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PRIMENA GEOFIZIČKIH ISTRAŽIVANJA ZA REŠAVANJE PROBLEMA PROCURIVANJA NASUTE ZEMLJANE BRANE

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Ključne reči: morfometrija, seizmometrija, elektrometrija

Gubici vode iz veštačkih akumulacija su problemi koji su prisutni tokom celokupnog perioda njihove eksploatacije, a naročito je problematično kada je u pitanju procurivanje na samoj brani. Uslov za kvalitetno izvedenu sanaciju je efikasno i precizno utvrđivanje zona procurivanja. Projektovanje geofizičkih istraživanja sa izborom kombinacija adekvatnih metoda i postupaka, koje analiziraju različite fizičke parametre, obezbeđuje dobijanje najmerodavnijih rezultata. Akcenat u ovom radu je na projektovanju i izvođenju kompleksnih geofizičkih istraživanja za potrebe rešavanja problema procurivanja nasute zemljane brane, kombinovanjem više geofizičkih metoda i postupaka.

Na osnovu batimetrijskih sonarskih merenja, koja su prvo izvedena, definisana je topografija dna akumulacionog jezera. Na dobijenim podacima kote dna, izvedena je morfometrijska analiza sintetisanog digitalnog modela reljefa. Dobijene su pozicije rupturnih struktura ispod jezera. Te strukture mogu imati uticaj na cirkulaciju vode i promene fizičko-mehaničkih karakteristika nasutog materijala samog tela brane. Analizom predisponiranih pravaca cirkulacije vode iz akumulacije, kao i vidljive manifestacije cirkulacije na samoj brani, projektovana su i izvedena detaljna geofizička istraživanja na nizvodnoj kosini nasipa brane. Primenjene su elektrometrijska i seizmometrijska metoda geofizičkih istraživanja. Elektrometrijska metoda je izvedena postupcima sopstvenog potencijala i specifične električne otpornosti. Seizmometrijska metoda istraživanja, izvedena je postupcima uzorkovanja mikrotremora i refraktivnog profilisanja po parametru brzine prostiranja P talasa. U poređnom analizom rezultata primenjenih metoda i postupaka, definisan je finalni model rupturnog sklopa i pravaca cirkulacije vode kroz telo brane.

APPLICATION OF GEOPHYSICAL RESEARCH FOR SOLVING THE PROBLEM OF THE EARTHFILL DAM LEAKING

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Key words: morphometry, seismic, electrometry,

Water losses from artificial reservoirs are problems that are present during the entire period of their exploitation, especially when it comes to leaks on the dam itself. Efficient and precise detection of leakage zones are crucial for quality remediation. Designing of geophysical research with the choice of adequate methods and procedures combinations, which analyze different physical parameters, ensures obtaining the most reliable results. Paper emphasize the design and conducting of complex geophysical research to solve the problem of leaking earthfill dam, combining several geophysical methods and procedures.

Bathymetric sonar measurements were firstly performed, defining the topography of the bottom of the accumulation lake. Based on the bottom elevation data, a morphometric analysis of the synthesized digital relief model was performed and positions of ruptured structures below the lake were obtained. These structures can have an impact on water circulation and changes in the physical and mechanical properties of the filled material of the dam body itself. An detailed geophysical research on the downstream slope of the dam embankment was designed and performed by analyzing these predisposed directions of water circulation out of the accumulation, as well as visible manifestations of circulation on the dam itself. Geophysical research included geoelectric and seismic methods. The geoelectric method was performed by procedures of self potential and specific electrical resistivity. The seismic method was performed by the procedures of microtremor sampling and refractive profiling of the P waves velocity. Comparative analysis of all obtained results defines the final model of the ruptured assembly and the directions of water circulation through the dam.