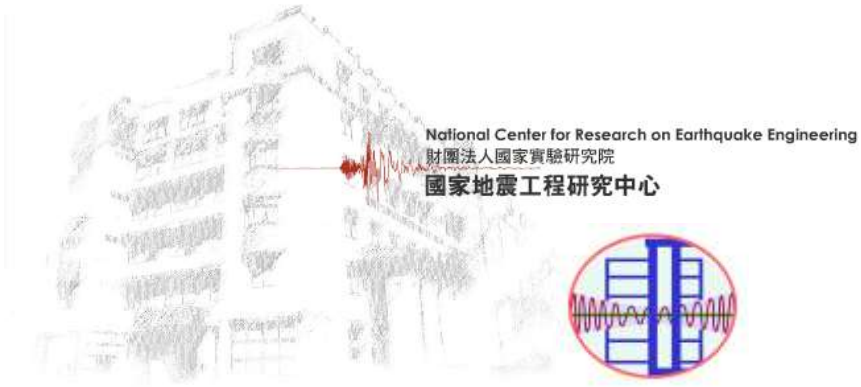
建築結構防爆及永續設計專題演講研討會

Seminar on Structural Blast Resistance
and Sustainability of Building Design



◎主持人及講員◎（依照出場序）

張國鎮	國家地震工程研究中心主任 國立台灣大學土木工程系教授
Ghani Razaqpur	Fellow of the Canadian Academy of Engineering Professor of Civil Engineering, McMaster University, Hamilton, Ontario, Canada
張慕聖	國立台北科技大學土木工程系明珠講座教授 Professor of Department of Civil & Environmental Engineering, Hong Kong University of Science and Technology
宋裕祺	國立台北科技大學土木工程系教授 國家地震工程研究中心橋梁組組長

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敬邀

財團法人國家實驗研究院國家地震工程研究中心
10668 台北市大安區辛亥路三段 200 號

國家地震工程研究中心
National Center for Research on Earthquake Engineering

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主辦單位：財團法人國家實驗研究院國家地震工程研究中心
協辦單位：中華民國結構工程學會、中華民國地震工程學會
、國立台灣大學土木工程學系
時間：102 年 08 月 28 日（星期三）
地點：國家地震工程研究中心 101 演講廳
費用：免費。
名額：預計 90 人。(額滿為止)
報名方式：即日起開始報名，請上網址 http://www.ncree.org.tw/
備註：本研討會已向行政院公共工程委員會申請技師換證積點，及公務人員終身學習護照相關證書。

◎宗旨◎

本次研討會由財團法人國家實驗研究院國家地震工程研究中心主辦，中華民國結構工程學會和中華民國地震工程學會共同協辦，邀請加拿大工程院院士、麥克馬斯特大學(McMaster University)土木工程系 Ghani Razaqpur 教授來訪進行兩場專題演講，講題分別為關於加拿大最新國家建築規範爆破荷載訂定內容和研究背景，以及應用等值水泥體積法(Equivalent Motor Volume, EMV)於混凝土配比設計之研究。Ghani Razaqpur 教授長期致力之主要研究範圍包括:

- Infrastructure Durability and Sustainability
- Infrastructure Security
- Advanced Numerical Modeling
- Design of FRP Reinforced Structures
- Concrete Design and Analysis

Ghani Razaqpur 教授此次訪台行程緊湊，特別安排於國家地震工程研究中心進行專題演講，預期將帶給與會者來自加拿大土木工程學界之研究新知，提升台灣土木工程學界與工程界在研討議題之知識，並利用本次專題演講討論會進行台灣與加拿大間相關研究議題之交流，有利未來雙邊研究合作發展。

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Seminar on Structural Blast Resistance and Sustainability of Building Design

Agenda (議程)			
102 年 8 月 28 日(星期三) August 28, 2013 (Wed.)			
Time (時間)	Program (講題)	Speaker (講者)	Chairman (主持人)
13:00～13:30	Registration (報到)		
13:30～13:40	Welcome Address (歡迎致詞)	*Prof. K.C. Chang (張國鎮 主任)*	
13:40～15:10	The New Canadian Standard for the Design of Buildings against Blast: Content and Supporting Research	*Prof. A.G. Razaqpur*	*Prof. Moe Cheung (張慕聖教授)*
15:10～15:30	*Coffee Break (休息/茶水)*		
15:30～17:00	The EMV Method of Mix Design: Key to Concrete Sustainability and Life Cycle Cost	*Prof. A.G. Razaqpur*	*Prof. Y.C. Sung (宋裕祺教授)*

Dr. A. Ghani Razaqpur

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Ph.D. (Calgary), P.Eng., FCSCE, FEIC, FCAE
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Professor, Civil Engineering

Biographical Sketch of Professor A.Ghani Razaqpur

Dr. A.G. Razaqpur is professor of Civil Engineering at McMaster University in Hamilton, Ontario, Canada. He is a fellow of the Canadian Society for Civil Engineering, a fellow of the Engineering Institute of Canada and a fellow of the Canadian Academy of Engineering and a former president of the Canadian Society for Civil Engineering. He currently serves on the editorial boards of the Journal of Cement and Concrete Composites and Journal of Protective Structures. He chairs the technical committees of the Canadian standards: CSA Standard S806: ***Design and Construction of Structures with Fibre Reinforced Polymers*** and CSA Standard S850 ***Blast Resistant Design and Assessment of Buildings***

He is the recipient of the Canadian Society for Civil Engineering 2012 A.B. Sanderson Award, given to an individual for outstanding contributions to the development and practice of structural engineering in Canada and of the Canadian Standards Association Award of Merit for major contributions and commitment to standards development in Canada.

Professor Razaqpur's research interest includes advanced nonlinear analysis of reinforced concrete structures, design and construction of reinforced concrete structures with FRP, design of structures against blast, and advanced finite element modeling of the deterioration processes of concrete structures, including chloride diffusion, carbonation and steel corrosion.

During the last 29 years he has published nearly 200 papers in international journals and conferences.

The New Canadian Standard for the Design of Buildings against Blast: Content and Supporting Research

A.G. Razaqpur

Professor of Civil Engineering, McMaster University, Hamilton, Ontario, Canada

In 2012 the Canadian Standards Association (CSA) published CSA Standard S850-12, Canada's first ever standard for the design of building structures against blast loads. The standard provides extensive provisions and specific guidelines about levels of protection and how they can be achieved under given blast scenarios. It contains detailed provisions and methods for determining blast loads (impulse and pressure) for both internal and external explosions, material properties under high strain rates, suggested methods of dynamic analysis, progressive collapse prevention strategies and blast load testing. The presenter chairs the Technical Committee of the standard and led a team which performed large scale field tests on reinforced concrete and steel structural elements and conducted extensive numerical modelling to validate some key clauses of CSA S850-12. In this presentation the major provisions of the standard related to reinforced concrete and steel structures and the research performed to validate them will be described. In particular, the advantages and disadvantages of field testing will be highlighted.

The EMV Method of Mix Design: Key to Concrete Sustainability and Life Cycle Cost

A.G. Razaqpur

Professor of Civil Engineering, McMaster University, Hamilton, Ontario, Canada

Sustainability and life-cycle costing in engineering design and construction have become major themes for both engineering education and practice in many parts of the world. In the context of concrete, the most prevalent modern construction material, reuse of old or demolition concrete as aggregate in new concrete, often referred to as RCA, has emerged as an important demonstration of its sustainability. Although extensive research is carried out in many parts of the world on RCA, one of the major drawbacks of much of the current research is the use of conventional concrete mixture design method for designing RCA concrete mixtures, which tend to show that RCA concrete is inferior to conventional concrete. However, it is argued in the current presentation and verified by extensive experimental data, that the reason for the reported inferiority of RCA concrete is the use of inappropriate concrete mixture proportioning methods. It is argued that at the macro scale, RCA is a composite of natural aggregate and residual mortar and its physical and mechanical properties depend on the relative volumetric ratio and properties of its two basic constituents. Without consideration of this fact, RCA concrete mixtures will exhibit variable and often inferior properties. To address this issue, the presenter and his research team have developed a novel mix design method, which applies to all concrete mixtures, with or without RCA. This method is termed the Equivalent Mortar Volume (EMV) method. In this presentation the method is described and its validity is demonstrated by presenting extensive test results related to the mechanical and structural behavior of RCA concrete mixes designed by the conventional and EMV method. Compressive strength, elastic modulus, creep, shrinkage, flexural and shear behavior of plain and reinforced concrete specimens are investigated to demonstrate the validity of the EMV method. It is shown that up to 15% less cement can be used in the mixes designed by the EMV method, without any detrimental effect on the resulting concrete properties. In view of the large amount of green house gas emissions associated with the production of cement, use of the EMV method could result in noticeable reduction in these emissions.