

Leoben, January 22nd 2015

PhD student positions at Montanuniversität Leoben, Austria

The dept. of Mineral Resources and Petroleum Engineering at Montanuniversität Leoben (MUL) has received a 3 year grant from the Austria Science Fund (FWF) for the project: "Fines generated by dynamic crack propagation, as in the blasting of rock". In it we will employ 2 PhD students in experimental and theoretical research that will lead up to PhD degrees. It involves cooperation with researchers in Canada, Finland, Spain and Sweden.

Fine particles from rock blasting are a liability from resources, production and environmental aspects. The general aims of this project are to create a better understanding of how the fine and very fine particles are created under blasting conditions. The underlying idea is that instability of fast propagating cracks through a branching-merging mechanism plays a fundamental role for the generation of the fines. The aim is to provide direct evidence of this by capturing images of branching at a running crack tip.

The scientific aims of this project are

- i) to verify or refute the mechanism for crack generated fines by blasting,
- ii) to find if there is critical velocity below which this mechanism ceases to contribute, further
- iii) to compare the fragment size distribution with models and to
- iv) provide a scientific model of how and in what proportions these fines particle are generated.

The testing will primarily use high speed photography of blasting of a cylindrical specimen confined in a closed container with a window through which the cracking is viewed. The fragments will be sieved the fragments down to about 2 μm . Supplementary strength, fracture roughness and Natural Breakage Characteristic measurements will be made to find correlations with the model parameters.

The Montanuniversität is a high reputation technical university in Leoben, Austria. Leoben is a local commercial and educational center where everything is conveniently close, including the mountains. Yet Leoben is within easy reach of major cultural cities like Graz and Vienna, 1-2 hours away by train.

The mining division of the Dept. Min Res & Petr. Engng has a long tradition of PhD projects in rock blasting, focusing on understanding basic fragmentation mechanisms. Advanced full-scale and in-house model-scale blasting has been a basis for this work. The supervisors have been Profs Peter Moser and Finn Ouchterlony, who is the project leader of the present FWF project.

The project requires 2 cooperating PhD students with overlapping competences; one dealing more with the practical aspects, the other more with the theoretical aspects of the scientific aims. The practical aspects require an understanding of mechanics, strength testing and general experimentation and a background in rock engineering. The theoretical aspects require an understanding of fracture mechanics, strength of materials and material physics.



The PhD positions will be salaried at 75% of full time and departmental duties to be discussed.
Interested students should contact:

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