

# Leica Geosystems **TruStory**

## Keeping a vigilant eye



**Newmont's Ahafo South Mine lies within the Sefwi Volcanic Belt, one of Ghana's largest volcanic belts. These active regions contain a wealth of mineral deposits, such as gold, but are also cause for a great deal of concern amongst mining corporations and employees. A gold mine's steep walls are very fragile and in constant motion. Continuous, extensive monitoring by geotechnical engineers must be done in order to keep open pit miners safe from falling rocks or collapsing walls.**

**One of the world's leading gold producers, Newport Mining Corporation, selected Leica GeoMoS monitoring solution due to the software's proven track record. The Ahafo mine is equipped with this industry-leading software to provide monitoring professionals with real-time, actionable information and keep mining**

### **responsible and safe.**

In business since 1921, Newmont operates mines in seven countries across seven continents. They acquired two mining properties in Ghana in the mid-1970s, Akyem and Ahafo, which quickly became major new gold mines for Newmont. With the Newmont Ghana mines, the company generated more than \$464 million in economic value for its stakeholders in 2015 alone.

The Ahafo Mine has been a challenge for Newmont over the few past years. The western part of the mine is characterised by a weaker rock material called graphite, which can cause stability issues when coupled with volcanic belt movement. Falling rock accidents were occurring and stability was becoming an issue.

In January 2016, a team of experts were employed to implement the GeoMos monitoring solution at the Ahafo mine. This new solution makes necessary round-the-clock measurement

observations of the mine pit walls in real time. Any fast movements occurring on the walls will be immediately detected and used to predict and prevent wall failures. This in turn saves the loss of equipment and, most importantly, protects the lives of Newmont employees on location in the pit.

### **10 years – a world of difference**

Commercial mining began at Ahafo back in 2006. Monitoring the stability of this 2100 x 450 x 120 metre pit was carried out manually by surveyors. Back then, they would periodically measure sets of prism targets installed on the mine's slopes, using manual Leica Geosystems total stations, such as the Leica TS11, and a software program located back in the office.

Deformation movement is determined by comparing sets of measurements. Ten years ago, data was collected manually once a day then brought



to geotechnical engineers to analyse based on comparisons with subsequent measurement sets. The entire process was very time consuming. Surveyors could also only take measurements during the day, dividing them in shifts. With too few skilled personnel and not enough data, the incidents at the mine continued to occur. The company decided to increase the monitoring of the steep slopes to five times a day. This brought about the upgrade from manual to automated monitoring equipment, such as Leica Geosystems robotic total stations TS15, TCRP 1201 and TCRA 1203 that automatically monitored the 30 prisms installed throughout the mine.

“All of these instruments live up to their reputation for being extremely robust and precise instruments. Newmont is convinced there’s no better accuracy or durability on the geodetic market,” says Nana Yaw Quayson from technical services and support at PDSA Ltd, author-ised service partner of Leica Geosystems.

#### **Investing in the best for maximum return**

Newmont opted for the new Leica MS60 MultiStation, which could scan critical slope surfaces in 3D point clouds and is capable of collecting data without having to access targeted locations to install prisms. Such inaccessible or dangerous monitoring points are scattered throughout the pit and are now easily monitored. Maximum deformation volume results are

delivered in these 3D point clouds, with each of the thousands of points within them being a highly precise measurement.

“The Leica MS60 not only recorded displacements in GeoMoS by collecting 3D scans, it also proved very helpful by scanning the volume of materials moved from the pit,” says Michael Muri, geotechnical engineer at the Newmont Ahafo Mine.

After considering several monitoring programs, the GeoMoS software was selected. It was the first automated monitoring system installed for a customer in Ghana by PDSA and Nana was part of the team who implemented it.

The solution consists of the Nova MS60 MultiStation, a digital terrain model (DTM) Meteo sensor for measuring atmospheric variations in temperature and air pressure, and a Netmodule Industrial WLAN Router for communicating between equipment and sending collected data. All of this is powered by a 12V solar panel power supply.

Leica GeoMoS Monitor and Leica GeoMoS Analyser software is used to monitor the mines.

All of this was set up in a shed close to the mine pit built specifically to protect the equipment. Once the instruments were configured, Nana and the team went back to the office, quickly installed GeoMoS and monitoring could begin.

#### **Worth its weight in gold**

Newmont uses the industry-leading GeoMoS monitoring solution at various other mine sites worldwide. Within the company, the software performance record is considered exceptional by monitoring professionals across the globe.

GeoMoS connects to the MS60, via a router, to collect data. It then stores and streams this data using a SQL database. The Meteo sensor, installed close to the monitoring station, measures any environmental changes, such as temperature and pressure, to correct the measured slope distances taken by the MultiStation.

The streamlined solution tracks the many movements of the gold mines. The MS60 is able to scan critical, inaccessible sections of the mine safely, without placing people or expensive equipment at risk. Using the reflectorless mode of the electronic distance meter (EDM), the MultiStation is able to measure with the highest accuracy possible, locking onto natural targets to detect deformation movements in areas of the mine’s surfaces where prisms have not yet been installed.

#### **Simpler workflows enable faster, more informed decisions**

All of this information is taken and processed by Leica Monitor, which provides monitoring professionals with understandable information instantly. Rapid movement below the earth’s surface can create instable walls and dangerous developments immediately.



Mining engineers and geologists use the results of this monitoring solution to understand the behaviour, condition and movement of a mine. If something moves, professionals using this software will know immediately. Detecting such movements around-the-clock also provides a continuous, long-term picture to form a better understanding of the pit's walls, which are continuously being chipped away at.

GeoMoS quickly processes and manages huge amounts of data collected by the total stations at the mine – reliably and around the clock. Because it is

completely automated, human errors have been significantly decreased. Wireless communication between the mine and office enables accessibility to data in real time. The analysis is also much easier for monitoring professionals to understand. Clear customised layouts of massive amounts of data enables engineers to react faster and make decisions quicker. “For Newmont, being able to provide their expensive heavy equipment a safe haven certainly saves them big. But most importantly, a safer working environment means providing employees more protection and saving lives,” concludes Nana.

**Leica Geosystems AG**

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- when it has to be **right**

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