The existing methods of substantiation of the effectiveness of hydropower construction alternatives have several shortcomings. Various authors [1-7] have pointed out the groundlessness of the applied rigid and unified norms of effectiveness and costs occurring at different times in the substantiation of long-term programs, the limitations of the criterion of amortized costs, which functions poorly in the evaluation of social and ecologic factors and the substantiation of territorial-industrial complexes, the underestimating of the live labor in the expenditures and capital investments for the considered alternatives, etc.

These shortcomings exert a significant effect on the technical policies in the field of hydropower and multipurpose water-management construction, in which the differences among the compared alternatives as regards capital consumption, fund structure, construction and operation mastering periods, labor productivity level, and amount and composition of the production expenditures are usually very sharply manifested.

Along with the topicality of the improvement of the methods of economic comparison of power construction alternatives, under the conditions of the increasing strain in the balance of the labor resources, considerable importance is attained by the working out of methods of comparison of alternatives directly from the labor costs. In this article, an investigation carried out for working out such methods is described.

Proposals for comparison of labor in a natural form are presented in [8, 9]. According to [8], the total labor costs can be determined in any given technical alternative by removing the total live labor costs from the materially expressed labor costs through successive apportionment of the live labor costs over the previous production stages and their addition to the live labor costs for the last stage.

Less labor-consuming is a proposal [9] for determination of the national income corresponding to each working day and addition, on the basis of this equivalent, of the past labor to the live labor. The individual cost economy of importance for evaluation of the effectiveness of the alternative can be calculated by taking into account the required design live labor costs.

The basic possibility of direct measurement of the labor costs is admitted also in [3], in which, however, the complexity of such calculations is pointed out.

The conditionality and approximate character of such methods of expressing labor in a natural form is perceived in the difficulties involved in adding labor time having different qualifications and intensity and in making commensurable the past labor expressed in production means and materials with the current live labor costs. These difficulties really exist, but, as shown below, they do not depreciate the method of analysis itself.

On examining different types of live labor with regard to their complexity, it might be well to point out their gradual approximation to each other, reflected in the interbranch labor balances [10].

The approximation of the different types of labor to each other may be indirectly judged from the dynamics of mean monthly wages of a worker for different branches of the national economy. This dynamics, for the data given in [11], is represented in Fig. 1, which shows the coefficient of variation and the ratio of the maximum mean-branch wages to the minimum for the entire national economy and the material production branches. From the graph of Fig. 1 it is seen that the limits of variation of the mean wages (and consequently, the simple and complex labor having different costs) exhibit a tendency toward approximation. This was confirmed in other investigations [12].

Translated from Gidrotekhnicheskoe Stroitel'stvo, No. 11, pp. 18-20, November, 1980.
Data [13] about the mean wages of a worker at a large number of hydro- and thermoelectric plants during 1964-1974 attest that the deviation of the wages from the middle for different electric plants in the European part of the USSR amounts to ±5%, while for the Asian part it amounts to ±10-13%. The mean wages for thermoelectric plants, in connection with the greater share of high-qualifications workers, are higher by 5-15% than for hydroelectric plants. This confirms the uniformity of the expression of the labor costs in man-days and a certain exceedance of the labor costs at thermoelectric plants upon their reduction.

The mean wages of coal miners also fluctuate for different mines within the above-mentioned limits, but, as is generally known, the absolute wages amount is substantially higher (up to 80%) than at thermo- and hydroelectric plants. The consideration of this factor should be reflected in comparative analyses.

On examining the materially expressed labor costs, it is necessary to bear in mind that they are determined not directly according to the time, but by means of the capital investments, and that their reduction with respect to the mean-social working time is thereby already realized. The past labor costs themselves are in practice continuously summed up with the live labor costs in each production stage. In connection with the fixed capital, the loss of their value during the process of wear is compensated with the aid of the depreciation norm, taking into account the material wear and the replacement-cost standard. In connection with the primary products and materials produced 1-3 quarters before their industrial consumption, the loss of value is in general insignificant.

It should be noted that inadequate consideration of the obsolescence in the labor expressed materially in man-days rather results in overestimating than underestimating of the value of the labor means. In this connection, the effectiveness of the capital-consuming new-technology alternative tends to be underestimated, a situation which should be recalled in comparisons of this type.

Before passing to the scheme of comparison of power construction alternatives for labor costs, using the current technicoeconomic indices, let us dwell on the quantitative expression for the equivalent of the national income in working time.

At the beginning of the 1960s, S. G. Strumilin evaluated this equivalent for the national economy on the whole. In [10] its evaluation was made in 1964 for the material production branches. In principle, the consideration of the total working time costs on the whole for the national economy is preferable, since the costs of the nonindustrial branches partly participate in the formation and conservation of the national income. Inasmuch as for the subsequent analyses, the important factor is not the absolute value of the equivalent but the