The design of a machine with an original method of moving, having a considerably smaller size than the machine of the All-Union Institute for Planning and Organizing Power Construction (Orgenergosstroy) and the Sayano-Shushenskoe hydroelectric station (designed by E. F. Nazarenko), is in the stage of field testing and final development at the Boguchany hydrostation. However, both these machines are in need of improvement, further tests, and organization of plant production.

In [2] a number of serious comments and suggestions were made to Minstroimash with respect to the Krasnyi Mayak plant. The plant is practically the only manufacturer of electrical vibrators. Being in the center of the city, it does not have possibilities for large reconstruction and expansion. The reliable supply of the plant with converters even under the existing program has not been solved. It seems that Gosstroii together with Minstroimash must examine the prospects of developing directions with respect to mechanization of the compaction of concrete in hydraulic structures, taking into account the competing vibrationless technology due to superplasticizers and forecasts for the indicated concrete.

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CONSTRUCTION OF GEODETIC NETWORKS FOR STUDYING CRUSTAL MOVEMENTS WHEN CREATING HYDRAULIC STRUCTURES IN SEISMIC REGIONS

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Among the engineering problems being solved at the stage of design and construction of large projects in seismic regions of the country, the problem of a space-time study of contemporary crustal movements (CCM) is important. The urgency of such investigations when designing, constructing, and operating large dams and reservoirs in seismic regions is most representative. The use of such objects is intended for hundreds of years, and in certain cases even slow ("secular") crustal movements can lead to undesirable consequences and major ecological catastrophes [4, 6]. Therefore, the purpose of studying the regularities of CCM in the region of a hydraulic structure at the stage of design and construction is to determine its future safe operation. Thus, as early as the design stage knowledge of the character and extent of secular and rapid contemporary crustal movements can be a decisive factor when selecting the location of a dam. Data on CCM obtained during construction and initial stage of operation of a hydraulic structure permit predicting the degree of the technogenic effect on the geokinematic conditions of the region and determining the relation between the dynamics of filling a reservoir and the character of local seismicity. Thus the possibility appears of making an engineering decision aimed at reducing the unfavorable consequences of CCM on the stability of the structure to be operated.

Repeated precision measurements of elements of geodetic networks created in regions where hydraulic structures are planned are one of the most common methods of gaining knowledge about geokinematics. In connection with this, problems of the design and creation of
geodetic networks for such regions remain urgent and have still not been completely elaborated [5]. The region of construction of each hydraulic structure in a geotectonic respect is strictly individual. However, the common character of the methods, purposes, and problems of investigating CCM being carried out under conditions of fault tectonics inherent to each object makes it possible to plan a common approach to the construction of geodetic networks for the indicated purposes.

Some methodological aspects of constructing networks for studying contemporary vertical crustal movements (CVCM) for the examples of the geodetic works in the regions of the design and construction of the Bartogai reservoir on the Chilik River and the Bestyuba reservoir on the Charyn River in highly seismic regions of the Northern Tien Shan are presented below.

The contemporary structural plan and fault tectonics play a decisive role in the occurrence of CVCM of Northern Tien Shan, just as any seismic region, and therefore a study of the geological structure of the region should precede planning of the leveling networks for studying all CVCM.

In a regional plan the regions of the Bartogai and Bestyuba reservoirs are located in the eastern ends of the Zailiiskii and Kungei Alatau ranges in a zone of intensity 9-10 seismicity. Figure 1 gives an idea about the morphostructure of the region. The zone of the Bartogai reservoir encompasses part of isolated tectonic structures, and, despite the limited size (8 × 6 km), is characterized by a quite complex structure.

In the zone of the reservoir there are two large faults, the Bartogai and Toraigyr, which represent [2] tectonic zones with a width of 400 m. In the region of the dam site there are subparallel fractures with a width from 0.5 to 10 m descending stepwise southward.

Intersecting 8-10 km west of the basin of the reservoir, the Toraigyr and Bartogai faults form a mobile tectonic knot, being the most probable site of accumulation of stresses and their release as an earthquake [3].