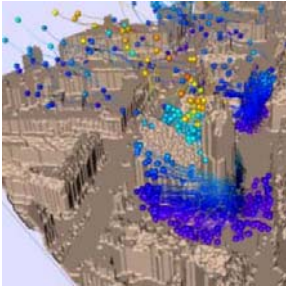




Department of Architecture, The Chinese University of Hong Kong
Professional Green Building Council, Hong Kong



An Expert Forum on UCMap & CFD for Urban Wind Studies in Cities

Air Ventilation Assessment (AVA) is important for projects in Hong Kong. Studies of the urban climatic environment and air ventilation of ultra high density city are the focus of this expert forum. The scientific methodologies of Urban Climatic Mapping will firstly be introduced, demonstrated and discussed. This will be followed by presentations and discussions using CFD (Computational Fluid Dynamics) for wind studies in the urban environment. Experts from Germany, Japan and UK, and invited local speakers will share their technical experiences.

If you have technical and advanced user experience to share AND/OR are clients/professionals with related experience wishing to table your practical perspective, we welcome you.

Date: **17 Oct 2006 (Tuesday)**
Time: **2 pm – 6 pm**
Venue: **Hong Kong Institute of Architects**
19/F, One Hysan Avenue, Causeway Bay, Hong Kong

Speakers

Professor Lutz Katzschner

Chairman, WG for a national guideline on urban climate, Germany

Dipl.- Ing. Jochen Mulder

Research Engineer, University of Kassel, Germany

Dr Hiroto Kataoka

Scientist, Technical Research Institute, Obayashi Corp., Japan

Professor Kenny Kwok

Director, CLP Power Wind/Wave Tunnel Facility, HKUST

Dr Raymond Yau

Director, Ove Arup and Partners (HK) Ltd.

Professor Akashi Mochida

Chairman, WG on CFD in Urban Wind Studies, AIJ, Japan

Professor Ryuichiro Yoshie

Wind Engineering Research Center, Tokyo PolyU, Japan

Dipl.- Met. Marcus Letzel

Research Engineer, University of Hanover, Germany

Forum Chairman

Professor Edward Ng

CUHK Department of Architecture

Limited seats available; ALL participants must make prior registration by returning the application form with a cheque of HK\$1,000 payable to "Chinese University of Hong Kong". Attn to Ms Cecilia Chan, Dept of Architecture, CUHK, Shatin, NT, HK. Fax: 2603 5267. Successful & invited participants will be notified.

Department of Architecture, The Chinese University of Hong Kong
Professional Green Building Council, Hong Kong

An Expert Forum on UCMap & CFD for Urban Wind Studies in Cities

Date: **17 Oct 2006** (Tuesday)
Time: **2 pm – 6 pm**
Venue: **Hong Kong Institute of Architects**
19/F, One Hysan Avenue, Causeway Bay, Hong Kong

Reply Slip

To: Ms Cecilia Chan, Department of Architecture, CUHK, Shatin, NT. Fax: **2603 5267**

I would like to apply to be a participant of the expert forum.
I enclose a cheque of HK\$ 1,000 payable to “Chinese University of Hong Kong”.

(Successful applicant will be notified. Cheque will not be cashed and will be destroyed if your application is not successful).

Name: _____

Organization: _____

Position: _____

Telephone: _____

Fax: _____

Email: _____

Address: _____

Relevant experience: _____

Reason for joining the expert forum: _____

An Expert Forum on UCMap & CFD

for Urban Wind Studies in Cities

Forum Chairman



Professor Edward Ng

CUHK Department of Architecture

*BA(Hons) Nott, BArch(Distinction) Manc, MBA(Distinction) Warwick, PhD Cantab
RegArch (UK), RegArch (HK), RIBA, HKIA, IESNA, MSL, FHKMetS, FRSA*

Prof Edward Ng is an Architect and a Professor at the Chinese University of Hong Kong (CUHK). He obtained his PhD from Cambridge University. Since then he has been practicing as an architect and lecturing in various universities. His specialty is in Environmental Design. He is director of the MSc Sustainable and Environmental Design Programme at CUHK. As a consultant to the Hong Kong SAR government, he developed the special performance based daylight design building regulations for Buildings Department HKSAR, he also developed the Air Ventilation Assessment (AVA) Guidelines for city planning in Hong Kong. Edward is a daylight and solar energy expert advisor to the Chinese Government. As a visiting professor at Xian Jiaotong University, China, he is designing ecological schools, and building sustainable projects in the region.

Speaker



Professor Lutz Katschner

Professor for urban climate and planning, physics of the atmosphere, clean air programmes and bioclimatology within the courses for architecture and urban planning, University Kassel, Director of the Research Institute for Environmental Meteorology at the University of Kassel

Chairman, WG for a national guideline on urban climate, Germany, Vice-President Commission on Environmental Meteorology Germany

Degrees and professional affiliations

Prof Lutz Katschner is Meteorologist at the Architecture Faculty University Kassel Germany responsible for the subjects He obtained PhD in Urban Climatology at the University of Kassel and followed up the item in a post Doctorate Urban Climate Evaluation Processes together with the environmental research institute of global climate change. He worked as invited Professor in urban climate in Salvador Brazil and Buenos Aires Argentina. He developed guidelines for urban climate research within the European Community. A specification was continued in thermal conditions.

Title of Lecture

Urban climatology and Urban Planning

Abstract of lecture

Urban climate analysis are a major tool for a sustainable urban development. Ventilation conditions heat island aspects have a great influence on health and humans well being. In the same time air pollution is effected by the meteorological parameters.

Main focus in the course is given to both: the thermal aspect and air pollutions problems. There will be an introduction to urban climatology and how to use results for planning. The link between urban planners, architect and urban climatologist is described and the planning level defined.

Introduction to urban climate maps and there use. Presentation of different investigation tools such as calculations or even assumptions. Presentation of results.

OBJECTIVES

- understanding of the physics in urban climatology
- knowledge of investigation methods, calculations and measurements
- evaluation use of meteorological urban climate data
- understanding of the principles in applied urban climatology

Speaker



Professor Kenny Kwok

Director, CLP Power Wind/Wave Tunnel Facility, HKUST

BE (Hons) PhD Monash FHKIE FIEAust CPEng

Professor Kwok's main areas of interest and technical expertise are in wind engineering and structural dynamics, particularly in wind effects on buildings and structures, wind tunnel tests, environmental fluid mechanics and vibration control. He has published over 300 articles in book chapters, invited and keynote papers, journal and conference papers. He has been a wind engineering consultant for many organisations, including the United Nations Development Program, Australian and Hong Kong government agencies. He is International Association for Wind Engineering's Regional Coordinator for Asia Pacific, a Life Member of the Australasian Wind Engineering Society and a Fellow of the Hong Kong Institution of Engineers and Institution of Engineers, Australia.

Title of Lecture

Effects of wind-structure interactions on urban wind environment and air quality

Abstract of lecture

Wind engineering plays an important role in infrastructure developments in majority cities around the world. While structural strength and safety is a dominant design consideration, particularly in strong wind regions such as typhoon-prone Hong Kong, environmental issues, particularly air quality, has recently captured the attention of regulatory authorities and the general population. This seminar outlines the role of wind tunnel model studies in addressing wind-related environmental issues. Recent research and case studies conducted at the Hong Kong University of Science and Technology's CLP Power Wind/Wave Tunnel Facility investigating the effects of wind-structure interactions on urban wind environment and air quality, including wind climate modelling in a complex terrain, pedestrian level wind environment and dispersion of airborne pollutants, will be presented.

Speaker



Dr Raymond Yau

Director, Ove Arup and Partners (HK) Ltd.

BSc(Hons) Manc, MBA cuhk, PhD Manc, RPE (HK), CEng (UK), FHKIE, FCIBSE, MIMechE, MASHRAE

Raymond Yau is a building physics engineer and a director of Arup in Hong Kong. He is a Global Buildings Sector Board member of Arup Group and a trustee of The Ove Arup Foundation. Raymond obtained his PhD from the UMIST, UK and joined Arup in London in 1987. He worked in Arup's HK office since 1992 and is now Head of Building Physics group in East Asia Region, responsible for sustainable building design and planning projects, and advanced fluid engineering applications using environmental and building physics skills and techniques. He has led a number of pivotal sustainable consultancy studies in Hong Kong such as the BD's Comprehensive Environmental Performance Assessment Scheme for Buildings (CEPAS), and requirements of lighting and ventilation of buildings, and EMSD's Life Cycle Energy Analysis (LCEA) of Building Construction in HK. He applied CFD prediction of air flow and temperature distributions in indoor environment since 1989 including Kansai International Airport Terminal in Japan and lately Beijing Olympic 2008 National Stadium. In recent years, he started to use CFD for outdoor built environment applications for sustainable master planning or wind microclimate studies with support of in-house wind scientists and engineers.

Title of Lecture

CFD Modelling of Wind in the Built Environment

Abstract of lecture

This lecture reviews Arup's involvement in the QNET-CFD Network for Quality and Trust in the Industrial Application of CFD. The work of COST action C14 on the use of CFD in predicting pedestrian wind environment will also be discussed. Preliminary results and comparison of pedestrian wind environments in urban areas using Reynolds Averaged Navier-Stokes (RANS) Simulation ($k-\epsilon$ turbulence models) and Detached Eddy Simulation (DES) are shown.

Speaker



Professor Akashi Mochida

Chairman, WG on CFD in Urban Wind Studies, AIJ, Japan

Professor, Dr. Eng.
Department of Architecture and Building Science,
Graduate School of Engineering, Tohoku University, Japan

Work Experience

- 1993- Lecturer, IIS, University of Tokyo
- 1995- Associate Professor, Niigata Institute of Technology
- 1999- Associate Professor, Tohoku University
- 2006- Professor, Tohoku University

Awards

- 2005 AIJ prize (AIJ: Architectural Institute of Japan)
- 2005 SHASE best paper award (SHASE: The Society of Heating, Air-conditioning and Sanitary Engineering of Japan)
- 2005 the JAABE best paper award 2002-2003
(JAABE: Journal of Asian Architecture and Building Engineering)

Subjects of Present Research Works:

CFD Simulation of Turbulent Flow in and around Building
Management, Control and Design of Urban Environment

Title of Lecture 1

CFD Prediction of Wind Environment and Turbulent Diffusion at Pedestrian Level in Urban Area

Abstract of lecture 1

This lecture reviews the recent developments of CWE researches for predicting the pedestrian level wind environment and turbulent diffusion in urban areas. After reviewing the progress of turbulence models in the last decade briefly, the results of AIJ (Architectural Institute of Japan) collaborative project of cross comparisons of CFD results of wind environments are shown. Next, recent achievements in the field of modeling canopy flows for reproducing the aerodynamic and thermal effects of trees, buildings and automobiles are outlined.

Title of Lecture 2

Outline of Comprehensive Assessment System for Building Environmental Efficiency on Heat Island Relaxation (CASBEE-HI)

Abstract of lecture 2

A new assessment system named CASBEE-HI has been developed for evaluating the effects of various countermeasures related to building design on heat island relaxation. In CASBEE-HI, environmental efficiency concerning the heat island relaxation (BEE_{HI}) is defined as Q_{HI}/L_{HI} , where Q_{HI} is the quality of outdoor thermal environment within a building site and L_{HI} is the loadings emitted from this building site to increase the heat island effects in its surroundings.

Speaker



Professor Ryuichiro Yoshie

Wind Engineering Research Center, Tokyo Polytechnic University, Japan

Degrees and professional affiliations

- Academic Degrees:
 - Doctor of Engineering from University of Tokyo, 1996
 - Bachelor of Engineering from Kyoto University, 1984
- Work Experience
 - 2004- Professor, Tokyo Polytechnic University
 - 1984-2003 Maeda Corporation (General Contractor)
- Affiliation
 - Member of AIJ (Architectural Institute of Japan)
 - Member of JAWE (Japan Association for Wind Engineering)
 - Member of SHASE (The Society of Heating, Air-conditioning and Sanitary Engineering of Japan)
- Principal Technical Interest Areas:
 - Numerical Simulation of Turbulent Flow in and around Building
 - Computational and Experimental Wind Engineering
 - HVAC System Utilizing Natural Energy

Title of Lecture 1

AIJ guideline for practical applications of CFD to wind environment around buildings

Abstract of lecture 1

The guideline for CFD prediction of wind environment around buildings was proposed by Working Group of the Architectural Institute of Japan (AIJ). The guideline is based on the many comparative and parametric studies on several building configurations. Some of the calculation results and the contents of the guideline will be introduced in this lecture.

Title of Lecture 2

Velocity ratios in a built-up area with densely jammed high-rise buildings

Abstract of lecture 2

Wind tunnel experiments for investigating the pedestrian wind velocity ratios in closely-packed high-rises were carried out. A model of cityscape of Mong Kok in Hong Kong was used for the experiment. The average wind velocity ratio for this model was much lower than that of the Japanese high-rise areas.

Speaker



Dipl.-Met. Marcus Letzel

Research Associate, Inst Meteorol. & Climatol., Leibniz Univ Hannover, Germany

*Dipl.-Met. Hannover (Germany), MSc Weather, Climate & Modelling (Distinction)
Reading (UK)*

Mr Letzel is a Meteorologist at the Leibniz University of Hannover. He has eight years research experience in boundary layer meteorology over heterogeneous surfaces. Recently he has started to “urbanize” the state-of-the-art CFD model PALM, a parallelized large-eddy simulation (LES) model developed by PD Dr Raasch at the Leibniz University of Hannover. In 2001/02, he visited Prof Kanda at the Tokyo Institute of Technology, Japan, for one year to compare meteorological field measurements and virtual LES measurements. Since then he has specialized in urban LES and has initiated a research cooperation and student exchange with Prof Kanda. He is expected to obtain his PhD early next year and to continue urban LES research with a new project focussing on urban roughness sublayer turbulence.

Title of Lecture

Parallel large-eddy simulation – A new dimension of urban CFD applied to Tain Sha Tsui, Hong Kong

Abstract of lecture

Mr Letzel presents the “urbanized” version of the parallelized large-eddy simulation (LES) model PALM and describes its new features and its performance on current supercomputers. Validation shows that PALM is in line with experimental and other LES results, i.e. superior to conventional Reynolds-averaged CFD models. The “new dimension” of urban CFD that LES offers is to forecast instantaneous fluctuations and peak values e.g. of wind velocity or pollutant concentration.

PALM's strengths are state-of-the-art parallel computing and parallel, on-the-fly graphics processing. Mr Letzel demonstrates this with a passive tracer turbulent dispersion animation of the Tain Sha Tsui Site in downtown Hong Kong.

Speaker



Doctor Hiroto Kataoka

Technical Research Institute, Obayashi Corporation, Japan

Degrees and professional affiliations

- Academic Degrees:
 - Doctor of Engineering from Osaka University, 1999
 - Master of Engineering from Osaka University, 1984
- Work Experience
 - 1995- Obayashi Corporation (General Contractor)
 - 1993-1995 Aerodynamisches Institut, RWTH Aachen, Germany (Guest Researcher)
 - 1984-1993 Obayashi Corporation (General Contractor)
- Affiliation
 - Member of AIJ (Architectural Institute of Japan)
 - Member of JAWE (Japan Association for Wind Engineering)
 - Member of JASME (The Japan Society of Mechanical Engineers)
- Principal Technical Interest Areas:
 - Computational fluid dynamics (CFD)
 - CFD prediction for pedestrian wind environment
 - Wind-resistant structural designing by CFD

Title of Lecture

Numerical evaluation of the wake field behind high-rise buildings by RANS and LES

Abstract of lecture

Numerical flow computations and wind-tunnel experiments are conducted for evaluating the wake field behind high-rise buildings around Shinjuku, Tokyo area. Computations are done both by LES and by RANS. RANS results show slower recovery of wind-velocity than those of LES on the leeward of high-rise buildings and spread low velocity region in cross wind directions. The comparison with experimental results lead us to conclude that LES can reproduce time averaged velocity field well while RANS underestimates the thickness of wake region.