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"CSTCT-PPR": METAL TILE ROOFS OF HISTORICAL BUILDING OF ODESSA

It is offered to create in the city of Odessa "Corporate scientific and technical a 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 of buildings of historical building of Odessa 1820–1920 years under standards power efficiency. Calculation of predicted average service life of roofing covering from a metal tile for finishing parts of some reconstructed buildings of historical building of Odessa 1820–1920 years is executed. The received result much less than standard service life for the given kind of a metal tile (Tst = 20 years; Tav = 141.2 months ≈ 12 years) and depend on a considerable quantity of random factors, including from quality of civil and erection works.

Key words: *operation of buildings, organizational structure, corporate scientific and technical a complex town-planning power reconstruction, roofs.*

Introduction. As one of perspective forms integration various complexes act in town-planning structure. In the course formation plans social and economic development large cities even more often there is a situation when for increase efficiency used financial, material and a manpower concentration of efforts, but also new progressive forms the organization building manufacture is necessary not simply. We offer to create the corporate complexes having various scales, the purposes, structure (in town-planning reconstruction – Corporate scientific and technical complexes town-planning power reconstruction "CSTC T-PPR").

Analysis of recent research and publications. The concept covers "a town-planning heritage" both separate buildings, and large quarters, zones the historical centers and a city as whole. "The city is the integral of human activity materialized in architecture...". Such capacious definition to a difficult city organism was given by architect A.K. Byrov. A new city – the instant phenomenon. Time having arisen, it becomes historical category in the course of the development and is object of modern consideration [1; 2].

Value a historical architecturally-town-planning heritage is defined by following positions:

– architectural and town-planning achievements last epoch are one of the major components of a historical and cultural heritage;

– monuments history and culture, the historical architectural and spatial environment enriches the appearance of modern cities;

– presence the developed ensembles causes aspiration to harmony with surrounding context.

According varying social and economic conditions life in city organism naturally die off old fabrics and are born new, therefore updating of cities occurs consistently, by replacement of an out-of-date supply available and gradual transformation by this basis planning structures in whole or its separate elements. The purpose reconstruction and restoration an architecturally-town-planning heritage is preservation composite and aesthetic features the historical city environment. Town-planning reconstruction is a purposeful activity on change before the generated town-planning structure, caused by requirements development and perfection. The concept reconstruction of cities has double sense. On the one hand, it reflects development the occupied places, improvement their spatial organization, proceeding long time. On the other hand, it is material result, a building condition at present. Only having understood these parties reconstruction in their interrelation, it is possible to approach correctly to an estimation problems and to establish methods a reorganization of cities. Reconstruction – the continuous process which is

passing in each city differently, depending on the previous growth and modern requirements. It predetermines value a city as historical phenomenon in which various epoch intertwine. And in a modern city organism its components continuously change [3–9].

In town-planning the tendency to integration, both in sphere production of goods, and in management sphere is shown. 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.

Setting objectives. 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 to execute (for example) calculation of predicted average service life a roofing covering of such buildings.

The main material research. As a leading sign expediency application coordination principles management generality the economic purposes and the problems, demanding close industrial cooperation branches acts.

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

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

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

– territorially caused social and economic unity, impossible without realization coordinated economic policy, free from tactical and departmental restrictions.

Such are the most general features, testifying that at the organization of 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 today is maintenance of coordination in activity the controls concerning various links and levels building branch. Suggest them to unite "under the general roof" as the uniform owner is necessary 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 a coordination. Integrity CSTC T-PPR is given by not so much spatial organization, how many that end result – a product manufacture 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 municipal economy, and the happened cardinal changes in economy. Especially it concerns problems with acceleration technical updating sphere manufacture of building materials.

Today struggle against bureaucratize of administrative apparatus is everywhere conducted, "superfluous" control links are liquidated, necessity existence many organizational structures the government is called into question. Instead those contractual associations are created. There is a deep and exact criterion for estimation the chosen way – how much it will be possible to remove sharpness contradictions available in a former control system, to make their motive power of development.

The drastic contradiction in today's economy is a discrepancy between the saved up scientific and technical potential and its use in practice. All newest history development public systems is a continuous search effective ways development scientific achievements for satisfaction increasing requirements the person.

At legislative level in Odessa operate: the Program support of investment activity in territory a city of Odessa on 2016–2018 [10] which acceptance is caused by necessity creation conditions for activization the investment activity directed on improvement environment for conducting business and economic activities, improvement the general macroeconomic indicators, as consequence maintenance constant social and economic development a city of Odessa; and the Complex Program development building in the city of Odessa on 2013–2018 [11] which is directed on the decision such basic problem questions town-planning sphere a city of Odessa as housing construction development, and also updating a technical condition objects social appointment and an engineering-transport infrastructure.

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. In Odessa in a context of the international integration to standards power efficiency buildings city target programs operate: the City target program inclusion of the central historical part of building Odessa to the basic list of the World inheritance of UNESCO on 2013–2018 [12] and the City Program power efficiency of Odessa on 2013–2018 [13].

As a result an unsatisfactory condition an available housing, an street-high system, engineering communications, deterioration of comfort residing, and as a whole losses integrity perception the historical environment in the central historical area a city, and also deterioration tourist and investment appeal a city the complex target program "Preservation of authentic building and development the historical centre of Odessa" [14] is developed.

Within the limits these programs it is necessary to carry out calculations predicted average service life constructive elements and a building as a whole.

For reception these data in operational divisions the Corporate scientific and technical complex of town-planning power reconstruction (CSTC T-PPR) the scientifically-proved gathering the information on defects and refusals of designs, about their development on time should be adjusted.

And buildings as a whole judge operational properties constructive elements on indicators their reliability. The basic indicators non-failure operation: parameter a stream refusals λ(t), probability non-failure operation P(t) and density probabilities f(t) define, having statistical data about the refusals, grouped a timebase. For an initial estimation parameters non-failure operation the statistics about requirement under repair constructive elements as the requirement under repair is, as a rule, a consequence occurrence refusals can be used.

The primary operational organizations keep account requirements under repair building designs and the engineering equipment by results checkup. Mathematical processing this statistical material allows receive quantity indicators parameters non-failure operation: λ(t), P(t), f(t).

For definition relative density refusals concrete constructive elements it is necessary: to define volume operational refusals and their development in time (readout is conducted from year construction or year carrying out last major repairs); to count up non-failure operation parameters;

$$f(t) = \text{the saved up amounts of works / total amount of works;} \quad (1)$$

$$\lambda(t) = \text{volume repairs for a year / total amount of works;} \quad (2)$$

$$P(t) = 1 - f(t) \quad (3)$$

In 2005–2009 reconstruction the finishing parts some buildings historical building of Odessa 1820–1920 years has been executed. The roof these buildings from a sheet tin has been replaced with a metal tile.

Let's execute calculation predicted average service life a roofing covering from a metal tile (the method of the least squares, [15, item 7.1.]). In 10 houses historical building it is surveyed 23 870 м^2 a roofing covering from a metal tile. From the analysis defective sheets it is counted up, that for the given buildings refusals were observed: in 12 months on the area 168 м^2; in 24 months refusals are registered in addition on the area 240 м^2; in 36 months the same on 310 м^2; in 48 months – on 388 м2; in 60 months – on 455 м^2; and in 72 months – on 515 м^2. On the basis these data it is possible to define frequency refusals roofs in six points a timebase:

$$F(t) = n_o/N, \quad (4)$$

where *N*– quantity all surveyed elements;

n_o– quantity the given up elements by the moment t.

On value *F(t)* it is defined statistical probability non-failure operation *P(t)* and corresponding to it quintile normal distribution on [15, p. 439] also it is made out in the tabular form (tab. 1).

Table 1

Definition quintile

№ points	Time *t*, month	Frequency refusals *F(t)*	Probability non-failure operation *P(t) = 1 – f(t)*	Quintile, u_i
1	12	0,007	0,993	2,457263
2	24	0,017	0,983	2,120072
3	36	0,030	0,970	1,880794
4	48	0,046	0,954	1,6871868
5	60	0,065	0,935	1,5152825
6	72	0,087	0,913	1,3600501

Frequency refusals F(t):
In 12 months: 168/23870 = 0,007;
In 24 months: 0,007 + 240/23870 = 0,017;
In 36 months: 0,017 + 310/23870 = 0,030;
In 48 months: 0,030 + 388/23870 = 0,046:
In 60 months: 0,046 + 455/23870 = 0,065;
In 72 months: 0,065 + 515/23870 = 0,087.

The concrete value service life registered while in service, can be presented as:

$$t_i = T_{av} - и_i\sigma, \quad (5)$$

where T_{av}– average service life an element;

σ– average quadratic a deviation.

Proceeding from it, we will write down system of the equations:

$$12 = T_{av} – 2{,}46\ \sigma;$$
$$24 = T_{av} – 2{,}12\ \sigma;$$
$$36 = T_{av} – 1{,}88\ \sigma;$$
$$48 = T_{av} – 1{,}69\ \sigma;$$
$$60 = T_{av} – 1{,}52\ \sigma;$$
$$72 = T_{av} – 1{,}36\ \sigma;$$

Let's combine the equations term by term: $252 = 6T_{av} – 11{,}02\ \sigma$,

Whence Tav = (252 + 11,02 σ)/6, month

Following a way the least squares [15, item 7.1.]), we multiply each member the made equations on corresponding quintile.

We receive new system the equations:

$$29{,}49 = 2{,}46T_{av} – 6{,}05\ \sigma;$$
$$50{,}88 = 2{,}12T_{av} – 4{,}5\ \sigma;$$
$$67{,}71 = 1{,}88T_{av} – 3{,}53\ \sigma;$$
$$80{,}99 = 1{,}69T_{av} – 2{,}86\ \sigma;$$
$$90{,}92 = 1{,}52T_{av} – 2{,}31\ \sigma;$$
$$97{,}92 = 1{,}36T_{av} – 1{,}85\ \sigma;$$

Let's combine the equations term by term: $417{,}91 = 11{,}03T_{av} – 21{,}1\ \sigma$;

Let's substitute value Tav in the equation and we will define a root-mean-square deviation:

$417{,}91 = 11{,}03\ ((252 + 11{,}02\ \sigma)/6) – 21{,}1\ \sigma$;

$417{,}91 = 463{,}26 + 20{,}26\ \sigma – 21{,}1\ \sigma$;

$0{,}84\ \sigma = 45{,}35$; → σ = 54 months.

Let's define average service life a roofing covering from a metal tile:

$T_{av} = (252 + 11{,}02 \times 54)/6 = 141{,}2$ months ≈ 12 years.

Conclusions. It is offered to create in the city of 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 of historical building Odessa 1820–1920 years under standards power efficiency. Calculation predicted average service life a roofing covering from a metal tile for the finishing parts some reconstructed buildings of historical building Odessa 1820–1920 years is executed. The received result much less than standard service life for the given kind of a metal tile (Tnorm = 20 years); average service life element Tav= 141,2 months ≈ 12 years, it depends on a considerable quantity random factors, including from quality civil and erection works.

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«КНТК МЕРек»: МЕТАЛОЧЕРЕПИЧНІ ПОКРІВЛІ БУДІВЕЛЬ ІСТОРИЧНОЇ ЗАБУДОВИ ОДЕСИ

Пропонується створити у 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 1820–1920 рр. за стандартами енергоефективності. Виконано розрахунок прогнозованого середнього терміну служби покрівельного покриття з металочерепиці для завершої частини деяких реконструйованих будинків історичної забудови Одеси 1820–1920 рр. Отриманий результат значно менший за нормативний термін служби покрівлі для даного виду металочерепиці (Тнорм= 20 років, Тср = 141,2 міс ≈ 12 років) і залежить від великої кількості випадкових факторів, у тому числі від якості будівельно-монтажних робіт.

Ключові слова: *експлуатація будинків, організаційна структура, корпоративний науково-технічний комплекс містобудівної енергореконструкції, покрівлі.*

«КНТК ГЭРек»: МЕТАЛЛОЧЕРЕПИЧНЫЕ КРОВЛИ ЗДАНИЙ ИСТОРИЧЕСКОЙ ЗАСТРОЙКИ ОДЕССЫ

Предлагается создать в городе Одессе «Корпоративный научно-технический комплекс градостроительной энергореконструкции «КНТК ГЭРек» как инновационную организационную структуру, использующую на практике накопленный научно-технический потенциал для реконструкции зданий исторической застройки Одессы 1820–1920 гг. по стандартам энергоэффективности. Выполнен расчет прогнозируемого среднего срока службы кровельного покрытия из металлочерепицы для завершей части некоторых реконструированных зданий исторической застройки Одессы 1820–1920 гг. Полученный результат значительно меньше нормативного срока службы для данного вида металлочерепицы (Тнорм = 20 лет; Тср = 141,2 мес ≈ 12 лет) и зависит от большого количества случайных факторов, в том числе от качества строительно-монтажных работ.

Ключевые слова: *эксплуатация зданий, организационная структура, кровли, корпоративный научно-технический комплекс градостроительной энергореконструкции, кровли.*