

EXPERIMENTAL STUDY OF DOWN-HOLE PERCUSSIVE DRILLING

MINEX CRC PROGRAM 1

Drilling Technologies

PHD PROJECT

Curtin University

PREREQUISITES AND INTERESTS

Background in rock mechanics, data processing and experimental research

PRIMARY SUPERVISOR

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RESEARCH PROJECT

This project aims at gaining insight in the mechanisms associated with the drilling action of a down-the-hole hammer assembly, with particular focus on what is referred as the sweet spot (optimal drilling conditions) and an overarching goal of deriving methodologies and algorithms to identify and seek optimal drilling conditions in real time on site.

The work will rely on state of the art laboratory and field experiments.

Laboratory experiments will include both experiments focusing on discrete events (impacts and penetration events), as well as full hammer drilling experiments. Innovative experiments will be designed with the objectives of:

- (i) Tracking the kinematics of the bit and the piston (impact force, duration, but penetration, etc.),
- (ii) Estimating energy transfer, and
- (iii) Exploring the effect of operating and design parameters on the drilling response (sweet spot).

Field experiments will involve the implementation of new sensors and recording system, the design of field experiments and the processing and interpretation of data. Goals of the experiment are to:

- (i) Identify the requirements (sensors type and location, sampling rate) for surface measurements to reliably assess drilling performance in real time, and
- (ii) Implement and test real algorithms for the interpretation of the drilling response.