ASHRAE Hong Kong Chapter

The Hong Kong Air Conditioning and Refrigeration Association Ltd.

ASHRAE/ACRA Technical Workshop

Title: **HVAC water system design and applications**

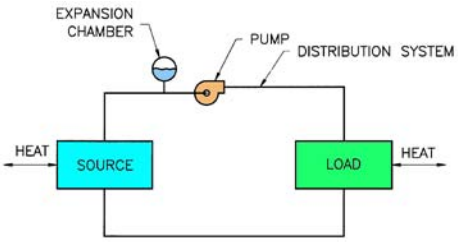
Date/Time: 3, 6, 10, 13 January 2011 (Mon, Thu), 6:30 pm – 9:30 pm (lectures for four evenings)
8 January 2011 (Sat), 9:30 am – 12:30 pm (technical visit)

Venue: Lecture room – FJ303, PolyU, Hung Hom, Kowloon
Technical visit: PolyU

Description: **What You Will Learn**

You will develop an understanding of the basic concepts of hydronic system operation and design including piping systems, pipe materials and fittings, centrifugal pumps, terminal units, expansion tanks and water chillers. After completing the workshop, you should know:

- The components of closed and open hydronic systems.
- The basic concepts of piping system design.
- The different types of pipe used in hydronic systems.
- How centrifugal pumps operate.
- How to match pumps to systems.
- What variables are involved in terminal unit control.
- How to optimize water chiller operation.
- The Latest Technology – Variable Primary Flow
- How cooling towers works



Course Content

Water System Design Components -- Introductory concepts, basic system components, heat transfer in hydronic systems and load systems.

Piping System Design -- Basic considerations, design philosophy, sizing piping, and flow rate measurement.

Pipe Materials and Fittings -- Pipe materials, corrosion, valves and fittings, backflow-prevention devices, and pipe selection.

Centrifugal Pumps -- Types of pumps, pump selection and system design considerations.

Terminal Unit Performance and Control -- Types of terminals, performance and control, system control characteristics, and system control configurations.

Expansion Tanks and Air Elimination -- Open and closed water systems, hydronic accessories, and sizing expansion tanks.

Piping System Development -- Piping system design, direct return analysis, primary-secondary analysis, types of pumps and valves, primary-secondary application study, antifreeze solutions for low temperature applications, and pumping design factors.

Matching Pumps to Systems -- Matching the pump to the system, parallel pumping, series pumping, standby pumps, trimming pump impellers, two-speed pumping, variable speed pumping and source distribution pumping.

Water Chillers and Load Control - Basic water chiller components, refrigeration cycle, heat transfer chiller, refrigeration power, chiller types and control, chiller piping arrangements, chiller energy performance and thermal storage.

Variable Primary Flow System – Basic Working Principle, Compare with De-coupler System, Advantages of VPF, Chiller Selection for VPF, Plant Sequencing, and Case Study.

Cooling Towers – Cooling Tower Fundamentals, Type of Cooling Towers and Cooling Tower Selection.

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Water System Testing & Commissioning – General principle, tools on equipment on T &C, procedures and application on water-side system balancing with examples.

Who Should Attend

- engineering graduates and technicians working in the HVAC&R industry and related fields;
- experienced engineers entered the HVAC&R industry from other engineering fields; or
- other professionals who want to increase their knowledge of air system design.

A study guide "*Fundamentals of Water System Design*" from ASHRAE, list price at US$150, will be given to the participants (included in the fee). Certificate of attendance will be issued to each participant at the end of the workshop. Light refreshments will also be provided.

Speakers:

Dr. Sam C. M. Hui

PhD, BEng(Hons), CEng, CEM, MCIBSE, MHKIE, MASHRAE, MIESNA, LifeMAEE, Assoc AIA

Dr. Hui is a Teaching Consultant and an Honorary Assistant Professor of the Department of Mechanical Engineering, The University of Hong Kong. He has a strong technical background in the study of energy efficiency in buildings and is active in promoting sustainable building technology. He has good experience in practical building services design and has carried out teaching, research and consultancy studies in Hong Kong, Mainland China, Germany, Japan, USA and Thailand. He was the President of the ASHRAE Hong Kong Chapter in 2006-2007. He is selected as a Distinguished Lecturer of ASHRAE U.S. Headquarters for 2009-2011.

Ir Daniel Chong

BSc.(Hons), RPE, CEng, CBCP, FHKIE,FIPHE, MIMechE, MCIBSE, MIMarE, MIE(Aust), RSC(V)

Mr. Daniel Chong is a specialist on MVAC system design, installations, T&C and re-engineering services. He is a AEE Certified Building Commissioning Professional (CBCP)

Ir Victor Wong

BEng.(Hons), MBA, RPE, CEng, FSOE, FIPlantE, MIMechE, MHKIE, MCIBSE, BEAM Pro, LEED AP.

Ir Victor Wong currently holds the position as Senior Manager of Trane Hong Kong. Mr. Wong has established a career with Trane Company for over 20 years. His primary corporate responsibilities include Engineering Project Management, Air Conditioning System Sales and Training.

Mr. Simon Kwok

Mr. Simon Kwok is a product manager of Jardine Engineering Corporation. After graduation from Hong Kong Polytechnic in Mechanical Engineering, he joined JEC in 1984. He has a solid experience background in HVAC field for equipment like cooling tower, steam and hot water boilers,ventilation fans, thermal insulation, plate type heat exchanger, solar hot water panels, etc. In particular, he is responsible for cooling tower products since 1997 to promote the energy efficiency of the equipment.

Language: English (supplemented with Cantonese)

Application: Open to all interested persons. Please complete and return the application form by e-mail/post and send the crossed cheque via post before **1 Dec 2010**. Number of participants is limited. Places will be allocated on a first-come-first-served basis. Successful applicants will be informed individually by e-mail / phone.

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Application Form: HVAC water system design and applications

Name (Dr/Mr/Mrs/Ms/Ir) : _____

ASHRAE Membership : Class:_____ No.: _____

ACRA Membership : Class:_____

Company/School : _____

Contact Address : _____

E-mail Address : (Required)_____

Contact Numbers : (Tel/Mobile) _____ (Fax) _____

[* Course fee includes refreshments, lecture notes, a copy of the reference book and admission to technical visit.]

Course Fee (ASHRAE/ACRA Member) - $2,500 x _____ person (cheque no.: _____)

Course Fee (Non-Member) - $2,800 x _____ person (cheque no.: _____)

Enquiries: For inquiries, please contact us at email **info@acra.org.hk** **or** **info@ashrae.org.hk**

Registration: The application form and crossed cheque with appropriate payment in Hong Kong dollars payable to "**The Hong Kong Air Conditioning and Refrigeration Association Ltd.**" shall be sent to **Room 1801, Tung Wai Commercial Building, 109-111 Gloucester Road, Wanchai, Hong Kong**, before **1 Dec 2010**. The applicant may e-mail the above information to **info@acra.org.hk** for place reservation and then followed by cheque payment via mail.