METHOD OF DETERMINING THE COST OF HYDROPOWER OBJECTS
AND THEIR COST EFFECTIVENESS

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Standard Basis for Determining Construction Costs. The basis for determining construction costs in the former USSR prior to the 1940s was the integrated estimate standards: SUSN-37 and SUSN-38 ("Directory of integrated estimate standards for general construction and special types of work") and since 1945, SUPR-45 ("Directory of integrated indices in construction"). The integrated method of estimating the cost of construction provided simplicity of making estimated cost calculations and their reliability, since in structure it was comparable to the data of statistical reports on types of construction and made it possible, when necessary, to correct the cost indices of the types of work.

After the 1941-1945 war, the need to find means to restore the war-destroyed economy, in combination with the guidelines of state structures (USSR Industrial Construction Bank (Promstroibank), USSR Ministry of Finance (Minfin), USSR State Construction Committee (Gosstroi)), led to the rejection of the integrated, comparable to statistics, method of determining expenditures in construction and to changing to "refining" of each element of the works, designs, and expenditures on their extremely differentiated varieties. A vast control apparatus was created, estimating became extremely complicated, and attempts to "refine" the cost of construction by detailing led not to refinements of the construction costs but to confusion of its determination and to the impossibility of a comparative analysis of the estimate standards and prices with the real accounting and reporting data.

From 1955 up to the present, the basis for determining construction costs has been the elemental estimate standard of building codes and the Unified Regional Unit Prices (URUPs) for elemental types of construction and installation works and structures, their parts, elements, the total number of which (with consideration of modifications according to the annotations) amounts to hundreds of thousands of items (prices) compiled on their basis. Thus, just for earthworks and works accompanying them, tens of thousands of standards and prices, price lists, and other integrated indices of construction costs compiled on the basis of these elemental estimates, standards, and prices have been developed, which do not increase the reliability of determining the construction costs, since they contain an arbitrary selection of elemental standards and prices. For performing this work, it is sufficient for the design engineer to have on hand three to five (maximum) directories. The estimator is "equipped" with 50 collections of URUPs, the same number of collections of prices for installation and special works, tens of collections of elemental estimate standards, estimated prices for materials, parts, structural members, estimates of construction mechanisms, hauling freight for construction, price lists, unified standards and prices, etc., etc., and tens of supplements and amendments to them coming as a powerful and continuous flow — a "Mont Blanc" of books! Here the difference in thousands of prices (1.5-2 ruble prices for earthworks, 40-100 ruble prices for concrete works, and 300-400 ruble prices for steel structural members) came out to only 3-5 kopecks.

Furthermore, an elemental determination of the costs of construction is one of the causes of an excellent possibility of an increase of its costs. And conversion to so-called contract prices in construction (actually they are not set) changes hardly anything, since there is always the possibility of introducing corrections into the "base" prices serving as the basis for the contract prices.

Thus, today the actual cost of construction is formed according to some laws and principles, but is determined according to others having little in common with the practical activities of construction organizations.

And until we return to the integrated (most reliable and comparable with statistics) estimates and the resource method of calculating expenditures in construction, there will be no positive shift in this matter. The resistance to this is and will be fierce, since such a change will make it possible to radically reduce (and subsequently eliminate) the vast apparatus engaged not only in a business that is useless but also harmful for the country's economy.

Construction Cost — Basis for Determining Its Cost Effectiveness. At present the cost effectiveness of constructing an object is determined on the basis of the design level of annual operating costs and extent of investments in construction, calculated from the sum of expenditures in the local and object estimate calculations. However, the estimated extent of investments in no way characterizes the actual extent of expenditures, not only for the reasons presented in the preceding section but to a still greater degree because in addition to the estimated price of construction there is additionally its contract price, which includes many expenses which either were not reflected in the estimate or were reflected in it at an insufficient level. The latter is due to the existing method of a "stringent" directive estimate standardization of individual types of expenses in construction "from the top" (by the government and former Gosstroi).

The presently existing numerous legal acts in construction (instructions, methods, standards, directives, etc.) have not been cancelled and this places a dilemma before designers: either present formally "correct" material for approval, or take into account all factors affecting construction and its costs and present the design-estimate documents in a form which may not be accepted by the evaluating and confirming authorities compiled violation of the standards, prices, regulations, and methods that were not cancelled.

Naturally, the first, easiest, "legal" path is tempting for the designer. However, this makes the entire economic part of the project senseless. The more so under market conditions, when the difference between the customary state standards and prices and the actually existing level of costs is enormous. A clear example of this is the feasibility study of constructing the Gilyui hydroelectric station (the developer is the Leningrad Institute of the All-Union Planning, Surveying, and Scientific-Research Institute (Gidroproekt)) presented to the State Evaluation Committee of the former Ministry of Economics and Finances. The construction costs determined by the existing estimate canons in the existing 1991 prices is 1.3 billion rubles. On the basis of it, the effectiveness of investments was determined. At the same time, with consideration of the costs not reflected in the estimate (according to the existing method, they should not be taken into account) which are related to a number of recent public resolutions concerning an increased level of overhead expenses for construction projects in regions of the Far North and costs equated to them, allowances included in the tariff rates and basic pay, permission to state enterprises (from 10 to 30%) and nonstate enterprises (100%) to sell their own products at market prices, conversion of banks to commercial banks and an increase of credit charges to 15-20%, need to increase the profitability of construction in connection with a reduction of appropriations of funds for the development of the facilities and industry of construction organizations, an increase of the cost of business trips by 3.2 times and inflationary processes with a natural annual inflation up to 20-30%, etc., which should be included in the contract price, the cost of construction according to the evaluation by experts will be at least 3 billion rubles. In this case what remains of the substantiation of the cost effectiveness of construction? However, designers formally have the right not to reflect the aforementioned costs in the estimate.

The flagrant contradiction, being the result of the sluggishness of organizations developing and approving the appropriate standard materials, their inability (and possibly, unwillingness) to promptly and with determination to solve methodological problems of entering the market, is obvious. There has long been the need to develop and put into action instructions on the need to present at all design stages at least an approximate, conditional, rough calculation of construction costs with consideration of all necessary and inevitable construction costs not figuring in the estimate but subject to reflection in the contract price with consideration of the actual index taking into account the conditions of market relations, economic situation, and level of inflation.

Method of Determining the Cost Effectiveness of Construction National Economic and Sector Effectiveness. At present there is essentially no method of determining the national economic effectiveness of construction. The existing method determines not the national economic but only the intrasector effectiveness of construction. Here an object detrimental for the country's economy as a whole can have quite effective indices and vice versa. We will explain this by way of an example of comparing machine building and the power industry.

When a plant creates a new product, for example, a combine, the cost effectiveness of the new production assets is determined not only by how much cheaper is the new combine per unit power, weight, productivity (with consideration of investments for developing its production) but mainly by how much the grain losses decrease and the cost and labor-productivity of harvesting, operating the new machine, etc., are reduced. It would be ridiculous if only the possibility of the production of the combine was evaluated independently of the results of its work on harvesting the crop. But precisely this occurs in the electric power industry: the effectiveness of investments in electric and thermal power is determined by the payback time of investments calculated on the basis of the profitability of the production of electric (thermal) energy without consideration of the results of using electricity or heat in consumer sectors (industries). Thus the main national economic result of investments in the power industry, substantially exceeding the intrasector effectiveness, remains unaccounted for.