

This project investigated improvements in power line communications (PLC), condition monitoring techniques and diagnostic aids, together with improving audible communication systems underground. The work on PLC investigated narrow-band, low data rate technologies and high data bandwidth broadband PLC technologies. It is concluded that broadband PLC technologies cannot currently meet the requirements of providing backbone communications in mining and that fibre-optic methods offer better performance. However, short range broadband applications are feasible and an innovative voice and data transmission system, including remote control features, has been developed for coalface communications, using radiofrequency and digital voice technologies not previously used for this application. This system accommodates all the new digital interfaces: Bluetooth, PLC, twisted pair cables, etc. The condition monitoring research has led to a suite of new specialised ATEX-certified sensors together with the development of new vibration signature tracking and classification devices and methods, which provide an early indication of incipient failure. Particular value of these methods is anticipated with coalface equipment. A further component of the work examined the practicability of implementing noise reduction techniques in mining communications systems and noisy workplaces by means of active noise cancellation (ANC). Whilst ANC-based techniques would not be currently cost-effective, several other practical communication improvements are worth considering further. These include new hearing protector technologies and a simple but effective 'waveshape compressor' to improve speech dynamic range in communication systems. A final component of the project examined the issue of mining alerts and alarms, where significant advances in signal design tools have been made.

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Community research

Enhancing the performance of mine communication, warning and condition monitoring systems

PROJECT REPORT



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