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MONITORING OF THE HYDROTECHNICAL TORRENT CONTROL STRUCTURES: A STATISTICAL APPROACH

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Abstract

This paper examines a new approach to the monitoring of the torrent control structures, which is based on mathematical-statistical research of the frequency and magnitude of the behavioural events recorded during the functional period of these structures.

The research material consists of the transverse hydrotechnical works placed in 21 managed torrential valleys in a watershed that is located in the Braşov mountainous area (in the centre of Romania), where 24 behavioural event types were identified following a 25-year functional period of the works.

First, a hierarchical classification of events was performed according to their frequency of occurrence. Analysis of the correlation and regression proved the existence of a strong correlation between the number of identified events and the number of performed works (and, relatedly, the number of affected parts of works).

Finally, in order to emphasize the laws underlying the occurrence and manifestation of the behavioural events, this research investigated the possibility of fitting the frequency distribution of the number of recorded behavioural events by three of the most well-known theoretical distributions: the normal distribution, Charlier type A distribution, and Beta distribution.

Given that the assumption of normality regarding the frequency distribution of the behavioural events was met, there now exists a theoretical argument for including the results of the statistical research regarding these events into a new approach elaborating - on the watershed scale - the norms monitoring (in the long term) the hydrotechnical torrent control structures.

Key words: behavioural event, hydrotechnical structure, monitoring, torrent control

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