SANCOT and SAIMM

In February, I had the pleasure of participating in two notable events organized by the SAIMM and SANCOT: the Herrenknecht Seminar, which focused on 'New Developments in Mechanized Tunnelling and Shaft Sinking for the Civil and Mining Industries' held in Johannesburg, and the SANCOT-ITA Workshop that delved into 'Technical and Legal Aspects of Underground Construction, Operational and Mine Accident and Fire Risk' in Cape Town.

Many of you might already know that SANCOT (South African National Council on Tunnelling) has been operating as a special interest group within the SAIMM since 2003. https://www.saimm.co.za/about-saimm/saimm-committees/south-african-national-council-on-tunnelling-sancot

However, SANCOT's roots extend much further back. Established in 1973, SANCOT became a founding member nation of the International Tunnelling Association and Underground Space Association (ITA) just a year later, in 1974. https://www.saimm.co.za/news/313-sancot-and-the-international-tunnelling-association-ita

Today, the ITA is an international non-governmental, non-profit organization with 79 member nations, incorporating both corporate and individual members. The organization is dedicated to promoting the use of underground spaces for the public good, the environment, and sustainable development. It also supports progress in the planning, design, construction, maintenance, and safety of tunnels and underground spaces. The partnership between SANCOT and the SAIMM is reciprocal, with the SAIMM Secretariat providing valuable administrative services and event management.

The primary focus of SANCOT and ITA lies in the realm of civil underground infrastructure, yet the parallels with tunnels and large excavations in mines are quite evident. The civil engineering sector's experience with the latest underground technologies is a rich source of knowledge. In particular, the area of mechanized tunnelling and boring has seen remarkable progress within civil engineering applications. Tunnel boring machines (TBMs) have become instrumental in the safe and rapid development of long tunnels for road and rail transport, water and sewage transfer, and many other applications. Historically, TBMs have seen limited use in mining; however, the industry is now considering the adoption of newer, compact, and more versatile TBMs.

A good example is Master Drilling's recent initiative to develop an exploration decline at Anglo American Platinum's Mogalakwena mine, employing its Mobile Tunnel Borer (MTB). The MTB is a horizontal cutting machine that incorporates a full-face cutter head with disc cutters, a concept borrowed from traditional TBMs. This innovative machine is designed for functionality in both inclines and declines and is capable of navigating around corners in access tunnels with a diameter of 5.5 m. It has front and tail shields to temporarily support the rock, protecting operators and the specialized equipment. The integrated bolter rig can install a pattern of 1.8 m long resin rebar bolts. Ground conditions are better with less support, due to the circular tunnel profile and absence of blast damage.

https://sanire.co.za/documents/symposium-presentations/symposium-2022/day-1/session-2/882-support-design-for-two-tunnels-at-anglo-platinum-mogalakwena-sandsloot-exploration-28-july-2022/file

https://im-mining.com/2021/08/31/master-drillings-mobile-tunnel-borer-heads-anglos-mogalakwena-mine/

President's Corner *(continued)*

In mining operations, raise boring is a common technique used for excavating vertical shafts and orepasses. However, its application is limited to scenarios where the rock mass is stable and competent throughout the entire length of the excavation because support can only be installed once boring is completed. Addressing this limitation, manufacturers of TBMs have engineered shaft boring machines that have the dual capability of boring while concurrently installing the necessary support. Construction of orepass and ventilation raises could also be carried out with boxhole boring machines (BBRs) to create a pilot hole and boxhole backreaming machines (BBMs) to enlarge to the final diameter. A lining can be installed concurrently during the back reaming process to provide early support in challenging ground conditions.

At the Herrenknecht seminar, the talks covered a range of topics, including selection criteria for TBMs in varying rock mass conditions, innovative technologies for the excavation of vertical shafts, BBR and BBM technology, TBMs for the development of spiral ramps and horizontal infrastructure, pipe laying technology and its potential application in mining, and reef boring trials for narrow tabular orebodies. Reference projects were included where this new technology has been applied. An informative discussion panel on 'Innovation in Mechanized Excavation' provided some additional insights.

Mechanized tunnelling machines represent a significant advancement, yet broader adoption will take time. Adaptions will be necessary to tailor these machines for specific mining purposes. They demand a substantial initial investment and skilled personnel for operation and maintenance. However, these costs could be balanced by enhanced safety measures, accelerated development, and earlier access to reef. Mechanized boring of narrow tabular reefs is intriguing, since it will be much safer, and potentially more productive, but it will take even longer to develop the new mining methods that utilize this equipment.

At the SANCOT-ITA workshop, a variety of engaging presentations were delivered, addressing an array of subjects, including the state of technology for mechanized shaft and tunnel development in hard rock, fire safety in underground facilities, lessons learnt from a challenging rescue after a tunnel collapse, transferring essential skills from the tunnelling industry to the mining industry, contract management, and geotechnical aspects.

The next SANCOT Symposium will take place during October 2024, and I look forward to seeing you there.

W.C. Joughin
President, SAIMM