

# MINING

## REVIEW AFRICA

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UNITED MINING SERVICES

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EXCELLENCE  
FOR MODERN  
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“Mining needs diverse skills, and women have a place in all of them.”

Raksha Naidoo, Chairperson: WiMSA

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**Council for Geoscience**

# Water engineering for modern mining

## Bridging mining with sustainability

Water engineers play a crucial role in the modern mining industry. Their work bridges the demands of supply, mine process, operations and tailings management with safe surface water management that promotes environmental sustainability and community well-being. **ROBERT GREYLING**, technical director of water at **Knight Piesold Southern Africa** elaborates.



**M**ines consume, store and dispose of significant volumes of water through their processes.

As regulatory frameworks evolve, environmental regulations tighten and expectations for sustainable operations grow, many water-related challenges on mines require the specialised skills of professional water engineers.

Involvement should span the full project development cycle, from mine planning, operation and management of water systems to closure, remediation and site rehabilitation. Early involvement ensures that water management infrastructure component requirements, which are often poorly defined at planning stage, are appropriately sized from the onset, so that realistic execution timeframes and budgetary allocations are made. This avoids reactive design, improves the efficiency of operations, ensures compliance to regulations and ultimately reduces the environmental impacts caused by mines.

### Mining's specific water needs

The mining sector offers significant opportunity for water engineers to develop technical expertise and gain appreciation for practicality during implementation. Each mine and project site is unique, requiring bespoke engineered solutions. Designs are made in accordance with national and international standards, guidelines and regulations such as the Global Industry Standard on Tailings Management, Canadian Dam Association, (International Commission on Large Dams) ICOLD Bulletin 194, SANS 10286 and Dam Safety Regulations.

Tasks comprising a water engineer's function on a mine include the following:

- Stream and river diversions
- Water abstraction and treatment
- Desalination, storm rainfall and runoff assessments
- Clean and dirty water separation systems
- Water balances, pollution control dams, sedimentation ponds, barrier/lining design, raw water dam design and slope stability

In some cases, where mines operate in remote locations with rivers flowing nearby, unique opportunities exist to contribute towards the design and implementation of run-of-river hydropower stations that can provide renewable energy to support both the mine operations and promote growth opportunities for communities. Apart from economic benefits, these hydropower plants can play an important role in limiting greenhouse gas releases, protecting ecosystems and sustaining communities long after mining operations have ceased.

Throughout project involvement, exposure to several other technical specialists, stakeholders, project managers and investors that form part of a multi-disciplinary mine implementation team is assured. Teams comprising specialised geotechnical tailings engineers, mechanical and electrical, process engineers and environmental practitioners collaborate on projects. This creates a space to hone and attain additional skillsets through knowledge sharing during solution planning and application of advanced technologies. Collectively, these specialists drive change in the industry to find new ways of operating more efficiently, sustainably and responsibly.

As resource efficiency and environmental accountability become increasingly important, so will the role of water engineers on mines develop to form part of the forefront specialists advancing mining innovation and responsibility. **MRA**

