



Evaluation Model of Life Loss Due to Dam Failure

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Dam failure poses a serious threat to human life, however there is still lack of systematic research on life loss which due to dam failure in China. From the perspective of protecting human life, an evaluation model for life loss caused by dam failure is put forward. The model building gets three progressive steps. Twenty dam failure cases in China are preferably chosen as the basic data, considering geographical location and construction time of dams, as well as various conditions of dam failure. Then twelve impact factors of life loss are selected, including severity degree of flood, population at risk, understanding of dam failure, warning time, evacuation condition, number of damaged buildings, water temperature, reservoir storage, dam height, dam type, break time and distance from flood area to dam. And through principal component analysis, it gets four principal components consisting of the first flood character principle component, the second warning system principle component, the third human character principle component and the fourth space-time impact principle component. After multivariate nonlinear regression and ten-fold validation in combination, the evaluation model for life loss is finally established. And the result of the proposed model is closer to the true value and better in fitting effect in comparison with the results of RESCDAM method and M. Peng method. The proposed model is not only applied to evaluate life loss and its rate under various kinds of dam failure conditions in China, but also provides reliable cause analysis and prediction approach to reduce the risk of life loss.