

MODEL INVESTIGATIONS OF ARCH
DAMS RESPONSE ON SEISMIC EFFECT

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ABSTRACT

The purpose of these investigations was to determine the aqueous medium and the arch dam structural feature effect on its earthquake resistance. The investigation procedure of the structure working in the elastic stage is based on the earthquake resistance spectral theory. As to the investigation procedure of the dam's breakdown mode during the earthquake, it's assumed here that the dam's (model's) material is elastic-brittle and that during a short-time dynamic loads the destruction comes without plastic deformation effects, having limiting tensile stress at any point. The main problem was to define the foundation acceleration conforming to the first strain crack occurrence in the dam model. According to the accepted technique a set of Inguri Arch dam's model tests was carried out on the seismic platform. The displacement amplitudes and stresses in case of a full reservoir was established to be greater than in case of an empty one for the same foundation acceleration; the strain increase for a longitudinal seismic load being 18 per cent and for a transverse one - 5 per cent. The average increase of displacement amplitudes in case of a longitudinal seismic load reaches 15 per cent and for a transverse one - 6 per cent. The accelerations conforming to the beginning of crack generation in dam body are also increased. The acceleration increase amounts to 60 per cent in case of a longitudinal seismic load and to 40 per cent in case of a transverse one. The frequencies of natural vibrations are considerably reduced in case of a full reservoir. At the same time the water effect for the first tones is of a great extent (the frequency average reduction for the first tone amounts to 20 per cent) and for the higher tones this effect is greatly reduced (for the seventh tone the reduction amounts to 1 per cent).

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