PURDUE UNIVERSITY | Lyles School of Civil and Construction Engineering

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Reception: 3:00-5:00pm in Wood Commons (Hampton Hall)
Lecture: 5:00-6:00pm in HAMP 1144

Roberto T. Leon received a B.S.C.E. degree from the U. of Massachusetts at Amherst in 1978, an M.S.C.E. from Stanford U. in 1979, and a Ph.D. from the U. of Texas at Austin in 1983. He taught at the University of Minnesota and Georgia Tech before joining Virginia Tech in 2012, where he is now the C.E. Via Professor of Civil and Environmental Engineering.

Dr. Leon's research focuses on dynamic behavior and design of composite and hybrid steel-concrete structures, testing of full-scale and model structures in the laboratory, and field instrumentation of structures. Among other positions, Dr. Leon has served as President of the Consortium of Universities for Research in Earthquake Engineering (CUREE), the Network for Earthquake Engineering Simulation (NEESinc), the Board of Governors of the Structural Engineering Institute (SEI) of ASCE and the Board of the Applied Technology Council (ATC). He is a registered professional engineer in Minnesota, the co-author of a book on composite construction, a non-technical book on bridges and tunnels, the author and co-author of over 135 articles in refereed journals.

Complexity Lessons from Recent Structural Failures: By exploring some details of recent structural failures, ranging from the collapses of the Golden Line metro in Mexico City in 2021 to the more recent Francis Scott Bridge in Baltimore, we will examine how young engineers can develop a personal framework to understand similar events and their origins. The goal is to develop strategies to communicate to the public at large the complexities and cultural issues behind such disasters, in order to influence infrastructure policies and community resilience. Central to that framework are issues of complexity and system interdependencies that are not often taught or discussed as part of engineering education. The importance of considering human factors and cascading consequences have also been evident in the collapse of the Champlain South condominium and the recent failure of the Francis Scott Bridge in Baltimore. By comparing and contrasting the technical and professional issues that led to these recent failures, a case is made that (1) we need a far more systematic forensic engineering approaches that include sociological as well as technical components, and (2) such formal failure analysis techniques should be an important component of undergraduate engineering education. Finally, the need to understand the complex relationships between political priorities and infrastructure resilience as an integral component in all engineering courses will be emphasized.