Keynote Address 3:

Aspects of Structural Vulnerability against Tsunamis

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Abstract:

Using historical data, it is shown that tsunamis may not occur for earthquake magnitudes even up to Mw = 8. Field data can be used to arrive at generalized fragility curves for different materials of construction as functions of inundation depth. Such curves can also be integrated into vulnerability curves that can be characterized by simple negative exponential equations. It is also possible to create synthetic fragility curves generated by Monte Carlo simulation, which were found to have a reasonable fit with the empirical ones. While most simulations focus only on the structural frames in buildings, partitions can also play a significant role in damage mechanisms. There is also a role for simplified indices of either risk or robustness, based ideally on physics rather than expert opinion. Such indices can also be used to consider risk to an entire system, for example buildings, functions and backup services that are spread across adjacent coastline hospitals.

Speaker Biography:

Priyan Dias has a doctorate from Imperial College London and is an Emeritus Professor in Civil Engineering at the University of Moratuwa, Sri Lanka, where he was the founder Director of Research (2014-17). He has also held research fellowships at the University of Bristol, Carnegie Mellon University, the University of Melbourne and the National Technical University of Athens. He is now attached to the Sri Lanka Institute of Information Technology as a part time Consultant and Professor. He is currently the Sri Lanka Representative for the Institution of Structural Engineers, UK; and the President of the National Academy of Sciences of Sri Lanka. He is also an associate editor of Civil Engineering & Environmental Systems, and has authored a book with Springer Nature in 2019 titled Philosophy for Engineering: Practice, Context, Ethics, Models, Failure. In 2020 and 2021, he was included in a database of the top 2% of researchers worldwide, prepared by authors from Stanford University and Elsevier.

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