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DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
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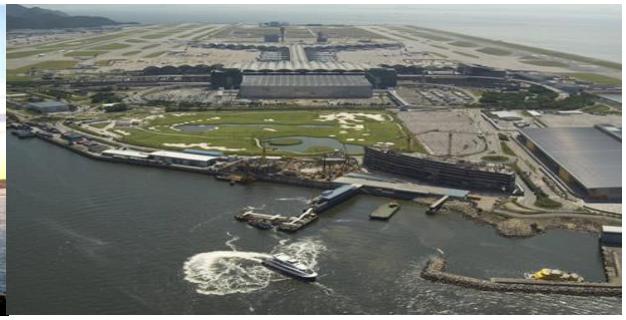

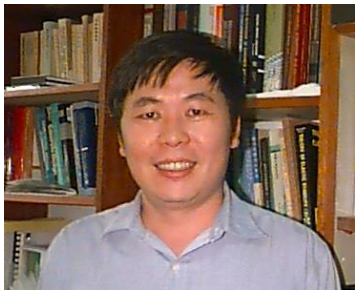

STRUCTURAL PERFORMANCE EVALUATION OF PREFABRICATED CONCRETE SEGMENTAL COLUMNS AND CONVENTIONAL MONOLITHIC COLUMNS AGAINST VEHICLE IMPACT

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Time: **11:00 a.m. - 12:00 noon**

Venue: **Room ZS970, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong**

SEMINAR ABSTRACT

The demands on prefabricated construction have been significantly increasing around the world in the last few decades owing to its many advantages compared to the traditional cast-in-place technology. Prefabricated concrete segmental bridge columns (PCSBCs) offer faster construction, lower cost, higher construction quality and efficiency, less environmental impacts, and better work-zone safety. However, the performance of the PCSBCs under impact loads such as truck impact has not been well studied yet although vehicle collisions to bridge structures or buildings occur occasionally around the world. This study comprehensively investigates the performance of PCSBCs with unbonded prestress tendons under truck impact by using finite element models. The numerical model is built and validated against experimental testing results. The impact responses and failure modes of the PCSBCs subjected to truck impacts are investigated and compared to a conventional monolithic column (CMC). Firstly, based on the shear mechanism of the CMC, an empirical equation to estimate the maximum dynamic shear capacity has been proposed. The response of the CMC under vehicle collision, i.e. flexural response and shear response is classified into different categories according to the response characteristics. Secondly, by comparing the impact performance of the PCSBC and CMC, it is observed that the PCSBC shows an advanced performance compared to its counterpart in terms of the induced bending moment and shear force in the column due to the joint sliding and joint opening between concrete segments which absorb a large amount of impact energy. This study systematically classifies, explains, and discusses the different failure modes observed in real vehicle collision accidents which have not been thoroughly explained yet.

SPEAKER'S BIOGRAPHY

Hong Hao received BEng from Tianjin University, MSc and PhD from the University of California at Berkeley. He is John Curtin Distinguished Professor, Director of Research Centre for Infrastructure Monitoring and Protection in Curtin University. He has won two dozen research, research publication and research supervision awards, and has been invited to give more than 60 keynote presentations in international conferences in many countries. His research results are included in textbooks, adopted in design codes, and used in construction projects around the world. He is the chief editor of International Journal of Protective Structures, chief editor of International Journal of Lifecycle Performance Engineering and serves in the editorial boards of another 10 journals. He is the President of the International Association of Protective Structures, Australian Rep in the International Association of Earthquake Engineering, Advisory Board member of Australian Network on Structural Health Monitoring. He chaired or co-chaired 14 international conferences, and served in more than 100 international conference committees. He has published more than 460 journal articles. His publications have received more than 12500 citations with H-Index 59. He is one of the most highly cited researchers in civil engineering. He is an elected fellow of Australian Academy of Technological Science and Engineering, and ARC Laureate fellow.

***** All Interested Are Welcome *****

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