Models and methods for subject specialization deepening of regional constructional enterprises by the mobile units` relocation

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Abstract. This article shows the amount of construction and installation works at the regional level that are formed according to the individual cluster territories, considering the specialization of the production development. For their implementation, it is necessary either to change the specialization of contracting capacities, or to use them with the consideration of the movement mobility in development zones.

1 Introduction

In the planned management system, execution orders for certain types of construction-assembly works and formation of annual unloading capacity contractors` programs were carried out on a territorial and sectoral principle. There was not much of a competition. The municipal administration prescribed in advance the consolidation of "Local" construction capacity, thereby forming their load. In 2002 the contracts` tendering was implemented, that influenced a lot in initial loading conditions of the construction capacity both in territorial dispersion and specialization ways. As example of Tula region, this situation can be considered as the most typical for Central Federal District, thus the issue of the loading construction capacity can be formulated in a way:

- there are social development territory plans, that are the base of formulation the amount of construction and assembly works at the objects, including technological and industry specialization; [1]
- the tender documentation is being prepared by the administration of the municipal structures according to the alleged general contract;
- it is required to predict the strategic utilization of construction capacities, including their specializations, mobility and the possibility of involvement of executors from the adjoining territories. [2-3]

2 Materials and methods

Additional expenditure (C_{st}^T), emerging as a result of variability of the progressive growth of construction-assembly works from optimum alternative due to the intensive probabilistic factors, are accepted for following calculation:

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$$C_{st}^T = d \cdot (V_{st} - \gamma_{st} \cdot V_{st-1}) = d_s \cdot |\Delta_{st}|, \quad (1)$$

where C_{st}^T – organizational expenses in the reporting period;

V_{st}, γ_{st} – specific gravity of construction and assembly works due to the rate intensity in the reporting period;

Δ_{st} – variance between the level of construction-assembly works of the specified organizational structure and optimal level of the reporting period, considering probabilistic factors. Indicators of interrelationship are taken to equate to 0,14 or 0,05 for stationary organizations, considering the positive and negative dynamics of variability; 0,14 is taken in the process of establishing mobile organizations and 0,09 or 0,04 - during the years of its operation with various indices range changing of construction and installation works. [4-6]

Fig. 1. Algorithm of level diversification for construction-assembly works between organizational structures.

Using the coefficients of labor intensity specializations and dispersion of construction types, that are shown in table 2, the resulting level of construction-assembly works for the organizational structure is:

$$W=50039 \text{ thousands of roubles} \quad (2)$$

The entropy of a specialized level reflection for the construction-assembly works for the organizational structure is:

$$H=0,23 \quad (3)$$

As a result:

$$C_{st}^{cr} = 0,02 \cdot 50039 \cdot 0,23 = 230 \text{ thousands of roubles} \quad (4)$$

Table 1 identifies the dispersal costs on the location of construction objects. It is calculated upon the formula:

$$C_{st}^{cr} = \frac{d}{100} * V * \frac{R_{cp}}{100} \quad (5)$$

where V – level of a construction spread, thousands of roubles;
 R_{cp} – servicing diapason of construction structure, km;
 d – dispersed costs, % of the scope of construction-assembly works.

The quantity of d shall be assumed to be 2,1; 2,3; 2,5, according to the third, second and first groups of stationary organizations according to specifications and codes of practice or shall be equal to 1,79 for mobile organizations. [7-11]

— - the boundaries of conditional zones (coinciding with the district boundary);
→ - the direction of the redeployment of mobile units;
-6 - conditionally formed zones.

Fig. 2. The scheme of redistribution of territorial divisions on the example of the regional level.

Table 1. The costs, that associated with the dispersal of construction.

Indicator	Year	The area of the region						MSO	Total
		1	2	3	4	5	6		
Basic version Scope of constructi on and assembly works, thousands of roubles	1999	268139	170555	143906	154620	172500	149429	0	1059149
	2000	372445	236902	199886	214768	239602	207556	0	1471159
	2001	578780	368145	310622	333749	372342	322542	0	2286180
The average distance of relocation, km		32	45,8	54	48,7	54,9	47,8	-	-
OTUSP groups		3	2	1	2	2	1	-	-
The costs associated with the dispersal of construction, % to scope of construction and assembly works per 100 km Average distance Relocation		2,1	2,3	2,5	2,3	2,3	2,5	-	-
Likewise, thousands of roubles	1999	1802	1797	1943	1732	2178	1786	-	11237
	2000	2503	2496	2698	2406	3025	2480	-	15608
	2001	3889	3878	4193	3738	4702	3854	-	24255
Proposed option Scope of construction and assembly works, thousands of roubles	1999	264172	154684	132005	134786	168533	121661	74305	1050146
	2000	366935	214862	183356	187219	234092	168986	101709	1457159
	2001	570217	333894	284933	290937	363779	262604	163816	2270180
The average distance of relocation, km	1999	32	45,8	54	48,7	54,9	47,8	71,3	-
	2000	32	45,8	54	48,7	54,9	47,8	71,3	-
	2001	32	45,8	54	48,7	54,9	47,8	71,3	-
OTUSP groups		3	2	1	2	2	1	3	-
The costs associated with the dispersal of construction, % to scope of construction and assembly works per 100 km Average distance Relocation		2,1	2,3	2,5	2,3	2,3	2,5	1,79	-
Likewise, thousands of roubles	1999	1775	1629	1782	1510	2128	1454	949	11227
	2000	2466	2263	2475	2097	2956	2019	1298	15575
	2001	3832	3517	3847	3259	4593	4593	2091	24277

3 Results and discussion

A basic and expected comparison estimated in table 2, that was carry out different ways, considering the redistributions of the regional level construction program in mutual relations of organizations, specifically stationary and mobile organizational structures. The

three-year program is economically effective by the amount of 6585 thousand roubles, based on the development of functionality of mobile organizational structures. [12-15]

Table 2. The comparison of options between basic and prospective levels in view of the amount of consolidated costs.

№	Indicator	Years			Total	Total based on the time factor
		1999	2000	2001		
1	Reduction coefficient	0.926	0.857	0.794	-	-
2	Estimated cost of construction and assembly by the region, thousands of roubles	1059149	1471159	2286180	4816488	4056819
3	The same, carried out by mobile construction organization	74605	101709	163816	339830	286042
4	Additional expenditure, associated with growth rate deviation of scope of construction-assembly works from «normal» level, thousands of roubles	28403	55223	110482	194107	161347
		27142	53173	107135	187451	155767
5	Costs, associated with the organization's specialization, thousands of roubles	39599	55003	85474	180075	151673
		37475	52053	80889	170417	143538
6	Costs, associated with the dispersion of construction, thousands of roubles	11237	15608	24255	51100	43041
		11227	15575	24277	51079	43020
7	Additional costs associated with the mobile nature of the construction-assembly works, thousands of roubles	2601	3560	5734	11894	10011
8	Total expenses accounted for (sum of lines 4-7)	79238	125833	220211	425282	356061
		77702	123344	216397	417442	349476
9	Choosing the best option					
10	Economic effect	1537	2490	3814	7840	6585
11	The same, % of the estimated cost of the construction-assembly work across the region (line 10/ line2* 100%)					
12	The same, % of the estimated cost of the construction-assembly work of the organization (line 10/ line3* 100%)	2.07	2.45	2.33	2.31	2.30

Considering the whole estimate shows, that calculated economic efficiency level of the annual effect is about 0,16 % of an estimate at the regional level. The mobile organizational structure directly shows, that the level ranges about 2,3% of total scope of construction-

assembly works for accounting period due to reallocations of specialization and improving the uniformity throughout the entire period of operation.

In conclusion, it would appear that:

- trends and progress in organizational and technological functioning of organizational structures at the specialize level are objectively existing. This is the result of enhancing technology specialization;
- progressive harnessing modern technologies and types of building materials is one of the main development directions of specialized construction organizations;
- the specialized level of executors continues to improve and the economic efficiency of capital investments in regional construction is increasing.

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