SEISMIC IMAGING & MONITORING USING LOW-POWER AND AMBIENT SOURCES

MINEX CRC PROGRAM 2
Data from Drilling

PHD PROJECT

Curtin University

PRIMARY SUPERVISOR

Prof. Roman Pevzner
e: R.Pevzner@curtin.edu.au
t: +61 8 9266 9805

CO-SUPERVISORS

Dr. Olivia Collet and Dr. Konstantin Tertyshnikov (Curtin University)
Dr. Ilnur Minniakhmetov (BHP)

PARTICIPATING ORGANISATIONS

Curtin University

BHP

RESEARCH PROJECT

The applicability of seismic methods for imaging and monitoring is primarily affected by the cost of surveys. In turn, the cost of the surveys is linked to the necessity to often use large high-power seismic sources (like vibroseis trucks), which are expensive to mobilise, operate and maintain. Massive monitoring arrays, such as those constructed using distributed acoustic sensing technology (but not only), allow the acquisition of a significant portion of surveys with a limited number of source positions. For instance, in borehole geometry, the entire length of the well can be measured with a single excitation of the seismic source. This gives an opportunity to use a large number of excitations at a limited number of locations performed with a low-power source (like small weight drop, sparker, etc.). The simultaneous development of data analysts algorithms for DAS data to increase its signal-to-noise ratio will add value to obtaining high-quality data at a fraction of the cost of the same survey acquired with powerful sources.

The main goal of this research project is the development of the methodology and necessary data analysis tools for this type of survey for subsurface resource imaging.

The activities will include:

- Legacy data analysis (both fibre optic and conventional geophones)
- Development of the tools for signal/noise estimation and optimisation
- Survey design and validation using data acquired at Curtin University training well facility and other sites across Australia