

## **GEOTECHNICAL TRAVELS ACROSS AFRICA**

Despite the current global economic downturn, our team of young geotechnical engineers at ARQ Consulting Engineers have been provided with numerous opportunities over the past year to enhance and develop our skills across the African continent. Despite having been involved in projects throughout all nine provinces of South Africa this year, ventures beyond our national borders have seen ARQ's geotechnical department getting involved in projects in neighbouring countries such as Lesotho, Swaziland and Namibia, as well as further afield in the DRC, Tanzania and Kenya.

Geotechnical engineers require a wide variety of skills and, in general, need to be more flexible in their approach than other engineering disciplines. Whereas most engineers have the freedom to specify the materials they use, geotechnical engineers have no choice but to work with the natural soil and rock available on site, or in the nearby vicinity. For this reason, it is essential that a detailed geotechnical investigation be conducted before design and construction can begin, so that the exact properties of the materials can be obtained.

A benefit of working in countries outside your own is that you get to team up with and work alongside local firms in those countries, as well as international firms from other countries also involved in the project. This is important because it provides you with a different approach to conducting business and a unique understanding into different operating environments. This opportunity to expose yourself to outside influences essentially enhances your abilities as a young geotechnical engineer.



Figure 1: Williamson Diamond Mine Site with the Baobab tree, Tanzania



Figure 2: Base Resources Titanium Mine Dam Site, Kenya

It is also important to familiarise yourself with the laws and legislation, as well as being aware of any social and environmental concerns, of the country you are operating in. A uranium mine in western Namibia was to be developed in a National Park where an ecologically sensitive area required special consideration during the investigation phase, as well as affecting the general plant and operations layout. A titanium mine in southern Kenya was to be developed on tribal lands, and developers had to be sensitive to the concerns of the local people and minimise their impact as far as possible. A rather unique project at a diamond mine in northern Tanzania involved a large, sacred baobab tree in which the entire process plant had to be designed and built around it.



Figure 3: Husab Uranium Mine Site, Namibia



Figure 4: Kamoto Copper Mine Process Plant, DRC

Opportunities, unique to the different countries themselves, are also available in other countries that you would not necessarily be exposed to in your own country. A copper and cobalt mine in southern DRC, located on the largest and richest ore body in the world, uses large quantities of sulphuric acid during the extraction and refinement of the ore. This acid would lead to exceptionally high corrosive soils that would aggressively attack any structures founded in them. A unique design approach, combining sufficient containment of this acid using special linings with adequate prevention of excessive acid-spill, has been proposed to deal with this condition.

It is these opportunities and skills that can be obtained from operating in an environment that differs from what you are used to, that would lead me to highly recommend that when opportunities to work in other countries arise, that you make the most of them.

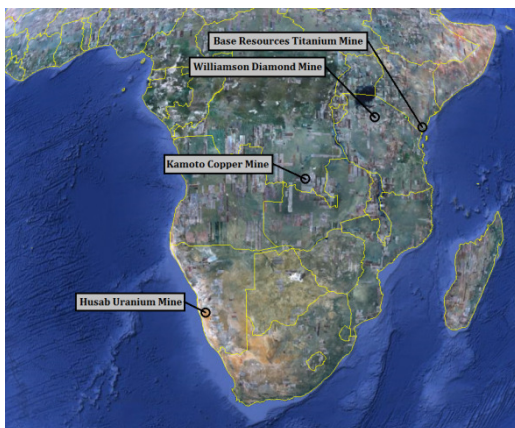


Figure 5: Location of these projects in Africa