

**Mine Health and Safety Council Research  
Project SIM 150202**

<b>Project Title:</b>	<b><i>Designing a feasible methodology for selecting permanent areal support for varying environments in underground mines</i></b>
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<b>Report Date:</b>	November 2016	<b>Related Projects:</b>	None listed
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<b>Category:</b>	Safety in Mining	<b>Applied Research:</b>	Yes
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**Summary:**

<p><b>Background of the Study</b> The study stemmed from a knowledge gap, namely the absence of a structured engineering approach in selecting permanent areal support in undergrounds mines.</p> <p><b>Objectives of the Study</b> The objectives of this study were to develop a methodology to guide the selection of permanent areal support (for varying environments) in undergrounds mines.</p> <p><b>Methodology</b> The approach used to undertake the study was multi-faceted. Support assessments on a number of mines were undertaken, combined with participation and inputs from a number of organisations and complimented with a literature review of material in national and international publications.</p> <p><b>Results of the study</b> In assessing different mining environments i.e. high stress (dynamic) and low stress, jointed (static) environments, various support systems were evaluated for their load bearing capacity (i.e. support performance), practicality and installed cost. A Support Assessment Tool and guideline booklet were developed to guide the selection of permanent areal support for varying environments. The Tool is not prescriptive; rather, it relates elements for specific mining conditions to be taken into account.</p> <p><b>Conclusions:</b> A Support Assessment Tool and guideline booklet were developed for a structured approach in selecting areal support for underground mines. It is envisioned that the transfer of knowledge from the research outcomes to industry at large, will enable mining operations to implement appropriate strategies for reducing rockfalls and associated fatalities in South African underground mines.</p>	<p><b>Acknowledgements:</b> The research agency would like to thank the following institutions and persons for their valuable contributions during the research project: The Mine Health and Safety Council (MHSC) for sponsoring the research; the mines and rock engineering personnel that contributed their technical documents, data, knowledge, insights and availability during the site visits and interviews through the course of the project - Harmony Gold Mines (Bambanani); Northam Platinum Mines (Booysendal); Sibanye Gold Mines (Kloof 4 Shaft); AngloGold Ashanti (Tau Tona); ARM – Impala Platinum Mines (Two Rivers Platinum); Anglo Platinum Mines (Tumela Mine and Dishaba Mine); and Lonmin Platinum Mines (Karee 3 Shaft); the academic personnel at the University of Pretoria for hosting the workshops for the research project, at their Virtual Reality (VR) Centre and Geobruigg Southern Africa (Pty) Ltd for facilitating site visits as well as providing technical product information.</p> <p><b>Recommendation:</b> It is recommended that training of mine personnel be carried out in order to transfer the knowledge gained from the study. Training will comprise practical instruction on how to navigate the Support Assessment Tool.</p>
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**Figure 1. Net retaining broken hanging without rock bolts (in-stope steel rope netting without tendons, Deep level mining in high stress)**