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Earthquake Risk Classes for dams situated in the Romanian Moesian Platform and Loss Estimates Scenario due to Ramnicu Valcea Dam collapse

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The main goal of this paper is the probabilistic assessment of the seismic hazard in the Moesian Platform due to intemediate-depth and crustal earthquakes and the rating of all dams from the zone into seismic risk classes. The second goal is to realise a scenario of loss estimates in the case of one of the largest dams from the Moesian Platform, the Ramnicu Valcea Dam.

Dam owners and regulators must ensure that dams are safely operated and present no risk to the public in case of an earthquake. While most old or new dams in recognized seismic regions have been evaluated and analyzed for seismic loads, dams located in areas of moderate or infrequent seismicity have been given less systematic attention. In such cases, owners of many dams or officials in charge of dam safety programs may consider comparative assessment of the seismic risk associated with their dams and establish priorities, as needed. Risk classes can be used to establish the necessity of detailed assessment of seismic safety of the dams and to establish the priorities of these evaluations.

Methodology which is used in this paper offers an easy way to evaluate the most vulnerable hydrotechnical facilities among the multitude of the Romanian dams, that are affected by normal and intermediate-depth Vrancea earthquakes. Generally the risk is expressed as a product between hazard and vulnerability. In particular, seismic risk in the case of hydrotechnical arrangements is computed as a product between seismic hazard (corresponding to the location of the respective hydrotechnical arrangement) and the seismic vulnerability of the respective arrangement. Various risk factors and weighting points can be used to approximately quantify the Total Risk Factor (TRF) of any dam [Bureau and Ballentine, 2002]. The TRF depends on the dam type, age, size, the downstream risk potential, and the dam vulnerability, which depends on the seismic hazard of the site. The dam structure influence is represented by the sum of capacity, height, and age risk factors. The downstream hazard factor is based on population and property at risk.