



Professor Jin-Guang Teng

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<http://www.cse.polyu.edu.hk/~cejgt/Prof-Teng.php>

<http://www.worldcat.org/identities/lccn-n96-86289>

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Chair Professor of Structural Engineering

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Research on Emerging Structural Materials and Systems (ESMS) at The Hong Kong Polytechnic University

Welcome to the web site of the ESMS Research Group!

A key impetus for innovations in structural engineering is the emergence of new structural materials; such new structural materials also necessitate the development of new structural systems that best exploit their advantages. Under the leadership of Professor Jin-Guang Teng, our research group undertakes active research in the field of emerging structural materials and systems (ESMS), with its current focus being on the use of fibre-reinforced polymer (FRP) composites in the strengthening and retrofit of structures and in the construction of new structures.

In the area of strengthening of structures with FRP composites, the ESMS group's research has been focussed on the development of an improved understanding of the behaviour and failure modes of FRP-strengthened structures, on the establishment of rigorous analytical models and advanced numerical models that aid in understanding the underlying failure mechanisms, and on the formulation of rationally-based and reliable design methods for practical applications. Most of the group's research in this area prior to 2002 has been summarised in the book "FRP-strengthened RC Structures". Design methods that have resulted from the research of the group have been included in the Chinese Code for Infrastructure Application of FRP Composites in Construction and design guidelines in the US, the UK and Australia.

In the new construction area, the group's recent research has placed emphasis on the hybrid use of FRP composites with other materials (particularly concrete) for application in bridges and other structures exposed to a severe environment. The steel-concrete-FRP double-skin tubular column for use as bridge piers and girders as well as tall towers for various applications is a significant development along this direction. The integration of fibre-optic sensors and other smart sensors into structures incorporating FRP is also being actively pursued to develop intelligent high-performance structures. The group has also developed a steel-concrete composite shell roof system that provides an alternative to concrete shell roofs.

Currently, the research of the ESMS group is being developed at three related fronts: (a) the use of FRP composites and other technologies for the seismic retrofit of concrete structures within the framework of performance-based seismic engineering; (b) the development of intelligent high-performance concrete structures that incorporate FRP composites and various smart embedded sensors; (c) the development of fire-resistant fibre-reinforced cementitious composites for structural strengthening/retrofit applications.

Members of the group welcome collaborations with researchers who have similar or complementary research interests. Over the years, the group has collaborated with many research groups around the world.

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Professor Jin-Guang Teng received his BEng degree from Zhejiang University in 1983 and his PhD degree from the University of Sydney in 1990. He was a Senior Lecturer at James Cook University in Queensland, Australia before joining the Department of Civil and Structural Engineering of The Hong Kong Polytechnic University (PolyU). He served as a Lecturer/Assistant Professor from 1994 to 1997, and was promoted to Associate Professor in 1997, Professor in 1999, and Chair Professor of Structural Engineering in 2005. He served as Associate Dean (Research) of the Faculty of Construction and Land Use (renamed as the Faculty of Construction and Environment in September 2011) from October 2005 to August 2006 and became Dean of the Faculty in September 2007. He also served as an Associate Vice President of PolyU from September 2006 to June 2010. He is a Fellow of the Hong Kong Institution of Engineers and served as the founding President of the International Institute for FRP in Construction (IIFC) from 2003 to 2006.

His research interests include emerging structural materials and systems, the structural use of fibre-reinforced polymer (FRP) composites in construction, seismic assessment and retrofit of structures, life-cycle structural engineering, steel structures, and thin-walled structures. He is the author/co-author of over 380 papers, including over 140 SCI journal papers which have attracted over 2400 non-self citations in the Web of Science. In addition, he is the lead author of the book "FRP-Strengthened RC Structures" published by John Wiley and Sons in 2002, a co-editor of the book "Buckling of Thin Metal Shells" published by Spon Press in 2004 (with Professor J.M. Rotter), and a co-editor of the book "Strengthening and Rehabilitation of Civil Infrastructures Using FRP Composites" published by Woodhead Publishing Limited in 2008 (with Professor L.C. Hollaway). In addition to a large number of publications, Professor Teng is the inventor of the steel-concrete composite shell roof system (the Comshell roof) and the FRP-steel-concrete double-skin tubular column, and has played a major role in the development of the National Standard for Infrastructure Application of FRP Composites.

Recent recognitions of his research contributions include:

President's Award for Outstanding Performance in Research and Scholarly Activities from The Hong Kong Polytechnic University, 2001;

Best paper award (honourable mention) from the Journal of Composites for Construction of the American Society of Civil Engineers, 2002;

Distinguished Young Scholar Award from the Natural Science Foundation of China, 2003;

First Grade Natural Science Prize from the Ministry of Education of China, 2003;

CICE 2004 best paper award from the International Institute for FRP in Construction, 2004;

Howard Medal from the Institution of Civil Engineers, UK, 2004;

Harting Award from the Society for Experimental Mechanics, 2005;

State-of-the-Art of Civil Engineering Award from the American Society of Civil Engineers, 2006;

Best paper award (honourable mention) from the Journal of Composites for Construction of the American Society of Civil Engineers, 2008;

IIFC Medal from the International Institute for FRP in Construction (IIFC), 2008; and

CICE 2010 best paper award from the International Institute for FRP in Construction, 2010;

Professor Teng served as the founding President of the International Institute for FRP in Construction (IIFC) from 2003 to 2006. He is the current Chairman of the Advisory Committee of IIFC. The aim of the Institute is to advance the understanding and the application of fibre-reinforced polymer (FRP) composites in the civil infrastructure, in the service of the engineering profession and society.

Professor Teng is the Editor-in-Chief of the international journal *Advances in Structural Engineering*, and a former Associate Editor of the *Journal of Structural Engineering*, ASCE. He is also a member of the editorial boards of the following international journals: *Journal of Composites for Construction*, ASCE; *Construction and Building Materials*; *Thin-Walled Structures*; *Steel and Composite Structures*; *Advanced Steel Construction*; and *International Journal of Concrete Structures and Materials*, Korean Concrete Institute. In addition, he is a member of the editorial boards of the following two Chinese journals: *Progress in Steel Building Structures and Spatial Structures*. Professor Teng served as a member of the Engineering Panel of the Research Grants Council of the Hong Kong Special Administrative Region from 2001-2006. He has also served as a referee for national research funding schemes in China, UK, Canada, Australia, Italy, Portugal, South Africa, Israel and for over 30 international journals.

Professor Teng has been the Vice-Chairman/Co-Chairman of the First (December 1996), Second (December 1999) and Third (December 2002) International Conferences on Advances in Steel Structures. He was also the Chairman of the Organizing Committee of the International Conference on FRP Composites in Civil Engineering held in December 2001 in Hong Kong, a Co-Chairman of the Organizing Committee of the International Symposium on Bond Behaviour of FRP in Structures held in December 2005 in Hong Kong, and the Chairman of the Organizing Committee of the First International Conference on Sustainable Urbanization held in December 2010 in Hong Kong. He has been a member of the Scientific/Advisory Committees of over 90 international and national conferences, and has delivered keynote/invited presentations at over 50 conferences/symposia. Some of the international conferences at which he has delivered plenary keynote lectures are:

- Ninth International Conferences and Exhibitions on Structural Faults & Repair, July 2001, London, UK;
- Tenth International Conferences and Exhibitions on Structural Faults & Repair, July 2003, London, UK;
- Second International Conference on Advanced Polymer Composites for Structural Applications in Construction, April 2004, University of Surrey, UK;
- Fourth International Conference on Advanced Composite Materials in Bridges and Structures, July 2004, Calgary, Alberta, Canada;
- Second International Conference on FRP Composites in Civil Engineering, December 2004, University of Adelaide, Australia;
- 9th International Symposium on Structural Engineering for Young Experts (ISSEYE-9), 18-21 August 2006, Fuzhou and Xiamen, China;
- Second International fib Congress, 5-8 June 2006, Naples, Italy.
- Eleventh International Conference and Exhibition on Structural Faults & Repair, June 2006, Edinburgh, UK;
- Third International Conference on Advanced Polymer Composites for Structural Applications in Construction, ACIC 2007, 2-4 April 2007, University of Bath, UK;
- Third International Conference on Structural Engineering, Mechanics and Computation (SEMC 2007), 10-12 September 2007, Cape Town, South Africa;

First Asia-Pacific Conference on FRP in Structures (APFIS 2007), 12-14 December 2007, Hong Kong, China;

Fifth International Conference on Thin-walled Structures, 18-20 June 2008, Brisbane, Australia;

Fourth International Conference on FRP Composites in Civil Engineering (CICE 2008), 22-24 July 2008, Zurich, Switzerland (IIFC Distinguished Lecture);

Tenth International Symposium on Structural Engineering for Young Experts (ISSEYE-10), 19-21 October, 2008, Changsha, China;

Ninth International Symposium on Fibre-Reinforced Polymer Reinforcement for Concrete Structures (FRPRCS-9), Sydney, Australia, 13-15 July 2009;

Third International Symposium on Innovation & Sustainability of Structures in Civil Engineering 2009 (SISS 2009), Guangzhou, P.R. China, 28-30 November 2009;

Fifth International Conference on FRP Composites in Civil Engineering (CICE 2010), Beijing, China, 27-29 September 2010;

Sixth International Conference on Thin-Walled Structures, Timisoara, Romania, 5-7 September 2011; and

Fourth International Symposium on Innovation & Sustainability of Structures in Civil Engineering 2011 (SISS 2011), Xiamen, P.R. China, 29-30 October 2011.

Professor Teng has taught a wide range of subjects since 1991, both within and outside the structural engineering area. At The Hong Kong Polytechnic University, he has taught Structural Analysis I, Tall Building Structures, and parts of Computational Structural Mechanics and Engineering Mathematics & Analysis. He was the Award Co-ordinator for both the MSc Programme in Civil Engineering and the MSc Programme in Structural Engineering for many years. For his contributions to teaching, he received the Faculty Award for Outstanding Performance/Achievement in Teaching from The Hong Kong Polytechnic University in 2003.