

**Proposal of a special session for the Third European Conference on Earthquake Engineering and Seismology (3ECEES) to be held in Bucharest, Romania, 5-9 September 2022.**

**March 4, 1977 Vrancea earthquake: Engineering, seismological and public policies reflections after 45 years**

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The March 4, 1977 Vrancea earthquake represented the Romania's greatest natural disaster in the 20th century. The available data prove some US \$ 2 billion losses, out of which about US \$ 1.42 billion were in construction field (buildings, water supply system etc), buildings being the most affected field. Out of Romania's 40 counties, 23 were strongly affected, while Bucharest recorded the highest losses. The casualties reached 1,578 lives and 11,321 injured, with 90% of the fatalities being in Bucharest. The rescue operations were rapid and efficient.

The automated seismic strong-motion network of ICCPDC-INCERC (existing since 1967) obtained three accelerographic records. The unique INCERC seismic record of March 4, 1977 highlighted, for the first time, the spectral content of long period seismic motions of Vrancea source, the duration, the number of cycles and higher values of actual accelerations vs the code values, with major overloading effects on flexible structures. On this account, there was a radical code change concerning the formula of the dynamic factor of seismic loading, as a function of natural periods, and significant changes of the seismic zoning map, although later on partially reduced.

As early as in March to June 1977 these data were known to the Romanian and international engineering community, the best foreign scientists visited the affected areas. The development of the strong motion array was possible with international support and the preparedness activities received a due attention.

It should be mentioned that in the political context the year 1976 coincided with a major offensive of Government reductions in materials consumption in constructions. The earthquake radically modified for a while the options and actions of specialists and authorities in civil engineering and construction industry. The design engineers tried to adopt solutions appropriate for avoiding the weaknesses revealed by the earthquake due damage, new rules of avoiding brittle failures, consideration of 3D performance, protection of service systems, risk reduction of existing buildings etc.

This new positive situation lasted just for a short time. In few months, there was a contradictory path of country's leader political decisions, lasting on July 4, 1977 when the ending of the damaged buildings consistent strengthening was ordered. Therefore, large categories of pre-code (damaged) or low-code (vulnerable) buildings were left to be only locally repaired and they represent a disaster potential and are the object of the risk reduction policies after the regime change of 1990's.

The special session is intended to gather contributions and present a review of the achievements and shortcomings in the last 45 years starting from the major opportunities of learning and of improving the earthquake protection of structures and the subsequent efforts aimed at reducing seismic risk. On long run, one of the issues is about the need and difficulty to communicate the seismic risk issues to the society and to decision makers before and in the aftermath of great disasters, in order to have best ways of disaster risk reduction.