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## ORGANIZATIONAL ACTIONS FOR FORMATION STREAMS CONTINUOUS DEVELOPMENT FRONTS WORKS (M-CDF) OF THE COMPLEX TOWN-PLANNING POWER RECONSTRUCTION

**Abstract.** *As one of the promising forms of integration, various complexes appear in the urban planning structure. The tendencies of the economy of the modern information society are such that the driving force behind the innovative development of society is science. Development and implementation of new and improvement of existing technologies in capital construction is determined by the need to reduce material and labor costs for their implementation, the annual amounts of which are calculated by millions of UAH direct costs and millions of people-days labor costs, and the need to shorten the investment cycle of construction of buildings and structures. Extended reproduction requires a further increase in the level of division of labor, concentration and specialization of construction production, intensification of the exchange of results of production and economic activity. Reconstruction historical building has the big social and economic value. Its primary goals consist not only in prolongation service life buildings, but also in liquidation physical and an obsolescence, improvement conditions residing, equipment residential buildings by the modern engineering equipment, increase operational characteristics and architectural expressiveness. It is offered to create in the city of Odessa “the Corporate scientific and technical complex town-planning power reconstruction “CSTC T-PPR”, as innovative organizational structure which uses in practice the saved up scientific and technical potential for reconstruction of buildings of historical building of Odessa under standards power efficiency. When organizing the management of the “CSTC T-PPR” it is not only possible to adapt the existing economic mechanism, it is necessary to search for new forms and methods of ensuring coordination in the activity of management bodies of different units. Any general managerial process by immovable object of historical building consists of management of the separate interconnected processes. The standard way of their dynamic display is the planned schedule allowing with certain periodicity to repeat the general functions of management in complex managerial process. The estimation of quality of operated processes “CSTC T-PPR”, as modeling of function of scheduling and management is executed. The presented model of an estimation of quality of management is effective as allows to estimate dynamically result of administrative activity and on this dynamics to form detailed enough forecasts of development of operated process.*  
**Key words:** *operational administration building, building organization, corporate scientific and technical complex, town-planning power reconstruction, finishing labor.*

### **Problem statement in a general view.**

As one of perspective forms of integration various complexes act in town-planning structure; in the course of formation plans social and economic development of large cities even more often there is a situation when for increase of efficiency used financial, material

and a manpower concentration of efforts, but also new progressive forms the organization of building manufacture – corporate, scientific and technical is necessary not simply, power efficiency.

**The review of last sources of researches and publications.** World practice shows,

that increase power efficiency is reached mostly at the expense of organizational changes in a guidance system power economy the enterprises or cities. Having introduced system power management it is possible to reach without the big financial losses considerable energy conservation in 3–5% for 1–2 years. Power management includes a set of the actions aimed at economy power resources: monitoring power consumption, working out power budgets, the analysis existing indicators as bases drawing up new budgets, working out a power policy, mapping out new power savings actions etc. Power efficiency building – property of a building, its structural components and plumbing system to provide during expected life cycle this building household requirements the person and optimum microclimatic conditions for its stay in premises such building at is standard-admissible (optimum) expenses power resources for heating, illumination, fanning, an air conditioning, heating of water taking into account a climatic conditions [1].

In town-planning is shown the tendency to integration, both in sphere of production of goods, and in management sphere; the expanded reproduction demands the further increase level a division of labor, concentration and specialization of building manufacture, an intensification exchange of results is industrial-economic activities. As one of perspective forms integration various complexes act in town-planning structure; in the course formation plans social and economic development of large cities even more often there is a situation when for increase of efficiency used financial, material and a manpower concentration of efforts, but also new progressive forms the organization of building manufacture – corporate, scientific and technical is necessary not simply, power efficiency [2–8].

**Research objective.** To offer the organizational structure using in practice the saved up scientific and technical potential for reconstruction buildings of historical building of Odessa 1820–1920 years under standards power efficiency and execute research line method the organization works – a method of continuous development of fronts of works (M-CDF).

**The basic material and results of researches.** As leading sign expediency application coordination principles of management the generality the economic purposes

and the problems, demanding industrial cooperation acts.

From positions methodology management CSTC T-PPR is the economic object the new class which has received the name integration. Its specificity follows from its integrated approach that assumes:

- High level coincidence interests of the basic industrial organizations entering in CSTC T-PPR at preservation a branch accessory and its corresponding inclusiveness in branch systems of planning, financing, logistics and management;

- The interrelation of economic activities defining them dependence in achievement both own, and branch purposes, forming the given complex;

- Territorially caused social and economic unity, impossible without realization the coordinated economic policy, free from administrative restrictions.

Such are the most general features, testifying that at the organization management CSTC T-PPR it is impossible to adapt only an operating economic mechanism, search of new forms and methods is necessary. In effect, the main problem is today maintenance coordination in activity of the controls concerning various links and levels building branch. Suggest them to unite “under the general roof” more often. But such structures are too bulky, unhandy, and are not always realized in practice, especially in building. It is necessary to organize thus participants CSTC T-PPR that they, realizing own purposes, would reach also the general results – we will tell, with partners in building of those or other building objects or with accessory manufacturers, though and not participating directly in works, but providing them, etc. Such mechanism is coordination. Integrity CSTC T-PPR is given by not so much spatial organization, how many that end result – a product of manufacture of reconstruction which and is created by builders. Now, when the emphasis becomes on economic control levers, neglect lessons coordination management in relation to primary economic cells are necessary for considering.

Successfully to develop CSTC T-PPR it is necessary to consider changes in a control system of municipal economy, and the happened cardinal changes in economy. Especially it concerns problems with acceleration of technical updating of sphere of manufacture of building materials.

Reconstruction of historical building has the big social and economic value. Its primary goals consist not only in prolongation of service life buildings, but also in liquidation physical and an obsolescence, improvement conditions residing, equipment of residential buildings by the modern engineering equipment, increase operational characteristics and architectural expressiveness.

It is necessary to execute reconstruction of buildings historical building of Odessa 1820–1920 years under standards power efficiency in which it is necessary to execute enough considerable quantity of internal painting and decorating.

Working out and introductions new and improvement of existing technologies in capital construction is defined by necessity of decrease in material and labor expenses for their performance, and also necessity reduction a reinvestment cycle building of buildings and constructions.

Application the mechanized methods manufacture internal painting and decorating raises efficiency of application building mixes as allows to organize performance works by a line method and to reduce duration of complex processes manufacture works. Wide introduction in practice building dry building mixes has opened possibilities mechanization manufacture plaster works with use both foreign, and the domestic equipment.

Before the beginning planning power reconstruction it is necessary to be defined with quantity power consumption to which it is necessary to aspire. In an original form it is recommended to stop on an intermediate variant somewhere in between the improved building and “the passive house”. Exact values will be defined within the limits of the further planning. Basically it is possible to choose both the maximum thickness of isolation, and minimum. The matter is that in parallel with thermal protection measures on decrease in consumption energy, including on hot water supply, other measures are planned for economic-household installations and the equipment and other needs also. The principle question demanding the answer is put so: what expenses are demanded by realization this or that measure, and what economy energy it will allow to achieve?

Any complex works can be executed various methods with different terms of the beginnings

and the terminations works, with different character use resources and development private fronts of works and according to technical and economic indicators different in size. Basically methods calculation the organization works are defined taking into account the restrictions imposed on communication between works.

The line method the organization works is formed by means of spatial division the general front works into private front works and parallel performance into them polytypic private streams works.

Line methods the organization works can be calculated in the different ways, therefore they have received names of methods calculation the organization works. We will consider a method of continuous development fronts works (M-CDF).

For calculation formation streams on method M-CDF we will consider the line organization of works presented by matrix durations and the schedule internal painting and decorating, at reconstruction of buildings of historical building Odessa 1820–1920 years under standards power efficiency (tab. 1).

On four building objects (buildings of historical building Odessa 1820–1920 years), defined as private fronts of works, are carried out four kinds of works in rigid technological sequence ( $A \rightarrow B \rightarrow C \rightarrow D$ ) on each object: plaster works (index A), priming works (index B), underpaint putty works (index C) and works on colouring (index D). The sequence development private fronts works also is fixed by the following sequence:  $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$ .

Each kind of work is carried out by constant cast which pass to the following object only after the full termination work on previous object. If the given complex works was carried out by a consecutive method its minimum duration would be equal to the sum of durations of all works entering into a given complex:

$$T = 7 + 9 + 6 + 8 + 2 + 3 + 2 + 3 + 13 + 17 + 11 + 15 + 5 + 8 + 4 + 6 = 119 \text{ days.}$$

For the line organization works at performance any work on any object performance two obligatory conditions is required:

1) the termination the given kind of work a resource on previous object (resource readiness of executors);

2) the termination a previous kind of work on the given object (technological readiness private front of work).

In the center of each element table 1 values duration works in days are shown. At formation of schedules works the primary goal consists in calculation terms manufacture works or, otherwise, terms the beginnings and the terminations works.

For the given stream (tab. 1) as restriction is entered maintenance continuous development each private front of work (a zero stretching face-to-face communications), and as criterion function – the greatest possible rapprochement adjacent fronts works.

For a conclusion of the basic settlement formulas the size carrying the name of the period expansion which defines a difference between the beginning the subsequent work on private front I and the beginning of previous work on the same front –  $T_{jj+1}^p$  is entered into consideration. Clearly, that the work first in a technological order is not preceded by any other work and hence its beginning is accepted by the zero. Thus, having defined the beginning the first work and the corresponding period of expansion the second work, it is possible to calculate the beginning its manufacture on

private front I etc. (on an induction) before definition the beginning last kind of work.

Having calculated the beginning of last work taking into account restriction on a continuity performance of works, it is possible to define the general duration of all complex works under the formula (1):

$$T = \sum_{j=1}^{n-1} T_{j,j+1}^p + \sum_{i=1}^m t_{n,i}, \quad (1)$$

Where  $T_{j,j+1}^p$  – the period expansion the subsequent front of work concerning previous;  $m$  – the general number kinds of works (a current serial index,  $i$ );  $n$  – the general number fronts of works (a current serial index,  $j$ );  $t_{n,i}$  – duration  $i$  works on last private front.

For definition of values the period expansion the subsequent fronts of works we will take advantage a condition (2) at which prior to the beginning any simple work, work the same kind previous on front should be executed:

$$T_{j,j+1}^p = \max_{i=1,m} \sum_{k=1}^i (t_{j,k} - t_{j+1,k-1}), \quad (2)$$

**Table 1.** Matrix durations and the schedule internal painting and decorating, at reconstruction buildings of historical building of Odessa 1820–1920 years under standards power efficiency, calculated by a method of continuous development fronts works

Index and the name of works	Private front of work												Total duration of work
	I			II			III			IV			
A. Plaster works	0		7	10		19	31		37	39		47	47=47-0
		7			9			6			8		30=7+9+6+8
													17=47-30
B. Priming works	7		9	19		22	37		39	47		50	43=50-7
		2			3			2			3		10=2+3+2+3
													33=43-10
C. Underpaint putty works	9		22	22		39	39		50	50		65	56=65-9
		13			17			11			15		56=13+17+11+15
													0=56-56
D. Works on colouring	22		27	39		47	50		54	65		71	49=71-22
		5			8			4			6		23=5+8+4+6
													26=49-23
Total durations of fronts of works	27=27-0			37=47-10			23=54-31			32=71-39			Stretching of communications resource 76=17+33+0+26
	27= =7+2+13+5			37= =9+3+17+8			23= =6+2+11+4			32= =8+3+15+6			
				$T_{II}^p = 10$			$T_{III}^p = 21$			$T_{IV}^p = 8$			

Source: It is developed by authors on the basis scheduling



Where  $t_{j+1,0}$  – the operation time a zero kind equal to zero.

For M-CDF restrictions forbid negativity of resource communications.

Let's take advantage the previous formula (2) and we will define the periods expansion works II, III and IV, shown by following formulas (3):

$$\begin{aligned}
 T_{II}^p &= \max \left\{ \begin{array}{l} 7 - 0 = 7 \\ 7 + 2 - 0 - 9 = 0 \\ 7 + 2 + 13 - 0 - 9 - 3 = 10 \\ 7 + 2 + 13 + 5 - 0 - 9 - 3 - 17 = -2 \end{array} \right\} = 10; \\
 T_{III}^p &= \max \left\{ \begin{array}{l} 9 - 0 = 9 \\ 9 + 3 - 0 - 6 = 6 \\ 9 + 3 + 17 - 0 - 6 - 2 = 21 \\ 9 + 3 + 17 + 8 - 0 - 6 - 2 - 11 = 18 \end{array} \right\} = 21; \\
 T_{IV}^p &= \max \left\{ \begin{array}{l} 6 - 0 = 6 \\ 6 + 2 - 0 - 8 = 0 \\ 6 + 2 + 11 - 0 - 8 - 3 = 8 \\ 6 + 2 + 11 + 4 - 0 - 8 - 3 - 15 = -3 \end{array} \right\} = 8.
 \end{aligned} \quad (3)$$

**Conclusions.** It is offered to create in the city Odessa “the Corporate scientific and technical complex town-planning power reconstruction “CSTC T-PPR”, as the innovative organizational structure using in practice the saved up scientific and technical potential for reconstruction buildings historical building of Odessa 1820–1920 years under standards power efficiency.

Formation of streams (in the matrix form) on a method of continuous development of fronts of works (M-CDF), as line method calculation the planned schedule performance internal painting and decorating of the Corporate scientific and technical complex town-planning power reconstruction “CSTC T-PPR” is executed. The considered method calculation a building stream effectively to apply in need delivery in operation building objects in limiting deadlines.

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### ОРГАНІЗАЦІЙНІ ЗАХОДИ ФОРМУВАННЯ ПОТОКІВ БЕЗПЕРЕРВНОГО ОСВОЄННЯ ФРОНТІВ РОБІТ (М-БОФ) КОМПЛЕКСУ МІСТОБУДІВНОЇ ЕНЕРГОРЕКОНСТРУКЦІЇ

**Анотація.** Як одна з перспективних форм інтеграції виступають у містобудівній структурі різні комплекси. Тенденції економіки сучасного інформаційного суспільства такі, що рушійною силою інноваційного розвитку суспільства стає наука. Розробка і впровадження нових і вдосконалення наявних технологій у капітальному будівництві визначається необхідністю зниження матеріальних і трудових витрат на їх виконання, щорічні розміри яких обчислюються мільйонами гривень прямих витрат і мільйонами люд.-днів. трудових витрат, а також необхідністю скорочення інвестиційного циклу будівництва будівель та споруд. Розширене відтворення вимагає подальшого підвищення рівня поділу праці, концентрації й спеціалізації будівельного виробництва, інтенсифікації обміну результатами виробничо-господарської діяльності. Реконструкція історичної забудови має велике соціально-економічне значення. Її основні завдання полягають не тільки у продовженні терміну служби будівель, але й у ліквідації фізичного і морального зносу, поліпшенні умов проживання, оснащенні житлових будинків сучасним інженерним обладнанням, підвищенні експлуатаційних характеристик і архітектурної виразності. Пропонується створити в місті Одесі «Корпоративний науково-технічний комплекс містобудівної енергореконструкції “КНТК МЕРек”», як інноваційну організаційну структуру, яка використовує на практиці накопичений науково-технічний потенціал для реконструкції будівель історичної забудови Одеси за стандартами енергоефективності. При організації керування КНТК МЕРек не можна лише пристосовувати діючий господарський механізм, необхідний пошук нових форм і методів забезпечення координації в діяльності органів керування різних ланок. Будь-який загальний процес управління нерухомим об'єктом історичної забудови складається з управління окремими взаємозалежними процесами. Загальноприйнятим способом їх динамічного відображення є календарний план, що дає змогу з певною періодичністю повторювати загальні функції управління в комплексному процесі управління. Виконана оцінка якості керованих процесів «КНТК МЕРек» як моделювання функцій календарного планування й управління. Представлена модель оцінки якості управління є ефективною, тому що дає змогу динамічно оцінювати результат управлінської діяльності й за цією динамікою формувати досить детальні прогнози розвитку керованого процесу.

**Ключові слова:** оперативне управління будівництвом, організація будівництва, корпоративний науково-технічний комплекс, містобудівна енергореконструкція, опоряджувальні роботи.

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