

## Safety In Mines Research Advisory Committee Project Summary:

<b>Project Title:</b>	Quantification of noise sources in mechanical board and pillar coal mining COL 714		
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<b>Report Date:</b>	31 May 2001	<b>Related Projects:</b>	GEN420
<b>Category:</b>	Coal	<b>Applied Research</b>	

### Summary

*Research Enterprises at University of Pretoria* was commissioned to provide industry with a consistent set of noise data, based on a common measurement protocol, on representative continuous miners, roadheaders and load haul dumpers.

Measurements were conducted and documented in accordance with a test protocol based on procedures outlined in GEN420 in accordance with BS 7025. A total of ten machines were tested on surface. To gain improved understanding of the differences between on surface and underground noise levels, another five tests were conducted underground.

From the tests it may be concluded that generally the noise levels on continuous miners are very high. In one case 115 dB(A) was recorded. The conveyor chain seems to be the major offender in terms of noise generation on continuous miners. This is particularly so on surface. Once the machine is at the coalface, it seems as if the conveyor chain noise may be significantly dampened by the presence of coal on the chain. Under these circumstances the scrubber contribution becomes comparatively more important, and it seems as if most of the development effort should be focused on these two components.

In one case very significant attenuation of conveyor chain noise was accomplished underground, even though the chain was not covered with coal. This should be investigated further to establish the consistency of these results and to identify the mechanism involved in the attenuation, so that it may be exploited in other cases.

Another contributor to the noise is the cutting process itself. There seems to be enough evidence that – although there are some conflicting results – this mechanism is less important than the conveyor chain and scrubber mechanisms.

Hydraulic noise is the least important of the noise generating mechanisms.

In order to reduce continuous miner noise levels, it is clear that immediate efforts will have to be focused on conveyor chain and scrubber development. Noise reductions of the order of 10 dB needs to be obtained. Such reductions are very significant and will require fundamental redesign of the components involved. These changes will compromise the performance and productivity of these systems.

Noise levels caused by load haul dumpers are lower than for continuous miners (bearing in mind that load haul dumpers were only tested under maximum engine speed but no load conditions), but still high. Engine noise must be attenuated.

Because of performance, productivity and cost implications, the changes required to reduce noise levels will never be implemented spontaneously, and firm targets and associated penalties for not attaining these targets will need to be introduced to provide the impetus required to make real progress in this regard. Procedures to test for conformance will also have to be laid down.

Once these targets are set, individual manufacturers of conveyor chains and scrubber fans will be forced to critically consider their designs and improve or optimise these designs. This will prompt more detailed experimental investigations. It is believed that the present work will provide a very useful basis for such investigations as well as for the setting of conformance tests.