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Aerial view of the collapsed Pooley Bridge in the aftermath of Cumbria Rainfalls in UK

Special Session:
Bridge Risk Assessment from Natural Hazards

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Special Session description

Modern societies are very reliant on infrastructure, especially for transportation. Transport networks allow for the movement of people and goods, ensuring communication and accessibility. Bridges are crunch points in such networks, since they connect links that would not be otherwise connected. They have high capital construction cost, and this results in fewer structures and therefore less redundancy in the system.

Given their structural nature and in some cases locations (e.g. over rivers), bridges are assets highly exposed to natural hazards, such as flooding, earthquakes, storms, wind or landslides. Their failure means not only the loss of a connection in the network, but also the interruption of service that they may be carrying (e.g. utilities such as water and power supply). Therefore, bridge failure could result in disproportionately negative consequences for the communities connected by the bridges.

A high percentage of current structures no longer meet the design criteria for which they were constructed, and are also inevitably aging. Additionally, the future is uncertain in terms of climate and demand. In parallel, new methods and new techniques (e.g. sensors) are opening the way towards a new era of bridge assessment systems. Bringing together experts to develop the capabilities of assessing the risks to bridges is fundamental for protecting our cities and communities. This Special Session is dedicated to advancements in bridge engineering, and it is inviting novel contributions from both academic and industry experts in the following (and not limited to) themes:

- probabilistic and statistical methods of risk assessment from natural hazards;
- analytical methods for vulnerability assessment of critical assets to natural hazards;
- Assessment of the social/economic consequences of bridge failures due to natural hazards;
- cost-benefit assessment and life cycle of bridges;
- bridge design criteria for withstanding climate change;
- cascading failure of infrastructure due to bridge failure;
- application of sensors for real-time and long-term monitoring;
- multi-hazard case studies of bridges impacted by natural hazards.