


**An Indian-Australian research partnership**

<b>Project Title:</b>	Geological effects on the propagation of ground vibrations produced by blasting	
<b>Project Number</b>	IMURA0336	
Monash Supervisor(s)	Prof Ranjith Pathegama (Monash)	
Monash Primary Contact:	Ranjith.PG@monash.edu	
Monash Head of Department:	Jeffery Walker	
Monash Department:	Civil Engineering	
Monash ADRT:	Emmanuelle Viterbo	
IITB Supervisor(s)	Prof T N Singh Prof Hemant Kumar Singh	
IITB Primary Contact:	tnsingh@ iitb.ac.in kumar.h.singh@iitb.ac.in	
IITB Head of Department:	Kanchan Pande	
IITB Department:	Earth Sciences	

**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](http://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

The influence of geology on the ground vibrations generated by blasting is acknowledged but not well-quantified. A starting point is the known literature on the propagation of seismic waves in layered media.

Relevant literature:

Any relevant background literature

Work by Brian Kennett at ANU is a starting point for the layered media; Vincent Lee for the influence of tunnels/voids. Many other references available including text books.

## Project aims

Build a capability and software that uses geological information to determine the ground vibrations and the influence of geology and other openings (tunnels, voids etc).

## Expected outcomes

Software and model with measurable inputs and outputs that successfully predict vibrations from real blasts in geological media.

## Capabilities and Degrees Required

*List the ideal set of capabilities that a student should have for this project. Feel free to be as specific or as general as you like. These capabilities will be input into the online application form and students who opt for this project will be required to show that they can demonstrate these capabilities.*

- Strong applied mathematics/physics/engineering background with interest in solving wave propagation problems in linear elastic, viscoelastic, and non-linear media.
- Demonstrated capability in solving such problems in idealised cases by using both analytical techniques and numerical codes such as finite element/difference codes.
- Demonstrated ability to do both fieldwork and modelling work and meld the two domains.
- Knowledge of the mechanics of solids and interest in expanding that for geological materials.