IITB-Monash Research Academy

Indian Institute of Technology Bombay | MONASH University

An Indian-Australian research partnership

Project Title:	**Fly ash utilisation in haul road construction in open cast coal mines: A geo environmental and hydrogeological investigation**	
Project Number	**IMURA0348**	
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Research Academy Themes:

Highlight which of the Academy's Theme(s) this project will address?

(*Feel free to nominate more than one. For more information, see www.iitbmonash.org)*

1. Advanced computational engineering, simulation and manufacture
2. **Infrastructure Engineering**
3. **Clean Energy**
4. **Water**
5. Nanotechnology
6. Biotechnology and Stem Cell Research

The research problem

There are three wastes streams within the mine/power generation complex (ie. overburden, fly ash and coal washery rejects) that need to be disposed. These volumes become huge when dealing with surface mining operations. One of the important determinants of economic feasibility of opencast mines is the cost competitiveness and mine haulage systems become very critical component to this. A successful haulage is dependent on a number of factors, such as transport fleet, haul-road geometry, etc.

When designing a good haul-road for a mine, the material composition of haul roads is the most important among many key design variables. A geotechnically sound and geochemically stable material is a prerequisite in making the haul road construction successful on a longer term.

Project aims

'Using power industry waste products (fly ash) and mine overburden waste to develop a soil that meets all stability, hydrological and geochemical requirements for all stages of sustainable haul-road design that is suitable for a range of climatic conditions'

Expected outcomes

It will demonstrate how to transform open-cut mine and power wastes into a suitable haul-road construction material, both of which are environmentally desirable and practically essential. Theinnovation lies in the reuse of mine waste products to assist the sustained mine development and reduce futureenvironmental risks from eventual closure of the mines.

It will provide a strategy to mitigate existing environmental hazards arising from the disposal of the mine wastesand the reduced requirement for remedial measures to deal with these hazards.

Its products will assist the reduction of mining whole-of-life costs.

How will the project address the Goals of the above Themes?

The project goal is to develop a soil that meets all stability and chemical requirements for the different bearing capacities and climatic conditions. The objectives stated above will be met by a tightly-integrated program of lab and fieldinvestigations coupled with modelling using a mosaic of pilot-plots specifically established for thestudy.

Capabilities and Degrees Required

A post-graduate engineer (M.E./ M.Tech./MSc in any branch of engineering and/or science) with an interest in soil science, geochemistry and geotechnical areas; a sound understanding of statistical methods; excellent computer programming skills