



# The Institution of Engineers, Malaysia

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## TALK ON

### “INVESTIGATION OF THE BURNER TILTING ANGLE EFFECT ON THE REAR PASS TEMPERATURE FOR 700 MW COAL FIRED UTILITY BOILER USING CFD”

Organised by the Mechanical Engineering Technical Division, IEM

Date : **12 December 2015 (Saturday)**  
Time : **11.00 am –01.00 pm** (*Refreshments will be served at 11.00am*)  
Venue : **C&S & TUS Lecture Room, 2<sup>nd</sup> Floor, Wisma IEM, Petaling Jaya**  
Speaker : **Ir. Assoc. Prof. Dr. Kannan M. Munisamy**

#### SYNOPSIS

The prime objective of the talk is to identify the cause(s) of excessive gas temperature at boiler rear pass and to recommend the appropriate solution(s) to the problem. In order to achieve the objective, technical analysis utilising state of the art Computational Fluid Dynamics (CFD) simulation techniques is undertaken.

Extensive CFD simulations has been performed on the boiler in order to simulate the combustion process, the combustion gas flow pattern and temperature distributions inside the boiler. These simulations include a reference design settings calculation as well as simulations with the controlled parameters changed so that different effects can be investigated. The effect of change in nozzle tilt angle is investigated.

The results of the baseline case indicate that the flow inside the furnace is very complex with intense mixing. The flow is highly swirling in anti-clockwise direction and the pattern persists until the exit of the boiler. Even with the design settings, the temperature distribution prior to the entry to the superheater is not symmetrical.

The main effect of the angle of tilt is to reduce or increase the mean temperature of the combustion gas at the superheater entry by changing the relative position of the fireball. Negative tilts will reduce the mean temperature, while positive tilts will increase the mean temperature at the entry to the superheater.

#### BIODATA OF SPEAKER



Ir. Assoc. Prof. Dr. Kannan M. Munisamy graduated from Universiti Tenaga Nasional (UNITEN) in 2000 with Bachelor of Mechanical Engineering (Hons). Upon completion of training with Tenaga Nasional Berhad (TNB) as trainee engineer he was assigned to Universiti Tenaga Nasional. He pursued his Master Degree in Cranfield University, Milton Keynes, UK. He was conferred with Master of Science in (Aerodynamics) specializing in Computational Fluid Dynamics. Currently serving as Associate Professor in UNITEN. He has completed PhD in Mechanical Engineering specializing in CFD and experimental on

Heat transfer modelling application from Universiti Tenaga Nasional in year 2012. With fundamental knowledge of thermal fluid system and CFD, various industrial consultancy projects were lead and contributed as team member. The consultancy projects including thermal power plant heat transfer related solutions especially on boiler operations, hydro power plant water flow problems, air conditioning industry flow cases, high efficiency axial fan development, fire simulations and green building-air change effectiveness calculations. Besides that, his expertise is in the area of automotive brake disk design and flow analysis for commercial and race car applications. He has lead couple of Ministry of Science and Innovation (MOSTI) funded projects on the development of brake disk experimental rig in lab located at UNITEN. He is also a member of Center of Fluids Dynamics (CFD) at UNITEN, IEM Council Member, Fire Advisory board member (IEM), SIRIM work group member for a few sub-standard in MS standard, IEM, IMechE, and Engineers Australia member. He has published in international and local journals and conferences. He is also reviewer for IMechE journals. He has vast experience operating CFD ACE+, GRIDGEN, FLUENT, commercial CFD software and Design Builder (Building energy simulation software). Special interest is on rotating type of flow simulations. His industrial CFD and thermo-fluid engineering experiences are accredited by Board of Engineers Malaysia and Engineering Council, United Kingdom and Engineers Australia by granting him Professional and Chartered Engineer status.

**Ir. Assoc. Prof. Dr. Kannan M. Munisamy**  
**Chairman**  
**Mechanical Engineering Technical Division, IEM**

#### ANNOUNCEMENTS TO NOTE:

- Preferential admission to talk shall be accorded to IEM members (pre-registration and online registration are NOT required). Telephone and/or fax reservation will NOT be entertained.
- Non members may also attend the talk but will need to pay a registration fee of RM50 and an administrative fee of RM15. GST is inclusive.
- For members of affiliated organisations, there will be no registration fee payable. However, they are requested to produce their membership card as proof of membership. For the list of affiliated organisations, please refer to IEM website at [www.myiem.org.my](http://www.myiem.org.my) under International/MoU.
- Limited seats are available on a "first come first served" basis (maximum 100 participants).
- IEM members are required to produce membership cards for confirmation of attendance (CPD purpose).
- Latecomers will not be allowed to enter if the lecture hall is full nor be entitled to CPD.
- *IEM members who fail to produce their membership cards will be charged a fee of RM25.00. GST is inclusive.*

#### ADMINISTRATIVE FEE

- Kindly be informed that an administrative fee of RM15 is payable for talks organized by IEM. GST is inclusive.
- The fee would be used to cover overhead costs, building maintenance expenses as well as contribute to Wisma IEM Building Fund.
- All contributions will be deeply appreciated by IEM.
- Student Members are however exempted.

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