



FCLU Public Seminar

Thermal Energy Stores: Technology and Advanced Design



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Abstract

Effective thermal energy storage is an important technology in energy conservation and the reduction of fossil energy consumption for producing hot water for residential and commercial building applications. Effective storage and retrieval of sensible heat can have immediate and significant impact on the overall energy budget of the individual, industry and nations alike. This presentation will cover a broad range of topics related to this

compelling issue at two levels: (1) current technologies and (2) recent developments in heat transfer research that can impact future design. In part (1), current technologies will be reviewed. General categories of thermal store designs will be discussed, and where possible a critique on a technical basis will be offered on efficiency and practicality. Despite many years of research toward improving the efficiency of thermal stores little progress has been made toward a universal design that provides rapid charge to discharge cyclic operation with sustained high temperature during the discharge cycle. Destruction of stratification in the store is the primary barrier to improved design and operation. In part (2), results of recent research on the stratification challenge will be described. Experiments, analytical studies, and numerical studies will be included. Newly obtained knowledge on the operation of immersed heat exchangers and the effectiveness of internal shroud and baffle systems on the internal heat transfer process will be discussed. The potential for application of this research to the next generation of thermal stores will be discussed. This seminar is aimed at engineering professionals interested in the energy engineering and researchers and product developers involved in energy utilization and conservation.

All Interested Are Welcome

Please register online at http://www.polyu.edu.hk/fclu/seminar/Seminar_22May09/

For enquires, please contact Ms Becky Chang at

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Email : clbecky@inet.polyu.edu.hk

Fee : Free of charge

- An attendance certificate will be issued to each registered participant.
- Applicants with confirmed registration who fail to turn up will be put on lower priority in the registration for the next Faculty distinguished lecture or seminar.

About the Speaker

Dr. Frank Kulacki is Professor of Mechanical Engineering at the University of Minnesota. His research lies in the area of thermal science and engineering, with focal interests being convective heat transfer, transport in porous media, nuclear safety, nuclear waste storage and disposal, catalytic combustion, electrohydrodynamic augmentation of heat and mass transfer, and composite materials. His current research and scholarly interests include coupled heat and mass transfer in porous media, two-phase flow in micro-channels, natural convection heat transfer with solar energy applications, heat transfer in metal foams, hybrid renewable energy systems, energy policy, management of technology, and the adaptation of computer-based technologies in engineering education. He is a Fellow of ASME and AAAS and over the years has held positions of department head and dean of engineering.



Date:

22 May 2009

(Friday)

Time:

6:30p.m. to 7:30p.m.

(Refreshments will be served at 6:00p.m.)

Venue:

M1603, Senate Room,

Li Ka Shing Tower,

**The Hong Kong Polytechnic
University**

