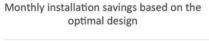
Economic benefits of the investigation

With the standard mine support design, the Andre Se Resin Anchor calculation indicated that the mine is wasting resin and losing R12.61 per support hole. The optimal design recommended by the authors will provide the mine with an efficient support system with a loss of only R1.20 per support hole, thus saving R11.41 per hole. This is a huge reduction in costs considering that the design is till efficient and providing full security. A total of 5 021 rockbolts were installed in the last quarter of 2015 (Table I in the paper). With a cost reduction of R11.41 per support hole, the mine could have saved R57 289.61, sufficient for the installation of 47 741 more rockbolts.

Figure 8 shows the total amount that could have been saved per month based on Table I and the reduction of R11.41 per support hole, as a result of the optimal design. Furthermore, addressing the design and operational inefficiencies will also result in a decrease in number of rockbolts that are installed incorrectly at the mine. The costs associated with the replacement of incorrectly installed resin-grouted rockbolts will thus be reduced significantly.

Conclusions

Decreasing the design diameter of the support holes from 32 mm to 30.5 mm, supplemented by a decrease in design length from 2.4 m to 2.36 m, result in an optimal support de-



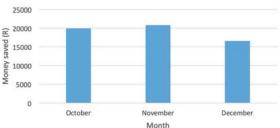


Figure 8—Monthly installation savings based on the proposed optimal support design

sign and a reduction of money wasted per support hole from R12.61 to R1.20.

➤ The standard mine support design should be optimized by reducing the diameter of the drill bit from 32 mm to 30.5 mm and reducing the length of the support hole from 2.4 m to 2.36 m. These changes will enable the mine to use different combinations of resin capsules to reduce the cost of installation per support hole.

The paper was first published in the April 2017 issue of the SAIMM *Journal* and a reader requested clarification of a particular issue.

Johannesburg and its Holey Mining Heritage

ohannesburg is probably unique in the world, in that it is now a major city that developed on and around the gold reefs discovered in 1886. Today these mined reefs run directly through the CBD and adjacent areas. It is probable that very few residents of the city know that they cross old mine workings on a daily basis, and that there are stopes of these old mine workings that are still open below surface. Surface development was not permitted in the region of the outcrops and shallow mining, and these open areas, close to the city and industry, have resulted in areas on which informal settlements have developed over the past two decades. Although most of the old mine openings were closed when mining ceased, the quality of the closure was often inadequate, and over time many holes into the old mine workings have appeared on surface. These can be a significant hazard to residents of the informal settlements, which prompted a recent investigation of old mine openings in the Johannesburg and Central Witwatersrand area. In this investigation 244 mine openings were located, and 80 of the more hazardous openings were subsequently sealed. This investigation provided a large source of information, which is considered to be of significant historical value. To document this valuable historical information regarding the city of Johannesburg and the Central Witwatersrand area, the Southern African Institute of Mining and Metallurgy is planning a special publication (book). In addition to details of the investigation and sealing project, additional material will be included, describing cases of stabilisation of mine workings that have taken place in past years to facilitate surface development. One such example is the Standard Bank building to the east of Simmonds Street and south of Frederick Street. Details are available of the investigation of the mine workings for this site, and the foundation stabilisation work carried out. This was the first major building to be developed across the mining outcrops, and Standard Bank must take great credit for proceeding with this project 30 years ago. The experience gained from this pioneering project subsequently facilitated the development of adjacent major buildings. It is planned that descriptions of these other developments will also be included in the publication, as well as historical information associated with other cases of instability and sealing of mine openings. The book will preserve some of the unique mining heritage associated with Johannesburg's past, and make a significant contribution regarding this aspect of the history of a holey City.

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