



Project 1.1: Next Generation Drilling Technologies



PROGRAM 1: DRILLING

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| Program Leader | Soren Soe (DET CRC) |
| Project 1.1 | Next Generation Drilling Technologies |
| Project Leader | Soren Soe (DET CRC) |
| Key Researchers | Vamegh Rasouli (Curtin University), Trevor Zwar (Boart Longyear), Philip Teakle (Teakle Composites), Stuart Addinell (CSIRO) |
| Participants | Boart Longyear, CSIRO, Curtin University, Imdex, Teakle Composites |
| Timing | 1 March 2014 – 30 November 2017 |
| Cash Funding | \$5,898,000 |
| In Kind Funding | \$9,703,125 |
| Review Panel Chair | John Brockelsby (Anglo American) |

“A cost of \$50 per meter in Greenfield mineral exploration drilling, will change the approach to exploration drilling programs.” Soren Soe, DET CRC

OBJECTIVES

To develop and build a Coiled Tubing Drilling Rig (CT Rig) for Greenfields mineral exploration drilling at a cost of \$50/metre to a depth of 500 metres and weighing less than 10 tonnes with ancillary safety and environmental benefits.

BACKGROUND AND AIMS

The major advantage of CT drilling is the elimination of drill rods leading to much higher drilling rates and hence no associated rod handling, the system facilitates a safer drill site. A CT rig has the ability to continuously maintain in hole pressures with a promise of improved hole stability plus capabilities to continuously retract the drill string at speeds of >30 metres per minute.

Project 1.1 aims to improve our current CT technologies to drill the hard rocks encountered in mineral exploration and to operate cost effectively. The project will also focus on improving the life and durability of the drill string (the coil) by researching new materials such as composites, high strength steel and alloy tubes in combination with optimised operating parameters. A key challenge for the Project is to produce a quality sample of the drilled formation so, combined research in borehole stability, water cleaning and cuttings transport are areas of focused research.

SERVICE SECTOR ENGAGEMENT AND COMMERCIALISATION

Project 1.1 has a significant requirement for engineering and will have significant involvement from Boart Longyear and Imdex. The project also requires significant expertise within composite design and composites manufacturing and solutions will be developed in collaboration with Teakle Composites.

LINKAGES TO OTHER DET CRC PROJECTS

There are close links between Project 1.1 and the other research projects. Program 1 will provide methods to drill hard rock and provide durable coil tubing. Cooperation is close with The DET CRC Program 3 that provides the Lab-at-Rig® analysis of the CT cuttings.

YEAR 2 MILESTONES

- Coiled tubing drilling to a depth of 150 metres completed at the Brukunga Drilling Research & Training Facility.
- Mid-term review of operational direction and organisational performance completed.
- Coiled tubing drilling program with 1st generation composite tubing to a depth of 100 metres completed.
- Define requirements for the SRU and mud/water quality in Stage 2.
- Steel coiled tubing drilling with fluid powered hammer drilling at the Brukunga Drilling Research & Training Facility completed and report uploaded.

COMMONWEALTH AGREEMENT OUTPUT AND MILESTONES

- Prototype coiled tubing drilling technology demonstrated in the field to identify improvements from current drilling methods.
- Fabrication of prototype coiled tubing drilling technology in preparation for field trial.
- Basic in hole sensors with adaptive control system installed and field tested.
- Field trials conducted on prototype coiled tubing drilling technology and design modifications completed for version 2 prototype.
- Prototype of the Coiled Tubing Drilling Rig (CT Rig) successfully deployed in a field drilling program of significant scale (> \$1M).