

Design & Operations of Circulating Fluidized Bed Boiler

25 – 27 April 2012 Kuala Lumpur, Malaysia

Expert Course Faculty:
Prof Prabir Basu, Ph.D., P.Eng.

Organised By
powerEDGE®



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Course Overview

A Circulating Fluidized Bed (CFB) is an evolving technology that is very efficient in generating low-cost electricity with low emissions and environmental impact. As this is a new technology, in-depth knowledge on this technology is not been wide spread. This 3 day course is intended to provide detailed understanding on the concept of fluidized beds, operation of circulating fluidized bed boilers, operational problems in boilers, co-firing options and the environmental impact of the CFB boilers.

Course Learning Outcome

This training course will be valuable to participants who either work in the power generation industry or deal with it externally. Those who need a fundamental understanding of the Power generation using fluidized bed technology or how it operates will find this course applicable. As CFB technology is relatively new, engineers, researchers, boiler manufacturers will find this course useful to enhance their knowledge by interacting directly with an expert in this field.

The course will begin with the lectures and multimedia presentations of power generation using CFB technologies. Participants will learn about the operation of fluidized bed, design methods, problems in boiler operation and solution methods, renewable co-firing option and environmental impact of the CFB boiler. Demonstration of CFBCAD, proprietary software for the easy design of CFB boilers will greatly enhance the understanding of the boiler design.

- Fundamentals of fluidized bed operations
- Operation of circulating fluidized bed
- Design methods of the fluidized bed along with CFBCAD demonstration
- Operational problems in CFB boilers and boiler failures
- Renewable way of power generation through co-firing
- Environmental impact of CFB boilers

Who Should Attend

Engineers and technical professionals directly or indirectly related to clean power generation from:
Power generation companies, boiler manufacturers, government regulators and research institutes

Unique Features with **powerEDGE** Training

- Pre-Course Questionnaire to help us focus on your learning objectives
- Detailed Course & Reference Manual for Continuous Learning and Sharing
- Practical Exercises & Case Examples to better understand the principles
- Limited class size to ensure One-to-One Interactivity
- Assessment at the end of the course to help you develop a Personal Action Plan

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3 Day Course Outline

Fundamental of fluidized bed power generation technologies

- Basic element of power plants
- Importance of fluidized bed technology in power generation
- Concept of fluidized bed
- Different component in fluidized bed system

Operation of fluidized bed power generation

- Combustion in fluidized bed
- Heat transfer in fluidized bed
- Boilers failures and way for identification with solution steps

Design of circulating fluidized bed boilers

- Designing methods of CFB boilers
- Demonstration on CFBCAD

Renewable power generation and environmental impact

- Co-firing in CFB boilers for renewable power generation
- Environmental impact
- Coal handling
- Safety issues in coal handling and overall power generation

Detailed Curriculum

Day 1

(Each module will be for 1.30 hrs, including presentation and discussion)

1. Hydrodynamics in CFB boilers
2. Combustion in CFB boilers
3. Heat transfer in CFB boilers
4. Configurations of CFB boilers

Day 2

(Each module will be for 1.30 hrs, including presentation and discussion)

5. Design methods for CFB boiler
6. Operating problems of CFB boiler
7. Boilers failures
8. Demonstration of CFBCAD software use

Day 3

(Module 9 will be for 1 hrs and module 10 divided into two sections for a total 4 hrs)

9. Co-firing in CFB boilers
10. Environmental, Health and Safety
 - Coal Properties and make up
 - Significant Incidents related to Coal such as spontaneous combustion and coal fires
 - Safety Hazards of Coal
 - Health Hazards Related to Coal
 - Environmental Hazards of Coal
 - Coal Dust Explosion (What happens / How it happens) and prevention
 - Safety, health and environmental processes to be observed in:
 - o Coal storage in Silo
 - o Coal handling in Conveyor belt system
 - o Coal reclaiming system
 - o Coal bunker and feeding system
 - Safety Awareness of storing coal in coal silos

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Your Expert Faculty: Prof Prabir Basu, Ph.D., P.Eng.

Internationally recognized educator and specialist in Energy and Environment, with a 30-year long professional career in energy, environment and power generation.

EMPLOYMENT HISTORY

- Professor, Director of CFB laboratory Dalhousie University, Mechanical Engineering Department, Halifax, Canada.
- Visiting Scholar, Electricite de France, Lyon, France
- Visiting Professor, Massachusetts Institute of Technology, USA
- Senior Industrial Fellow, Nova Scotia Power Corp., Halifax, Canada
- Director & Professor of Center for Energy Studies, Technical University of Nova Scotia, Halifax, Canada
- Manager, Development Department, ISGEC John Thompson, Calcutta, India
- Scientist, Central Mechanical Engineering Research Institute, Durgapur, India

Ph.D. (Engineering): University of Aston in Birmingham, United Kingdom, 1976.

Dissertation Title: Coal combustion in Fluidized beds

Professional Activities:

- Founder Chairman of International Conference series on Circulating Fluidized Beds and International conference on Combined Cycle Power Generation.
- Member of Steering Committee International Conference on Fluidized bed Combustion.

RECENT PROJECT EXPERIENCE

Internationally recognized educator and specialist in Energy and Environment, with a 30-year long professional career in energy, environment and power generation.

- West Bengal Power Development Corporation Limited (2002-2004) Designed, developed, built and commissioned at Kolaghat Thermal Power Station an innovative sub- compact circulating fluidized bed boiler for generation of process steam utilizing rejects from coal mills 6x 210 MWe PC boilers
- Madhya Pradesh State Electricity Board, (1999-2002) Techno-economic feasibility study. At the request of this Utility, a techno-economic feasibility study was carried out to examine the feasibility of revamping a 4 x 15 Mwe pulverized coal plant at their Amarkantak Thermal power Station using the environment friendly CFB technology. Findings of this report convinced the Utility to use circulating fluidized bed firing for renovating this plant.
- UP Rajya Vidut Nigam Limited (2003) Evaluated the techno-economic feasibility of revamping using environment friendly CFB firing 2x32 MWe PF boiler plants at Panki Power Station, which has been closed down for many years due to pollution
- Retained as a special consultant to various energy, process and environment related projects undertaken by Alcan International and its Research and Development Center at Jonquire, Que.
- ABB ABL Limited Technical Evaluation of Retrofit technology. (1996) Worked with the Engineering Division of ABB ABL Limited, the second largest power company in India and a member of the ABB group for evaluation of CFB conversion technology in revamping a 120 Mwe pulverized coal fired boiler. The evaluation examined details of the engineering modification to be made on the existing plant and associated problems. The study also worked out a price estimate for the entire conversion project

Books: Authored by Prof. P. Basu

- **Boilers and Burners, (In Korean Language)**, Seoul, South Korea, 2003
- **Boilers & Burners- Design and Theory**, Springer & Verlag, New York, USA, 2000
- **Circulating Fluidized Bed Boilers - Design & Operations**, Butterworths, Stoneham, USA, 1991
- **Circulating Fluidized Bed Boiler (In Chinese)** Science Press, Beijing, China, 1995
- **Fluidized Bed Boilers**, Pergamon Press, Toronto, Canada, 1985
- **Circulating Fluidized Bed Technology, I, II & III (edited volume)** Pergamon Press, 1986, 1990, 1994

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REGISTRATION FORM

	Early Bird Ends 14 Feb 2012	Normal	Savings
3 Day Outline	SGD 4500	SGD 4700	SGD 200

4 ways to Register

- Online:
www.poweredgeasia.com
- Email:
info@poweredgeasia.com
- Phone: (65) 6747 0775
- Fax: (65) 67478737

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COMPANY DETAILS

Organisation name Industry

Address

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Tel Fax

PAYMENT METHODS

By Cheque/ Bank Draft: Make Payable to Asia Edge Pte. Ltd.

By Direct Transfer: Please quote AE1 with the remittance advise

Account Name: Asia Edge Pte. Ltd.

Bank Number: 508 Account Number: 762903-001Swift Code: OCBCSGSG

All bank charges to be borne by payer. Please ensure that Asia Edge Pte Ltd receive the full invoiced amount.

PAYMENT POLICY

Payment is due in full at the time of registration. Full payment is mandatory for event attendance. I agree to Asia Edge Pte Ltd. payment terms

CANCELLATIONS & SUBSTITUTIONS

You may substitute delegates at any time. ASIA EDGE PTE LTD does not provide refunds for cancellations. For cancellations received in writing more than seven (7) days prior to the training course you will receive a 100% credit to be used at another ASIA EDGE PTE LTD training course for up to one year from the date of issuance. For cancellations received seven (7) days or less prior to an event (including day 7), no credits will be issued. In the event that ASIA EDGE PTE LTD cancels an event, delegate payments at the date of cancellation will be credited to a future ASIA EDGE PTE LTD event. This credit will be available for up to one year from the date of issuance. In the event that ASIA EDGE PTE LTD postpones an event, delegate payments at the postponement date will be credited towards the rescheduled date. If the delegate is unable to attend the rescheduled event, the delegate will receive a 100% credit

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- ✓ Introduction To Clean Coal Technology
- ✓ Introduction to Power Systems
- ✓ Renewable Energy Integration
- ✓ Fundamentals of Power Generation

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