

# Short Intensive Training Course

## Design and Troubleshooting of Pneumatic Conveying Systems for

# Fly Ash Handling in Thermal Power Plants

10-11<sup>th</sup> April, 2015

Organized by

Department of Mechanical Engineering  
Thapar University, Patiala



## Contact

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## INTRODUCTION

Pneumatic conveying systems to transport fly ash in dry mode are extensively used in of coal fired thermal power plants in India in large capacities due to the high ash content of Indian coal and the increasing requirements of conveying fly ash in dry form. However, reliable design of such system is not a trivial task and requires considerable amount of knowledge on product characterization and complex solids-gas-pipe wall interactions. A wrongly designed or not properly optimized fly ash pneumatic conveying system can cause significant amount of losses in terms of reduced delivery, increased energy consumption, unnecessarily larger capital investments, wearing of hardware etc. This short course is aimed at bringing the latest updates from the experts on the recent developments on improved system design and hardware. Several cases studies and troubleshooting options will be covered for the benefit of users, designers and suppliers.

## OBJECTIVES

On the completion of this professional development program, participants should be able to:

- Understand the different types of systems and flow modes of pneumatic conveying of fly ash
- Appreciate the importance and relevance of fly ash properties and characterization towards designing pneumatic conveying systems
- Evaluate quantitatively the dense-phase suitability of a given fly ash
- Estimate operating conditions for a given conveying system and type of fly ash
- Apply conveying performance characteristics to the design and analysis of systems
- Size feeders (blow vessel/blow tank) and dust collectors
- Apply the above fundamentals to the analysis, troubleshooting and design of fly ash pneumatic conveying in power plants
- Identify the latest developments in in fly ash handling systems: improved hardware design, modelling and scale-up procedures.

## CONTENT

The content of this program is based largely on the techniques used and developed and the experience gained by the expert presenters. The major topics to be covered during the course include:

- Principles of pneumatic conveying of fly ash
- Characterization and classification of different bulk solids and fly ash
- Latest feeding equipment
- Mathematical modelling of solids friction and pressure drops in straight pipes and bends
- Reliable prediction of pipe blockage condition and estimation of minimum pick-up velocity
- Conveying characteristics and scale-up
- Latest developments in pneumatic conveying technology for reliable fly ash transport
- Troubleshooting and optimizing fly ash handling systems
- Laboratory demonstrations at the Pilot Plant for pneumatic conveying at Thapar University
- Power plant case studies and user problems

## COURSE PRESENTERS

### Dr. S.S.Mallick



**Dr. S.S. Mallick** is Assistant Professor and In-charge of the Laboratory for Bulk Solids and Particulate Technologies, Department of Mechanical Engineering, Thapar University. Dr. Mallick completed his PhD in dense-phase pneumatic conveying from University of Wollongong, Australia in the year 2010 under the supervision of Prof. Peter Wypych. Before switching over to academics, Dr. Mallick worked as a consulting engineer for Development Consultants Private Limited (India) for 5 years, where he designed several coal and ash handling systems for thermal power plants. He has published several research papers in the area of bulk solids handling in top international journals. Dr. Mallick has developed test set-up (pilot plant) at Thapar University for dense and dilute-phase pneumatic conveying with funding from the Government of India. He has also received the prestigious Young Scientist Award from the Ministry of Science and Technology, India.

### Professor Dr. Peter Wypych



**Prof. Dr. Peter Wypych** is the Director of Australian Research Council endorsed Key Centre for Bulk Solids and Particulate Technologies at the University of Wollongong, Australia. He has been involved with the research and development of bulk solids handling and processing technologies since 1981. Dr. Wypych has published over 500 academic publications including 5 book chapters, 150 journal articles and 300 conference papers - in the areas of bulk materials handling. He has completed over 500 consulting reports for industry, trouble-shooting design/ optimization of new and existing plants and processes for companies all around Australia and overseas (e.g. USA, Hong Kong, New Zealand, China, Singapore, Korea, Africa, South America, Canada, India). He has been the Chief Investigator of 20 major government/industry sponsored projects totalling more than \$8 Million and currently is the Chair of the Australian Society for Bulk Solids Handling.

### Dr. Renhu Pan



**Dr. Pan** is currently the Vice General Manager, Fujian Longking Co. Ltd and Managing Director of Xiamen Longking Bulk Materials Science and Engineering Ltd, China. He has conducted about 750 turn-key projects in the area of Bulk Solids Handling. These projects include: pneumatic conveying systems for wet FGD ash, fly ash up to 1000 MW units, lime stone, mill rejects and so on and pipe conveyors. He is also the current Deputy Vice President, Technical Committee for Freight Pipeline, China Mechanical Engineering Society. Dr. Pan completed his PhD in pneumatic conveying from University of Wollongong, Australia in 1993 under the supervision of

Dr. P.W.Wypych.

**All presenters** have extensive experience as an academic, researcher and industrial consultant in the field of bulk materials handling including fly ash handling.

## REGISTRATION FEES

	Registration fees (Rs.) per person	
	Regular	Late
Industry	10000	14000
Faculty & Scientists	7000	9000
Students	5000	7000

**NOTE:**

- 10<sup>th</sup> March 2015 is the last date of regular registration; late registration charges will be applicable after this date.
- Course Fees include course kit, printed course material, course dinner, lunch and tea/coffee/snacks at course venue.
- Registration fees, once paid, will not be returned in case the delegate is unable to attend the course. However, the delegate may nominate a replacement delegate at no extra charges.

## VENUE

Department of Mechanical Engineering, Thapar University, Patiala, Punjab - 147004

## ACCOMMODATION

Delegates will need to make their own accommodation bookings. Some suggestions are:

**Guest House** at Thapar University campus (contact course organizers for booking)

**Hotel Grand Park**, <http://www.hotelgrandpark.com/>, within 1 km of venue

**Hotel TNG**, <http://www.hoteltnng.com/>, within 1 km of venue

**Hotel Jiwan Plaza**, <http://www.hoteljiwanplaza.com/>, within 1 km of venue

**Hotel Mohan Continental**, <http://www.mohancontinental.com/>, within 4 km of venue

**Hotel Harbans Residency**, [www.harbansresidency.com](http://www.harbansresidency.com), within 4 km of venue

**Hotel Narain Continental**, [www.hotelnarain.com](http://www.hotelnarain.com), within 4 km of venue

## DEPARTMENT OF MECHANICAL ENGINEERING

The Department of Mechanical Engineering was established in 1956 with the inception of the Institute to produce high quality engineers the field of Mechanical Engineering to cater the needs of the newly Independent India. The Department offers undergraduate program leading to B.E. Mechanical, Mechatronics ,Production Engineering, Postgraduate programs leading to M.E. (CAD/CAM & Robotics), M.E. (Production & Industrial Engineering), M.E. (Thermal Engineering) and Doctoral program leading to PhD Degree. The Department aims to produce quality professionals in Mechanical Engineering to compete globally and excel by carrying out basic and applied research in emerging areas by forging strong industry-institute interaction. In January 2008, the undergraduate program of Mechanical Engineering Department has been accredited for 5 years by NBA. The Department has been able to attract numerous prestigious research and infrastructural grants in recent years from agencies such as AICTE, DRDO, DST, UGC, to list a few. The department is having high quality laboratories in areas of Bulk Solids and Particulate Technologies, Heat & Mass Transfer, I.C engine, Manufacturing, Automation/ Robotics, Computer Aided Designs etc. The faculty and staff are actively involved in fostering industrial collaborations through training programs, workshops, consulting projects etc.

## SHORT INTENSIVE COURSE REGISTRATION FORM

Designing and Troubleshooting of Pneumatic Conveying Systems for  
Fly Ash Handling in Thermal Power Plants  
Thapar University, Patiala, India, 10-11<sup>th</sup> April 2015

NAME OF DELEGATE .....

ORGANIZATION:.....

DESIGNATION:.....

CONTACT ADDRESS: .....

TELEPHONE/MOBILE.....EMAIL: .....

	<i>Please tick in first column for your applicable category</i>	
	Registration fees (Rs.) per person	
Category of Registration	Regular	Late
Industry	10000	14000
Faculty & Scientists	7000	9000
Students	5000	7000

**REGULAR REGISTRATION: UPTO 10<sup>TH</sup> March, 2015**

METHODS OF PAYMENT:

**PAYMENT BY DEMAND DRAFT – Please tick**

Demand Draft (DD) to be made payable to *Registrar, Thapar University*, payable at Patiala

Fill up the following draft details:

*Demand Draft No:*..... *Dated:*.....

*Of Rs.*.....*Drawn on Bank*.....

*Branch*.....

**BANK TRANSFER PAYMENT – Please tick**

Please make payment to the following account:

State Bank of Patiala, TIET Branch (Thapar University Branch), Thapar Technology Campus

Account Name: *Imprest Account Head, Mechanical Department*

Bank Account Number: 65117125108

SWIFT Code: STBPINBB912, IFSC Code: STBP0000244

Fill up the following bank transfer details:

*Transaction/Journal No:* .....*Dated:*.....*of Rs.* ..... *Through*

*Bank*.....*Branch*.....

**NOTE: Transaction charges are to be paid by the sender**

Please return this form with your payment to:

*Dr. S.S.Mallick (Principal Coordinator - DTPCS 2015)*

*Department of Mechanical Engineering,*

*Thapar University, Patiala, Punjab-147004, INDIA*

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