

Project Summary : GEN 311

Project Title: Evaluation and further development of a >quiet' non-atmospheric polluting blast hole drilling system 65p.

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Agency:

CSIR

Report Date: January 1998

Related Projects: GEN 207

Category: Generic

Applied Research and Technology Transfer
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Engineering

Summary

The primary objective of this project is the further development and evaluation of the quiet blast-hole drilling system initially developed under project GEN 207. The main focus of this work is the resolution of the limitations and deficiencies identified in the prior work. In the previous work it was demonstrated that effective noise reduction methods existed for each of the major noise sources within a pneumatic rock drill and that these could be combined to provide a quiet blast hole drilling system provided that the thrust system produced the required thrust along the axis of drilling (ie >in-line= thrust). In the previous work this was achieved by effectively converting the rock drill to a piston within a sealed cylinder and providing the necessary thrust pneumatically. This arrangement achieved operational noise levels of 87.5 dB during over travel and 92 dB during drilling. Unfortunately, the use of pneumatic thrust introduced several problems relating to the control and maintenance of the required thrust. These problems generally arose from difficulties in maintaining an acceptable level of sealing in the complex sealing arrangement.

The results of the work were sufficient to warrant further development of the system and consequently this project was established. The primary focus of the work was to establish a thrust system which avoided the problems identified in previous work yet retained an >in-line= arrangement, thereby providing the features necessary for the application of the previously established noise reduction methods.

The thrust method developed was that of a reciprocating mechanism based on a standard beam crawler. Four prototypes were developed and manufactured and tested in surface drilling into Norite. The machines retained the noise reduction levels of the previous prototypes and provided drilling performance more than equal to a standard drill and leg arrangement. However, the thrust mechanisms proved to be limited in available thrust and endurance with several failures of small plastic elements within the pneumatic circuit at lives as low as 40 metres of drilling.

The problems identified during surface drilling are readily amenable to resolution with existing technology and know how and could be effectively introduced during commercialisation of the product. It is concluded that the concept as presented can provide for a quiet blast hole drilling system.

In conclusion, while the project achieved its objective in proving that the concept of a quiet rock drill is possible, further work is required to take the concept to full commercialisation.