

Formation of Hierarchies in the Organization System of the State Construction Supervision during Reshaping of City Territories

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Abstract: The authors in this article review the basic principles of the Formation of Hierarchies in the City of Territories. Also shown are the features of construction control (supervision) as a state regulatory apparatus in the context of the current legislation of the Russian Federation and the world construction complex as a whole. The development of an integrated control model for improving the qualimeter parameters of finished construction products is described.

Index Terms: Territories, Principles of the formation of hierarchy

I. INTRODUCTION

Hierarchy is an organizational form for management of complex structural elements of different nature focused on collaborative and purposeful functioning. Hierarchical organization is designed to optimise the processes of interaction and decision-making, both in the current management structure and in the integrated complex system itself, as well as to adapt the structures and functions of this system to changes in external and internal operating procedures.

The hierarchy structure is determined by the scale of complex system, functional diversity of its elements, environmental factors and the capacity (technical and human) to make decisions in dynamically changing environment.

II. MATERIALS AND METHODS

Hierarchical organization of a complex system is a multi-level structure consisting of interrelated sub-systems, elements of which are functionally able to make decisions. The organization hierarchy determines the order of subordination and interaction of sub-systems and elements in the control system, allocation of managerial functions and responsibilities. The higher elements of the management hierarchy have the priority of decisions and the right to intervene in the actions and decisions of subordinate elements and their sub-elements.

Both vertical and horizontal interrelations of these sub-systems are possible when organising the interaction between structural elements:

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– the sub-systems in horizontal structuring influence one another due to their complex forward and backward linkages, and that does not allow to determine the vertical hierarchy of subordination of purposes;

– sub-systems in vertical structuring are structured by the level of difficulty and decision-making responsibility. The behaviour of each sub-system regardless of the structuring type is described by the relevant model including variables and parameters appropriate for the particular hierarchy level. The main mechanism of the synthesis of the Building Production System hierarchical structure is the division of functions into responsibilities for the direct management of complex polyergatic system and responsibilities for the coordination of the major structural elements of the organization concerned (investment entities involved in construction):

– investors are natural or legal entities making capital investments in the formation of construction objects with the use of own or borrowed funds and creating conditions for financial (material) support for the construction industry;

– developers are natural or legal entities providing conditions for construction procedure (organization and formation of building system of major construction) in accordance with accepted constructive and technological-organizational solutions;

– customers (technical or state customers) are natural or legal entities providing subject-matter application of investment to construction operations and are the main users of construction products. Depending on the practical situation customers can function as developers and investors;

– design engineers (general design engineers) are natural or legal entities forming (developing, establishing) indices of performance and quality of construction products in the format of the relevant chapters of design and budget documentation);

– contractors (principle contractors) are natural or legal entities directly involved in the construction process. They set the actual indicators of the construction products quality;

– the State Construction Supervision is federal or regional authorities eligible to carry out the state construction supervision of the established procedure for construction products creation. Figure 1 demonstrates macro flowchart of interactions between main participants of the construction process (without the State Construction Supervision organs).



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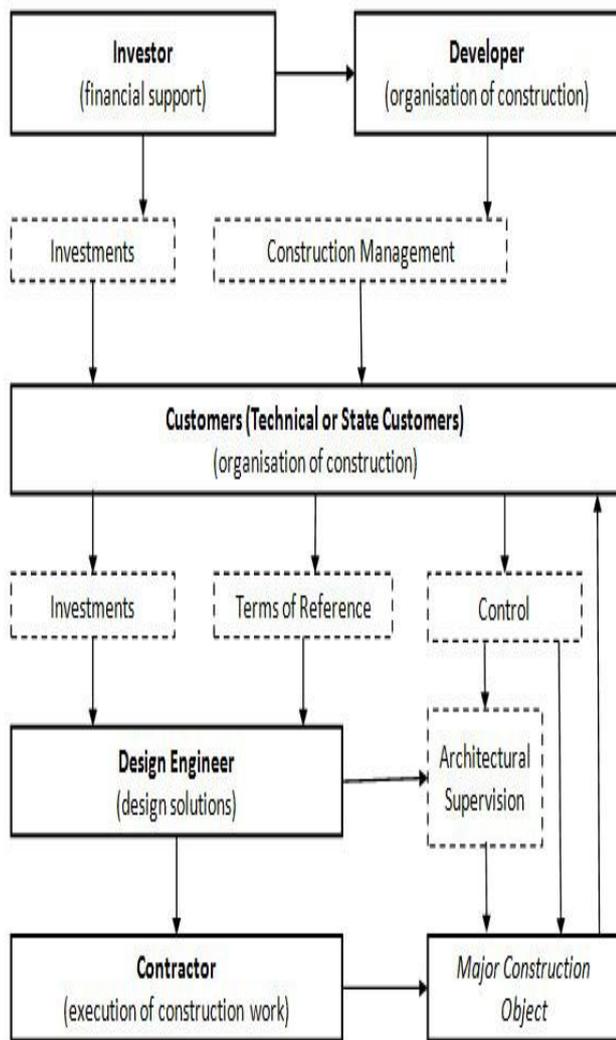


Figure 1. Flowchart of interactions between main participants of the construction process

Before the Developer (or the Customer) informs about commencement of construction, the authorised entities (or organizations) have to assess the conformity of construction project and relevant solutions, as well as project appraisal (project documentation examination). The results of conformity assessment are formalised as statements of conformity of government examination and are the justification for obtaining a building permission.

The interaction between the Developer (the Customer) with the State Construction Supervision Executive organs during the building of major construction objects is carried out according to the following formalized procedures (with the exception of specially protected territories and cultural heritage sites):

- issuance or renewal of the Building Permission — positive result is achieved when the document (permit) is designed and issued by the State Construction Supervision to the representatives of the Developer (the Customer);
- the Construction Commencement Notice — positive result is achieved when the Check Routine Programme and Building Project Risk Categorization based on the risk-oriented

approach are designed and issued by the State Construction Supervision to the representatives of the Developer (the Customer): “...in accordance with the criteria of risk categorization of constructed and reconstructed major construction objects...”;

- issuance of the document confirming Private Housing Construction (Reconstruction) Process which involves the use of the federal subsidies for multiple-child families — positive result is achieved when the document (permit) is designed and issued by the State Construction Supervision to the representatives of the Developer (the Customer);
- the Construction Completion Notice — positive result is achieved when the document (permit) is designed and issued by the State Construction Supervision to the representatives of the Developer (the Customer);
- issuance of the Statement of Built (reconstructed, renovated) Major Construction Object Conformity to the specifications and project documentation requirements — positive result is achieved when the document (permit) is designed and issued by the State Construction Supervision to the representatives of the Developer (the Customer);
- issuance of the Object Starting — positive result is achieved when the document (permit) is designed and issued by the State Construction Supervision to the representatives of the Developer (the Customer).

Conformance Inspection: “...conformity of work and construction materials used in the construction process ... as well as the results of such works to the requirements of specifications, other regulatory acts and project documentation...” is the main form of interaction between the State Construction Supervision organs and the Developer aiming at performance of the tasks related to “...the prevention, detection and suppression of Urban Planning Law violation including violation of technical regulations and project documentation requirements...made by the Developer, the Customer or the Contractor...”.

The Conformance Inspection results are documented in a special act (which specifies violations found and instructions for their elimination), which goes to: the Developer, the Customer, the Contractor (depending on which party is responsible for the violations) for review and fulfilment of the instructions stated in the act.

Refusal to eliminate violations found as well as incomplete, defective or late fulfilment of instructions may lead to non-issuance of statement of build (reconstructed, renovated) major construction object conformity to the specifications and project documentation requirements and/or object starting.

Following participants of the construction process ensure the preset quality level of construction products creation:

- organization the Developer (the Customer, the Technical Customer) — through appropriate actions in the framework of construction oversight (technical supervision) over the volumes and quality of construction work and processes carried out by the Contractor during all stages and cycles of construction.

Representatives of the Developer (the Customer) services involved in monitoring and control activities (incoming and operational control, acceptance inspection) are subject to mandatory registration in the State Construction Supervision Executive organs and are personally responsible for quality of construction products (similar to representatives of the Contractor);

– the Design Engineer — through appropriate actions in the framework of the Architectural Supervision over the quality of relevant design solutions implementation. Design organizations representatives (Design Engineers assigned and/or engaged by the Developer and/or the Customer for the Architectural Supervision) carry out the monitoring activities in the form of random checks of conformity (incoming and operational control, acceptance inspection) to design solutions. However, they are allowed to suppress the found violations only with the involvement of the State Construction Supervision Executive organs representatives. The Architectural Supervision representatives are responsible for the quality of: the construction, monitoring activities and elimination of violations and deviations;

– the Contractor — through appropriate actions during implementation of the organizational and technological sequence of building operations (particularly in incoming and operational control of construction processes parameters). Representatives of the Contractor are directly responsible for the quality of completed construction projects.

III. RESULTS AND DISCUSSION

Figure 2 shows a flowchart of hierarchical interaction between the main participants of the construction process ensuring the quality of construction products.

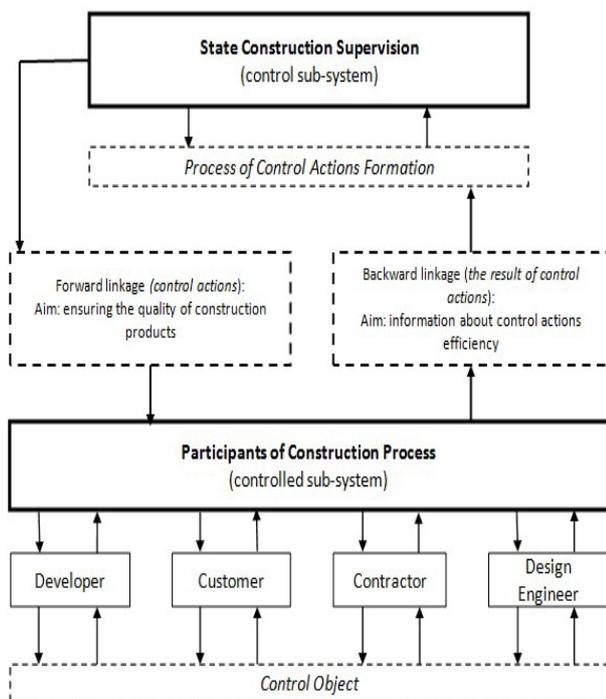


Figure 2. Flowchart of hierarchical interaction between the main participants of the construction process ensuring the quality of construction products

In the above structure of the control system (see Figure 2) the quality of state supervision control actions depends on the properties (structures, qualitative and quantitative parameters) of the management system itself. In the great majority of cases, the process of managerial decision-making (control actions) is accompanied by uncertainty in input data and dynamic variability of control object condition indicators

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