

2th **Successful Run** in Asia!

Special Focus on **CFB!**

CIRCULATING FLUIDISED BED COMBUSTION **FOR** **BOILER OPERATORS**

23 – 26 MARCH 2015, KUALA LUMPUR, MALAYSIA

Past Testimonials

“Courses of CFB Boiler has increased my knowledge in Thermal Power Plant.”

- Operations Engineer, Sudanese Thermal Power Generation.

“The course was very useful and a good introduction to many technologies in the power sector.”

- Mechanical Maintenance Engineer, Sudanese Thermal Power Generation.

“This course has opened my mind to the recent developments in power generation technologies and made further clarification to the differences & similarities among various combustion technologies.”

- Senior Operation Engineer, Sudanese Thermal Power Generation.

“This course increased my knowledge in power plant types (CFO, AF) – power plant industry and how to keep it clean.”

- Senior Operation Engineer, Sudanese Thermal Power Generation.

Expert Course Faculty Leader

Dr. Andrew Cox



About This Training Course

Circulating fluidised bed combustion (CFBC) is the predominant type of fluidised bed combustion technology used for power generation. The first development work on CFBC began in Germany in the mid-1970s. This was followed by commercialisation in Sweden, Finland and the USA. The first use of the CFBC technology for power generation started in 1985 with the operation of a 90 MWe CFBC boiler in Duisburg (Germany). Since then, over 600 coal-based CFBC generating units have been installed worldwide. A 2012 survey by Platts identified a total global capacity of more than 46 GWe – which continues to rapidly expand. Power plants using CFBC technology have been operating in the USA, Europe and Japan since the 1980s - and can now be found throughout the world [especially in China and a wide range of emerging economies]. Today, CFBC technology can be considered as a mature technology for power generation/co-generation and industrial-sized applications and is commercially available from multiple suppliers.

Learning Outcomes – CFBC Technology for Power Generation

- The course commences with a detailed review of fluidisation processes.
- It then proceeds with a thorough examination of the key issues affecting the development and operation of CFBC plants – with case studies and operational experience being provided from a wide range of countries.
- It should be an excellent opportunity for CFBC plant engineers and other staff to discuss the various operational aspects of CFBC plants – particularly the key problems that plant operators regularly have to deal with.
- Remedies and solutions to key technical problems will be examined in detail during the course [with appropriate power plant case studies].

Who Should Attend

This course will be valuable to those who work in the power generation industry. The primary focus group of this training course is boiler operators and other technical professionals working within the power plant, who are looking to expand their understanding of combustion in general and CFB combustion in particular.

About the Trainer

Since May 1995 Dr Cox has been an independent energy and environmental consultant. He specialises in consultancy work in the coal and energy sectors in the United Kingdom and throughout the world. Recent consultancy work has involved project and background studies covering climate change issues, economic appraisals and evaluations of coal to liquids technologies, surface coal mining projects, and a global market survey of virtual reality training systems in the mining sector.

Dr Cox was Editor of the monthly newsletter *UK Coal Review* from 1991 to 1999. The newsletter examined all aspects of the UK coal sector – including: coal production in underground and surface mines; UK power station sector; coal imports and transportation; corporate and related policy developments. In 2000 Dr Cox co-authored a book *Digging Up Trouble* [with Huw Beynon and Ray Hudson, published by Rivers Oram Press] – which examined the environmental, social, economic and political issues surrounding the UK opencast coal sector.

Since the late-1980s Dr Cox has written or contributed to a wide range of energy and environmental publications – with recent papers and articles dealing with clean coal technologies, the development of coal to liquid technologies, carbon capture and storage, and second generation biofuels.

Recent articles, papers and reports have covered a wide range of topics - including:

- International Clean Coal Projects;
- Reviews of the Indian and Chinese Coal Sectors,
- Drax Power Station; Coalbed Methane;
- Coal Liquefaction Technologies and Project Developments;
- Future of Global Oil Supplies;
- Climate Change Policies; Sustainability and Carbon Neutral Cities,
- Offshore Renewable Energy Systems;
- Energy efficiency developments – including equipment and technology developments – Low Energy Housing, Energy Efficiency in Data Centres and other buildings.

His academic qualifications include:

- Doctorate in Chemical & Process Engineering from the University of Newcastle upon Tyne, UK, Thesis title: "Future Strategies for Coal in the United Kingdom"
- MSc Degree Course: Environmental Technology (Energy Policy Option)
Imperial College, University of London
- BSc (Hons) Degree Course: Human Environmental Science
King's College, University of London

Dr Cox is also a Visiting Lecturer at Imperial College London.

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4 Day Course Outline

Course Introduction

Introduction to Fluidisation

- Mechanisms of fluidisation
- Gas flow characteristics
- Bed particle dynamics
- Bubble dynamics
- Solids mixing
- Heat transfer issues



Introduction to Combustion and Pollutant Formation in FBC plants

Overview of Fluidised Bed Combustion systems

- Bubbling fluidised bed combustion
- Circulating fluidised bed combustion (CFBC)
- Atmospheric and Pressurised FBC technologies

Current Status of CFBC technologies

- Process Description
- Plant sizes
- Steam conditions
- Design variants
- Applications



Developments in CFBC technology

- Furnace design – dimensions and lower furnace designs
- Solid separator systems – cyclones, impact separators, optimised arrangement of solid separators
- External heat exchangers

Power Plant Operating Systems

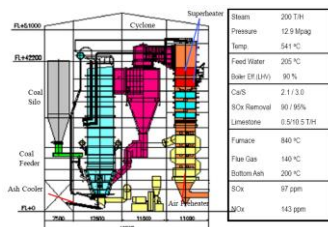
- Key systems available worldwide - and Cyber Security Issues

CFBC Case Studies

- Detailed case studies – highlighting the plant layout, range of fuels, and other operational information

Ash-related operational issues

- Slagging
- Agglomeration
- Erosion
- Ash cooling systems
- Strategies for dealing with operational issues – including detailed case studies



CFBC Ash Utilisation and Applications

- Challenges created by the ash composition of CFBC ash
- Leachability of ash
- Potential markets

Co-combustion issues in CFBC plants

Use of Petroleum Coke in CFBC plants

- Production of petroleum coke
- Types and properties of petroleum coke
- Petroleum coke-firing in CFBC plant
- Conclusions

Biomass fuel issues

- Fuel characteristics
- Co-firing biomass
- Technical and safety issues with biomass fuels

Other potential fuels

- Fuel characteristics and operational challenges

Advances in CFBC technologies and plants

- Scaling-up of CFBC
- Technical developments
- CFBC plants by region / country
- [Key features and fuel consumption of key CFBC plants are outlined]
- 600MWe+ designs
- Future developments – scale-up to 800MWe

Supercritical and Ultra-Supercritical Designs

- Overview of Supercritical technology issues
- Once-Through boiler technology
- Advanced materials
- Water Quality issues

CFBC Cogeneration Opportunities

Oxyfuel combustion

- Overview of the technology and its potential use in CFBC plants
- Review of demonstration projects

General conclusions from course

- Key points
- Developing a toolkit of knowledge and options for CFBC plant staff



Courses Available

- [4 Pillars of Transformer Condition](#)
- [Advanced Project Finance for Power](#)
- [Advanced Technical Report Writing & Presentation Skills](#)
- [Advanced Turnaround Shutdown & Outage Management](#)
- [Ancillary Services in Competitive Electricity](#)
- [Asset Management for the Power Industry](#)
- [Best Practice Renewable Energy Capital & Project Management](#)
- [Biomass Power Generation](#)
- [CFB Combustion for Boiler Operations](#)
- [Clean Development Mechanism and Carbon Markets](#)
- [Coal Contracts](#)
- [Combined Cycle Power Plants Operation](#)
- [Combined Heat & Power \(CHP\) and Co-Generation Plant Operations](#)
- [Competency Management System for the Power Industry](#)
- [Design & Operations of Circulating Fluidized Bed Boiler](#)
- [Developing & Structuring Public-Private Partnership \(PPP\) for Infrastructure](#)
- [Effective Tender Process Management for Power & Utilities](#)
- [Electrical Hazop \(eHazop\) Studies for the Power Industry](#)
- [Electricity Demand-Side Management](#)
- [Electricity Industry Design](#)
- [Electricity Network Planning](#)
- [Electricity Retail Contracts](#)
- [Electricity Theft](#)
- [Electricity Trading Essentials](#)
- [Energy Efficiency](#)
- [EPC Contract Management for Power & Utilities](#)
- [Essentials of Coal Markets and Trading](#)
- [Essentials of Power Trading](#)
- [Excitation Systems](#)
- [Feed-In Tariffs for PV Systems](#)
- [Finance for Non-Finance Professionals in Power & Utilities](#)
- [Financial Modelling for Project Finance in Power & Utilities](#)
- [Fitness-For-Service AP1 579 & High Energy Piping Life Management](#)
- [Fundamentals of Geothermal Energy](#)
- [Fundamentals of Power Generation](#)
- [Gas & LNG Contract Negotiation](#)
- [Gas Turbine Generator Selection, Operation & Maintenance](#)
- [Gas Turbine Hot Gas Paths, Rotors & Failure Analysis](#)
- [Gas Turbine Major Inspection & Overhaul](#)
- [GE Gas Turbine Operations Simulation Based](#)
- [HRSG Design, Operations & Understanding, Controlling of HRSG Damage Mechanisms](#)
- [HV Substation Design & Construction](#)
- [IEC for Utilities](#)
- [Integration of Distributed Generation](#)
- [Introduction to Carbon Capture & Storage](#)
- [Introduction to Clean Coal Technology](#)
- [Introduction to Power Systems](#)
- [Keeping Electrical Switchgear Safe](#)
- [Leadership & Team Dynamics for Power & Utilities](#)
- [LNG Fundamentals](#)
- [LNG Markets & SPOT Trading](#)
- [Maintenance Planning & Scheduling](#)
- [Making IPP & Renewable Energy Projects Contract Frameworks Bankable](#)
- [Managing Complex Projects for Power and Utilities Professionals](#)
- [Medium Voltage & High Voltage Switchgear](#)
- [Metallurgy for Engineers](#)
- [Mechanical Engineering for Non-Mechanical Engineers](#)
- [Mini Hydro Project Analysis](#)
- [MKV Speedtronic Control System](#)
- [MK VI Speedtronic Control System](#)
- [Nuclear Energy Project Planning & Economics](#)
- [Nuclear Power](#)
- [Offshore Platforms Electrical Systems Design & Illustrations](#)
- [Operations of Coal Fired Power Plants](#)
- [Power Generation Commissioning, Operations & Maintenance](#)
- [Power Generation Operation, Protection & Excitation Control](#)
- [Power Plant Chemistry for Chemist & Chemical Engineers](#)
- [Power Purchase Agreements](#)
- [Process Control Methods](#)
- [Programmatic CDM](#)
- [Project Management for Power and Utilities](#)
- [Relay Protection in Power Systems](#)
- [Reliability Centered Maintenance Masterclass](#)
- [Reliability Engineering](#)
- [Renewable Energy Development & Investment](#)
- [Renewable Energy Integration](#)
- [Risk Based Inspection](#)
- [Risk Management in Power Markets](#)
- [Root Cause Analysis](#)
- [Rotating Equipment Maintenance & Reliability Excellence](#)
- [SCADA & Power Systems](#)
- [Smart Grid](#)
- [Solar Energy & Photovoltaic Power](#)
- [Spare Parts Optimisation](#)
- [Supercritical and Ultra-Supercritical Coal-Fired Power Plant](#)
- [Technical Report Writing & Presentation Skills for Power & Utilities Professionals](#)
- [Ultra Low NOx Gas Turbine Combustion](#)
- [Uninterruptible Power Supply](#)
- [Vibration Analysis & Condition Monitoring](#)
- [Waste to Energy Plant Operations](#)
- [Water Treatment and Corrosion Control for Steam Generation and Power Production](#)
- [Writing Effective Standard Operating Procedures \(SOP\) for Power & Utilities Professionals & Engineers](#)

Frequently Asked Questions (FAQs)

1. Does PowerEdge have other programmes than those listed?

We have more than 200 programmes that we are capable of running. All we need is for you to contact us and request for the preferred programme and we will be able to develop it.

2. Where is PowerEdge based?

PowerEDGE is headquartered in Singapore but we run our training programmes in different venues around Asia.

3. What does PowerEdge do?

We are a Power & Utilities Training Specialist.

4. Can this course be done in our city?

It absolutely can. Get in touch with us to request for a training programme to be carried out in your city.

5. Can you reduce the price of our preferred course?

While our price has been reduced before it is even launched, we are always happy to help you with further discounts.

6. Can you change the dates of the course?

If you have a special requested date, let us know and we will arrange another session for you.

7. Who are the companies that will be participating?

This varies from a diversity of Power Operators, Regulators, Financiers, to Vendors in the Power & Utilities industry.

8. Where is the venue for the course?

We usually engage a 4 to 5 star hotel meeting room to ensure the comfort of our participants.

9. How many delegates should we expect for each course?

This varies from 15 to 20 participants. Class sizes are kept small to allow trainers to focus better on each participant.

10. What are the different payment modes?

We accept Visa/MasterCard, cheques, bank transfers and cash on site.

11. Is accommodation included when I sign up for a course?

Accommodation is not included in the course fee but we are always happy to advise on available accommodations.

12. Can I get a cheaper accommodation through PowerEdge?

We will be pleased to help you negotiate a better rate with hotels.

13. Is lunch provided during the course?

We provide lunch and 2 tea breaks every day during our training programmes.

14. Are the training materials included once I have signed up for a course?

Yes, training and course materials are included in the course fee.

15. Will there be a certificate for the course?

Yes, there will be a certificate of participation upon completion of a course.

16. Who are PowerEdge trainers?

They are expert consultants and practitioners with many years of experience in the subject matter that they deliver on.

17. Are PowerEdge trainers competent?

We have received numerous favourable feedbacks on our trainers from past participants.

18. Can PowerEdge assist with Visa travel applications?

We can assist in advising you on the relevant procedure(s) and embassies/consulates that provide Visa for travel purposes.

19. Can we purchase training materials without attending a course?

Unfortunately this option is not available as training materials are specially developed for courses.

20. Can course content be tweaked to cater to our needs?

Of course! Just let us know your request and we will get the trainer to assist in carrying it out.

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REGISTRATION FORM

	NORMAL PRICE	Early Bird SAVE SGD 200 Ends 31 JAN 2015	GROUP OF 3 or More
4 Day Programme	SGD 4,100 Per Participant	SGD 3,900 Per Participant	SGD 3,300 Per Participant

ATTENDEE DETAILS

Name Job title

Tel Department Email

Name Job title

Tel Department Email

Name Job title

Tel Department Email

Name Job title

Tel Department Email

Name Job title

Tel Department Email

COMPANY DETAILS

Organisation name Industry.....

Address

Postcode..... Country.....

Tel Fax.....

PAYMENT METHOD:

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

By Telegraphic Transfer: Please quote AE1 with the remittance advise

Account Name: PowerEdge Pte. Ltd.

Bank Code: 7339 Branch code: 686 Account Number: 686-253386-001 Swift Code: OCBCSGSG

Bank Address: 65 Chulia Street OCBC Centre, Singapore 049513

All bank charges and payment in Singapore dollars (SGD) to be borne by payer. Please ensure that PowerEdge 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 PowerEdge Pte Ltd. payment terms

CANCELLATIONS & SUBSTITUTIONS:

You may substitute delegates at any time. POWEREDGE 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 POWEREDGE 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 POWEREDGE PTE LTD cancels an event, delegate payments at the date of cancellation will be credited to a future POWEREDGE PTE LTD event. This credit will be available for up to one year from the date of issuance. In the event that POWEREDGE 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

4 ways to Register

 [Online Web Registration](#)
 info@poweredgeasia.com
 (65) 6741 9927
 (65) 67478737

You may also be interested in

- [Keeping Electrical Switchgear Safe](#)
- [Introduction to Power Systems](#)
- [Excitation Systems](#)
- [Fundamentals of Power Generation](#)



On Site Training

Can't make it for the Course?
We'll make the course come to you!!

Simply let us know your preferred time and dates and we will meet you at your schedule and venue.

With a host of highly trained experts, we will be happy to customize your programme with your needs 100% fulfilled.

Contact us today at

 info@poweredgeasia.com
 (65) 6741 9927

