

# Inviting Expression of Interest to Join Industry Funded Project as Project Engineer (PE)

***(Industry funded Research and Development Project: Sponsored by National Thermal Power Corporation (NTPC), A Maharatna Company and Govt. of India Enterprise)***

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## GENERAL

It is anticipated that National Thermal Power Corporation (NTPC), A Maharatna Company and Govt. of India Enterprise, is going to sanction a project of 1.50 Crores to the Bulk Solids Handling Research Group of the Department of Mechanical Engineering, Thapar University.

This will be a 2 year project and likely to start from the last week of October, 2017.

The project has the provision of hiring **Two (2) Project Engineers (PEs)**, who would be part of a project team along with 4 faculty members, PhD and Masters thesis student(s). Details of the project and project position description are given in the following.

Considering the project delivery requirement, we are hereby calling for an expression of interest from potential PEs. ***Potential candidates with interest are advised to send their resume to Dr. S.S.Mallick at [ssmallick@thapar.edu](mailto:ssmallick@thapar.edu) by 23.10.2017.***

Suitable candidates will be asked to visit Thapar University around 25-27<sup>th</sup> October for an interaction with the project team, familiarization to the project and requirements etc.

Within a week of project sanction, a formal interview will be conducted (tentative dates: between 1<sup>st</sup> to 5<sup>th</sup> November) for the two vacant PE positions. Successful PEs will need to join the project shortly thereafter. No TA/DA will be provided to attend the pre-interview interaction with project team and interview at Thapar University.

Interested candidates are advised to have one complete day in schedule for each of the pre-interview interaction and interview days. The candidates are welcome to bring documentary evidence of any past design and/or fabrication project(s) that they might have carried out in the past during graduation, wherever applicable.

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## PROJECT DETAILS

### **Project Title:**

On Developing Reliable Scale-up Procedures and Design Optimization for Pneumatic Fly Ash Conveying Systems for 500/800/1000 MW Units

### **Principal Investigator:**

Dr. S.S.Mallick (Associate Professor), Mechanical Engineering Department (Thapar University)

### **Co-Principal Investigator(s):**

Dr. Gautam Setia (Assistant Professor), Dr. Anu Mittal (Assistant Professor), Mr. Atul Sharma (Lecturer), Mechanical Engineering Department (Thapar University)

### **Project Type:**

Research and Development (Industrial)

### **Sponsoring Agency:**

National Thermal Power Corporation (NTPC), A Maharatna Company and Govt. of India Enterprise

### **Sponsored Amount to TU:**

Approx Rs. 1,15,00,000 (total project worth: Rs. 1,50,00,000)

**Project Duration:**

2 years from the date of project sanction

**Project Summary:**

The existing system of fly ash conveying in coal fired thermal power stations in India (including NTPC power stations) suffers from non-optimized designs for the storage and transport system. As a result, the fly ash either does not get discharged from the ESP hoppers/storage facilities and/or does not provide adequate material transport capacity (and often resulting in pipeline blockage). This project will develop improved design criteria that will be part of NTPC's future design/specification for ash handling systems for thermal power stations in India. The project is divided into three major stages: (1) expansion of the existing laboratory of bulk solids handling and performing extensive test work; (2) carrying out practical validation tests at NTPC plant(s); (3) preparation of a design specification by closely working with NTPC project/design team.

**Need of the Project:**

The installed pneumatic conveying systems for fly ash handling in coal fired thermal power plants often encounter the following:

- Reduced ash flow rate due to inaccurate estimation of total pipeline pressure drop – deviation from the optimum operating point on the conveying characteristics.
- Inaccurate estimation of minimum air flow rate requirement – leading to pipeline blockage.
- Too heavy (for coarse ash) or too low (for fine ash) flow of fly ash from the ESP hoppers – causing line choking due to product surge or inadequate product flow rate.
- Lack of comprehensive knowledge on the effectiveness of heaters and fluidizing aeration system on ash flowability in ESP and buffer hoppers.
- Lack of understanding of the root cause of fly ash agglomeration in boiler that results in unexpectedly high average particle size.

**Project Objectives:**

- To amend and/or develop test facilities for vacuum and pressure conveying systems, hopper flowability testing in trapezoidal and conical hoppers.
- To predict minimum air flow rate requirement in vacuum and pressure conveying pipeline for different samples of fly ash and pipe diameters.
- To predict pressure drop and optimum operating point on conveying characteristics in vacuum and pressure conveying systems for different samples of fly ash, pipe lengths, pipe diameters and layout.
- To evaluate the effectiveness of heaters and fluidizing air on flowability of fly ash from ESP and buffer hoppers – effect of heating/fluidizing air temperature, nozzle/pad type, air injection points etc.
- To validate the model/process optimized parameter to be developed in laboratory scale under actual power plant condition.
- Preparation of a technical specification for 500/800/1000 MW plants including specific design for a certain plant and delivery of formulae/tables/figures to select compressor, sizing, pipe sizing etc. for different solids/ash flow rates and ash properties (such as, for different ash particle size distribution, bulk densities etc.).

**Project Outcomes:**

- Achieving higher solids (fly ash) transport rates using pneumatic conveying systems (vacuum and pressure systems) without pipeline blockage and significant reduction in transport gas and operating power consumption, especially under stepped-up pipelines.
  - Optimal pipe sizing for given product, capacity and pipe layout.
  - Achieving higher fly ash flow rate coming out of storage vessels for fine, cohesive ash and controlled feed for excessive free flowing coarser ash.
  - Identification of possible root cause of unusually high level of agglomeration fly ash particles.
  - Improved ability to troubleshoot existing systems.
  - Getting a technical specification for 500/800/1000 MW plants including specific design for a certain plant and delivery of formulae/tables/figures to select compressor sizing, pipe sizing etc. for different solids/ash flow rates and ash properties (such as for different ash particle size distribution, bulk densities etc.).
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## POSITION DESCRIPTION

**Position Title:**

Project Engineer (project staff)

**Number of Available Positions:**

Two (2)

**Position Duration:**

Two years (employment is subject to satisfactory performance)

**Position Type:**

Temporary (till the completion of the project, employment is subject to satisfactory performance)

**Reporting Authority:**

Dr. S.S.Mallick, Associate Professor, Department of Mechanical Engineering, Thapar University

**Salary and Other Benefits:**

- Rs. 25,000 per month + HRA (as per Thapar University guidelines or as admissible) + medical allowance
- Opportunity to network/work with different industries, including NTPC
- Opportunity to network/work with national and international/overseas experts
- Suitable travel allowance will be provided for all project related travel and conferences
- Opportunity to write and publish papers in journals and conferences

**Key Responsibilities:**

- Carry out purchase process for recurring and non-recurring items: preparation of technical specification, data sheet, schematic and design drawings for various equipment, auxiliary, accessory, instruments, fabricated items required for the laboratory development (pressure and vacuum pneumatic conveying system and hoppers); search and establish technical contact with potential suppliers regarding bidding process; offer evaluation/prepare comparatives, selection of final supplier, preparation of draft purchase order, establish and follow up network with NTPC and TU purchase/finance/technical team for fund clearance, carry out purchase process including audit, bank guarantee, clearance of all bills etc.
- Facilitating/carrying out unloading, storing, installation, commissioning of equipment, instruments, auxiliaries etc.
- Preparation of fabrication and detail layout drawing, including BoM.
- Facilitating /carrying out fabrication of suitable parts and installation.
- Installation of auxiliary/accessory parts to main set-up.
- Travel to supplier facilities and NTPC project sites for purchase, site installation, testing, ash collection etc.
- Installation of instruments/auxiliaries/accessories at NTPC site for validation and carry out site tests.
- Establish reliable and safe testing/working procedure at the laboratory and perform test work on pneumatic conveying pilot plant and hopper/flow properties, including data analysis and interpretation.
- Troubleshoot mechanical and electrical/electronic systems/equipment etc. at the laboratory.
- Liaison with construction and maintenance department of Thapar University.

**Essential Attributes/Qualification:**

- Bachelor of Engineering/Technology Degree or *Diploma with 2 year of work experience* (industry) with overall first class on aggregate/CGPA in Mechanical/Industrial/Production/Chemical Engineering
- Strong skills in manufacturing and fabrication (having adequate practical hands-on experience)
- Strong skills in preparing design/fabrication drawings using appropriate computer tools
- Ability to operate and troubleshoot mechanical equipments/components (having practical hands-on experience).
- Ability to operate and troubleshoot electrical and electronic equipments/components (having practical hands-on experience).
- Decent competency on MS-WORD, MS-EXEL and MS-POWERPOINT
- Decent competency in written and verbal communication in Hindi and English
- Ability to work in teams and having decent interpersonal skills
- Ability and willingness to travel to all over India on short notice
- Ability to work beyond scheduled working hours and on holidays/weekends in case of emergencies

**Desirable Attributes:**

- Ability to join the position on short duration (within a week of appointment)
  - Having a valid driving license and having a two-wheeler/four wheeler
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**CONTACT**

All queries are to be addressed to:

**Dr. S.S.Mallick. Associate Professor**

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