general directions of the development of the construction realized both in mass housing construction and in tourism are demonstrated in Figure 1.

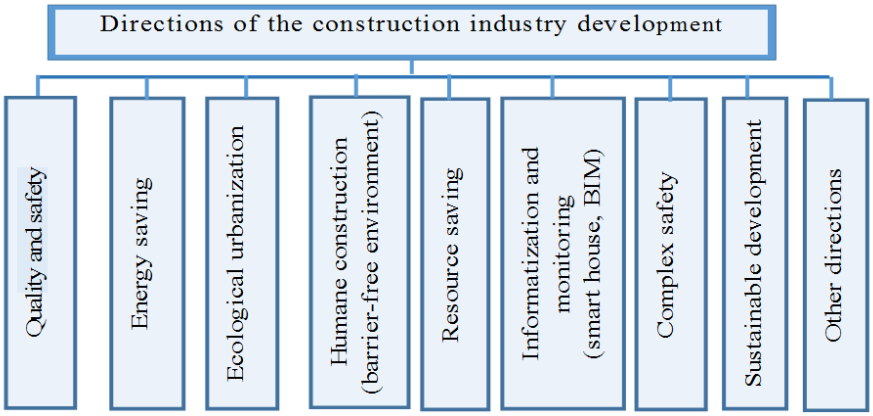

Fig. 1. Modern directions in the construction development.

The existing world global direction of the construction development, its sustainable development directed to the ecology preservation, energy, harmonization of various requirements of representatives of society, green construction, etc. requires improvement, especially for territories with great mass seasonal flows of travelers [15]. Every day cities accept a huge number population travelling by cars from recreational territories, and that does not only complicate transport communications both in the city, and at the entrance, but also complicates the ecological situation because of environmental pollution with waste of cars.

Therefore there become urgent the creation of the direction of development of the construction, which will consider legislative-and-standard requirements, consumer preferences, which will form special image of the territory, taking into account traditions and culture of the people [15] and also will form and promote common development as harmonious coexistence of an innovative and traditional way of development of the territory with accounting of preserving its recreational potential and potential of its attractions through mass media [2]. It allows keeping the recreational potential of the territories around megalopolises, to do them attractive both for tourism of the day-off for the constant residents of megalopolises, and for accommodation of the population with the high-quality level of life in those territories.

Thus, we refer to the educated development of construction as harmonious, eco-friendly, energy saving, combining advanced and traditional with representation in the society of these and general moral, art, cultural, traditional and other positive values aimed on the sustainable development of the territories for the population health recreation.

2 Methodology

For the formation of new approach to the development of construction demands the research of principles and ways of the modern directions of the construction development. As the main approach, we use the system approach, methods of the analysis and synthesis, assessment of risks, optimization and mathematical modeling. The analysis of the educated development of construction is considered, taking into account its features and the types of providing which are necessary for its realization.

3 The analysis and modeling of the educated development of construction in the recreational territories

The consumer quality of construction products in the recreational territories around cities meets the increased requirements in high-quality original individual housing, and it also requires accomplishment of legislative-and-regulating documents: laws, standards, construction regulations and rules, design-and-technology design [16,17,18] during construction. The important modern direction of the educated development of construction in these territories is the use of modern innovative technologies (Figure 2) with high-productive technology with the opportunity of urgent and quality estimation of the works performance [19] and their adaptation in the real condition of application with subsequent diagnostics and monitoring. In such cases, there is the necessity for the formalized models not only for buildings and structures, but also the territories, taking into account the integrated quality systems of the recreational territories. The use of the modern computerized technologies of measurements and control allows reducing their dependence on qualification of contractors [20,21,22]. For the matter solution, the important part is played by the application information technologies throughout the lifecycle of construction projects, and so do all the construction system in the territory including various construction objects. The organization of the construction works should not only provide the effective sequence of their accomplishment, responsibility of qualified personnel and services, employer control system realization, etc. Also, the use of motivation of all the parties attracted to the construction is required in the sake of improvement of the construction products quality.

And still the main starting point in construction is the accounting of consumer preferences to the construction projects which are aimed on satisfactions of various needs of the population.

Mass cost-effective construction for the recreational territories in the case of unification of construction products makes the dwelling of economy class available to the population. But the continuous mass construction destroys the environment and its ecological potential. Individual construction products in construction (multi-apartment houses with the original internal layout, cottages, etc.) cause excessive costs and therefore can't gain mass distribution, especially as dwelling of economy class and dwelling constructed in the recreational territories. Also, the continuous mass construction of the territories requires high-tech system of their life support (customer services, transport communications and other) and it is not only vulnerable in case of failure in logistics and communications of the urbanized territory, but it also leads to the territory's modification, loss of cultural originality and natural uniqueness. In the territories for seasonal rest and tourism requires application of singular construction designs, for example: application of mobile housing [23], collapsible constructions with availability of energy efficient and ecological decisions for them. These seasonal constructions for rest allow to hold cultural-and-and mass, sports or other events of case tourism without any special technogenic impact on the environment [24].

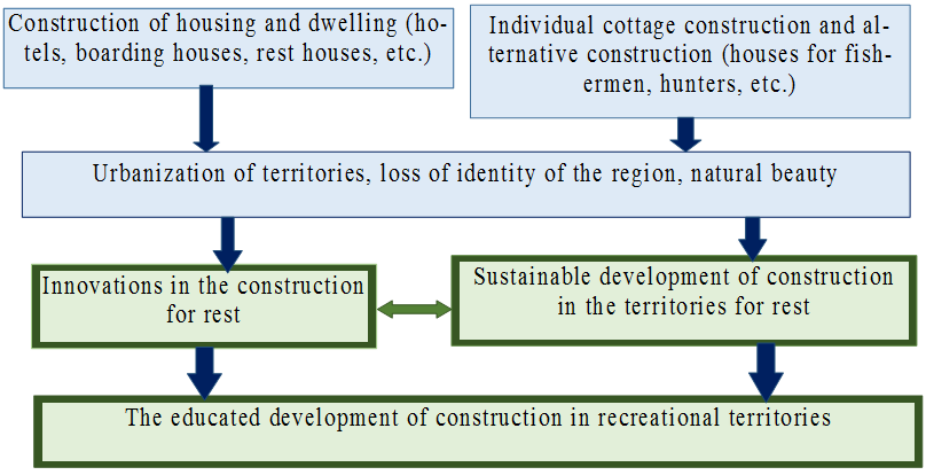

Fig. 2. Educated development of construction in recreational territories.

For the assessment of the educated development of construction in the territory for rest and recovery of health it is necessary to have some reasonable criteria:

- optimization of the flow of taking into account the cost of recreational resources of the territories and their potential as well as taking them into account in case of advance planning of the territory development [16,25];
- minimization of the cost of the attraction resources, fuel, water, energy, etc.;
- harmonization of the construction projects both with the respect to the environment, and with the respect to its consumers and others.

The calculation of level of the recreational territories construction considers the total number of its visitors W, which can be provided by the resource capacity of territories and its self-restoration opportunity.

At the same time the rational localization of construction projects for the population and tourists service in the territory [26] which can be estimated with the help of the following criterion is important:

$$D = \bigcap_{l=1}^{E} t_l \,;\; t_l \in M^T when (A_l \cdot K_l \cdot B_l) \to max \qquad (1)$$

Where D is the rational quantity E of options of the localization of housing, service and seasonal construction taking into account comfort and availability (including transport availability) and safety (ecological, fire, power), $l=1 \ldots E$, t_l- coordinates of the rational point I of the project localization in the chosen territory of the region, A_l are the attractions for the rational point I of the projects location, B_l is the safety level assessment for the rational point I the project location [27], K_l is the comfortable location assessment (including taking into account transport availability) and the assessment of functioning for the rational point I of the project location.

The general safety assessment B_k of site under the camping is carried out by calculation according the following expression taking into account all the risks:

$$B_k = \begin{bmatrix} 1 \; when R_{max} \leq 1 \\ 0 \; when R_{max} > 1 \end{bmatrix} \qquad (2)$$

Where R_{max} is the maximum level of the safety risk of the project, implemented with the help of the expert assessment for each project site.

The assessment of the probable proceeding danger from object v$u_{k,i}^{(v)}$ (Figure 3) at the rest and service location$a_{k,i}^{(c)}$ distance $S_{k,i}^{(v)}$ is taken onto account as well as the threats to security level $R_{k,i}^{(v)}$ During the expert assessment the maximum level of threats is implemented as the greatest risk of the threats: $R_{max} = \max\left(R_{k,i}^{(v)}\right)$.

Ak attractions for the area unit in the territory of the rest region I are implemented according to the analysis of the area unit for different types of attraction. Among the attractions, the preferences are given the those which coincide with the motivations of visitors of means of placement projects. The more compliance of attraction $a_{k,i}^{(c)}$ to the expectations, the higher is the powerful coefficient q_i, and thus the total score follows:

$$A_k = \sum_{i=1}^{D} q_i * a_{k,i}^{(c)} \tag{3}$$

In case of the choice of the construction site the important indicator is the criterion of its comfortable arrangement. The criterion of comfortable arrangement $K_k$for the area unit in the territory I of the region as well as the functioning of the project site is determined as the amount of cost estimations $Z_k(A_k)$ for visiting of the service organizations and sights and as the quality $G_k(A_k)$ of the stay of a tourist at the project site:

$$K_k = Z_k(A_k) + G_k(A_k) \rightarrow max \tag{4}$$

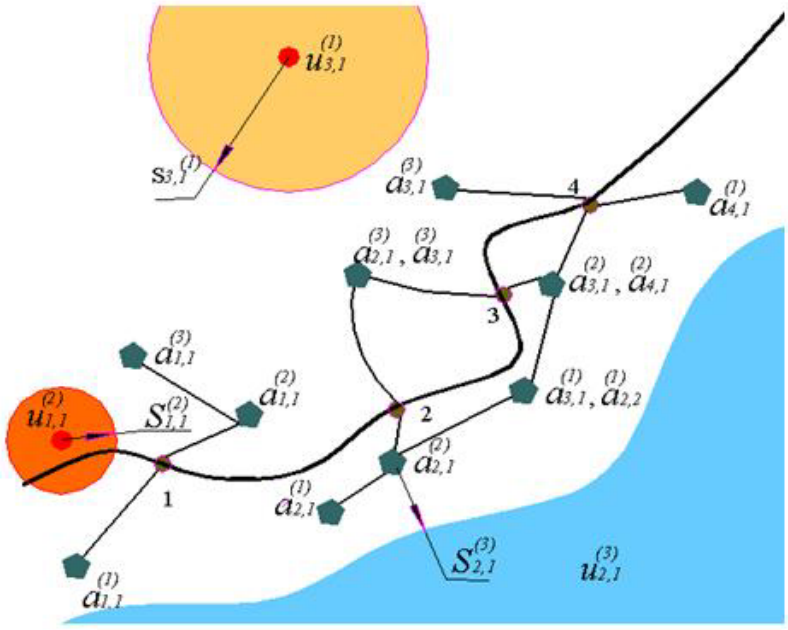

Fig. 3. Scheme for the definition of rational localization of seasonal construction projects for the rest and service of vacationers in the recreational territory.

Time necessary for visiting (taking into account loss of time in case of decrease in the high-speed mode of movement on roads because of reduction of their throughput capability – Figure 4) influences on the cost level of Z_k (A_k). The correct location of the service

centresallows increasing the stability of the territory, including the territory of rest and recreation [26].

With respect to the results of rational construction localization according to criterion *D* (1) in the recreational territory the optimal variant of their location, providing the minimum costs of visiting service, housing and attraction of facilities with ensuring safety of resources and their safe use, is established.

Application of economically low-cost designs for the construction structures through the implementation of mobile housing [23], when the dwelling, can be transported during the change of the place of residence of its owner, is limited by climatic conditions, and also (according to foreign experience), legal issues in the field of their taxation. In this case, it is important to establish rational regulations of regulation between the owner of such mobile house and local administrations of the territories at the local legislative level (local regulation-and-legal documents – Figure 5). Depending on cultural traditions and local population life, as well as on opportunities and availability of the territories, free for the use, the time period of the use of the site and engineering communication in the territory with the corresponding regulation of relations with local administrative subjects and tax administrations can be established. Restoration and upgrade of the existing housing structures (the thrown individual housing structures), as well as development of innovative solutions are possible.

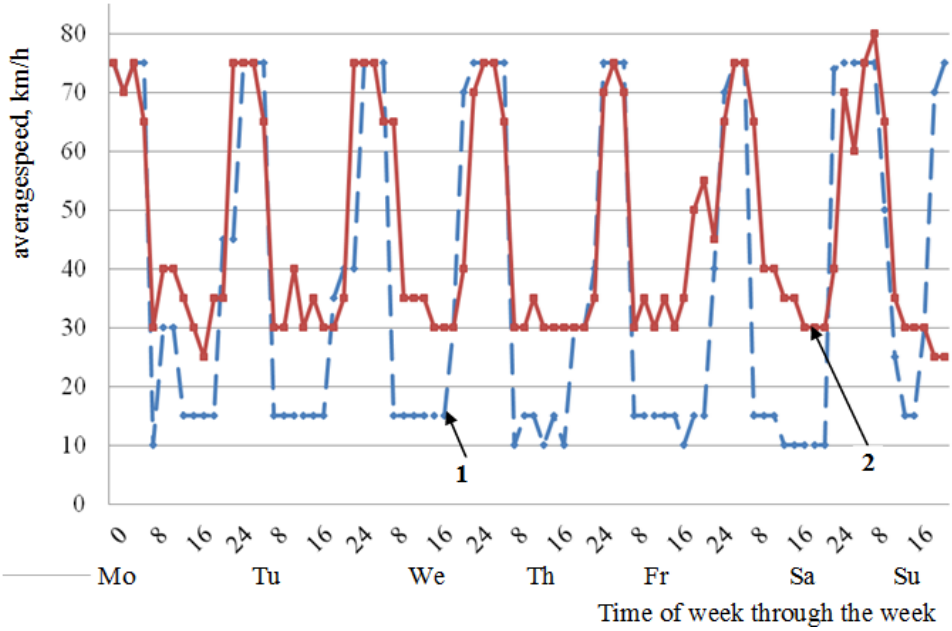

Fig. 4. Schedules of change in time of day within a week of the high-speed mode of traffic on the entrance and departure from the Moscow Ring Highway on Leningradskoye Highway towards the suburb (2015) the 1-average speed of departure from the city, 2 - the average speed of entry into the city.

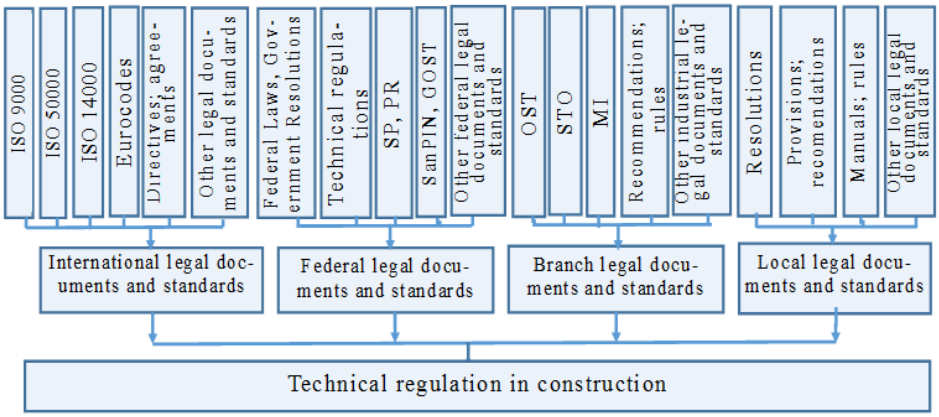

Fig. 5. Technical regulation of construction in the recreation territories.

It is impossible to have the uniform principle of the decision in the Russian Federation because of essential climatic and cultural and traditional distinctions. It is very important to consider all these features of regions.

4 Results

In world practice, new directions in the development of the natural territories appear [15], aimed on their exploration, as well as on their reasonable development, development optimum in capacity, and sustainable educated development. The educated development of the construction industry assumes that the consumer of housing in each region creates consumer quality requirements to the construction products. The decisions in maximum permissible parameters, regulations and principles of the housing construction are accepted by regional and local administrative and legislative bodies, ensuring complex safety of sustainable development of the territory. Strategic planning of the sustainable development of the territory is impossible without the general perspective plan of the region development, federal purposes and other factors, or without forming of suggestions at the local level. During the formation of the educated construction it is very important to for consumers to comprehend the importance of the principles accepted for it:

- functionality, which means the degree of the compliance of its main objective, literally to release of necessary amount according to conscious self-restriction of the high-quality products, to providing rational household and sledge - tare and hygienic conditions [28], favorable conditions of work, life, rest, etc. not only in the building itself, but also in the surrounding territory (transport availability, availability of social-and-economic objects, etc.);
- social principle which means the exception of the development of social contradictions in society, preservation of traditions and long-term development of the society, with the possibility of participation in the development both local population, and visitors according to the norms of cohabitations in the given territories;
- resource-saving when the renewable energy resources and environmentally friendly construction materials are mostly used, the steady use of natural potential is provided and also the energy-intensive production technologies, maintenance and utilization of construction facilities are excluded;
- system city at which each construction project is the compound part of the territory for the high-quality accommodation of the population with its sustainable development;

- technological effectiveness, with the combination of efficiency of engineering procedure and labor productivity level with cost and quality of the construction products [29];
- constructability, providing the construction project with stability, durability, reliability, etc.;
- predictability when monitoring, diagnostics and assessment of risks of the construction system allows to carry out quickly assessment of the risk level and to exclude defects and failures in it;
- predictability when monitoring, diagnostics and assessment of risks of the construction system allows to carry out urgent assessment of the risk level and to exclude defects and failures in it;
- harmony when architectural-and-construction structures organically join the surrounding natural [30] as well as cultural-and-social environments;
- profitability when financial-and-economic costs minimized according to the calculation for the lifecycle of the construction complex when the created positive economy of impressions, etc. [31], participates in the development of the territory.

The educated construction requires the enhancement of staffing of the construction industry when the qualification of the personnel is provided [21]: with the corresponding system thinking of the educated construction at the administrative and managerial level of the industry, their architectural-and-design servicing and administration-and-legislative regulation of the territories; with knowledge of the integrated management systems of quality, technologies of monitoring and management, ensuring rational control of all the stages of the construction [3,32]; owning the advanced innovative technologies both when designing construction complexes, and in case of their production and the operation [20,22] and also – understanding, accepting and realizing the principles of the educated construction in its work.

This approach is already implemented through the separate directions of the construction industry development: energy saving, ecological and energy security [10,11, 6,17,33], complex safety [34,35,36], sustainable development [7,10,11,37-39], informatization and implementation of the intellectual "smart" systems, etc. The educated construction in many respects unites this directions, and also brings the need of understanding of taking into account the local traditions of culture and the prospects of social development of the region, standard legal limits, stated by local decisions (Figure 5) providing their considering in the construction (for example, the common design of the territories, free use of its resources, etc.), and also conscious acceptance of this direction by all the participants of the educated construction, the state, local authorities of management and the population of the territory and its guests and so on.

5 Conclusion

The offered approach to the construction industry development will allow to create the more long-term prospect of development of regions and their territories, and thus the successful prospect of the whole country development with the high-level quality of its population life. The implementation of the following events will be probably necessary for the receipt of the educated development of construction:

- re-urbanization (optimization) – consolidation, taking into account the sustainable development, as well as in the compliance with territory resources (for example: rational localization by criterion of D (1)), and also - based on the accepted general plans of the territory development;
- conscious restriction in consumption, forming of the consumer culture;

- forming of original image of the recreational and urbanized territories, taking into account the organic inclusion of construction objects into the existing environment;
- complex providing the educated development of construction from the research of various type of resources in the territory to their monitoring of construction structures and diagnostics of the impact for the environmental;
- technical regulation of the educated construction taking into account the application of regional and local standards and legal documents in construction, which were accepted by the self-government institutions;
- development of innovations in the mobile housing construction and as well as the creation of its infrastructure and so on.

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