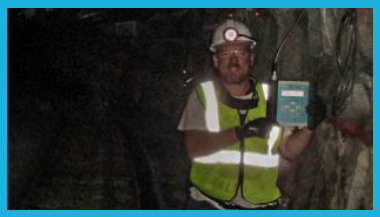
APPLICATION REPORT

COMPRESSED AIR IN A MINE

Mining

"Flexim's non-intrusive compressed air measuring technology allowed our customer to get a much better idea of where flow is and is not present. Furthermore, they can easily and rapidly identify leaks and unusually high consumers."



Werner Smit,
Sales Specialist, Actum Group,
South Africa

Measuring Task

Non-intrusive flow measurement of compressed air in a deep-level underground platinum mine

Compressed air systems are one of the most significant energy users on a mine, with a contribution of about 20 % to the total electrical energy consumption. The air is used to power tools, mainly the pneumatic rock drills. Surface compression facilities supply air to an underground network of pipes laid in the vertical and horizontal shafts. The air is typically provided from a DN 24" supply into 6" – 12" feeder pipes at around 90 psi. As various sections of the ore body are extracted, air supply is required in different shafts. The electricity costs associated with supply utilities are significant – in an underground platinum mine near Rustenburg in South Africa circa R350K (25K USD) per day.

Flow measurement is needed for the following objectives:

- Identify if there is flow in inactive areas, isolate the ring, and stop wastage.
- Identify high consumers in active areas. This may indicate equipment wear and therefore able to prioritize these for intervention.
- Identify leaks; it is estimated a punch hole caused by a nail can result in loss of R500K (36K USD) p.a. while open ends can be as much as R10 million per annum (715K USD).

- Supply data to compressed air simulation models.

The operators of the platinum mine were therefore looking for a suitable way to monitor the compressed air flows using measurement technology.

Solution

Actum Group, Flexim's sales partner for South Africa, mobilized a service team with a FLUXUS® G601 portable gas flowmeter to the mine. Significant time and operational savings were made in being able to clamp the meter on the pipe where measurements are needed, no time spent looking for suitable ports, that may be far away from the point. The transducers can be clamped onto the pipe and do not require lots of access space – a scarce commodity in a mine.

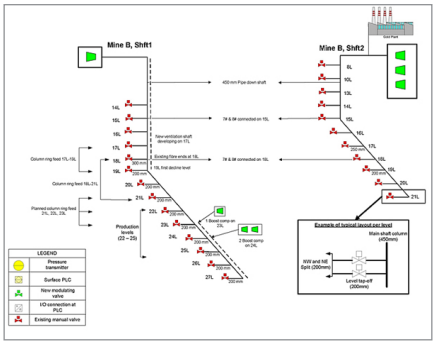
With the ultrasonic measuring system, it is now possible to monitor the air consumption of the machinery, useful especially in the early identification of maintenance requirements, which results in more up-time and better asset utilization. A typical week may require the measurement of 30 – 50 individual locations. Another advantage is that the non-intrusive measurement from the outside of the pipe is not affected by wetness in the gas which significantly decreases the accuracy of thermal mass meters.

Flexim's clamp-on flow meters are also ideal for use in optimizing the energy consumption of the compressors and permanent meters can be integrated to the control philosophy allowing a greater degree of automation. The demand on the system is dynamic depending on the primary activity:

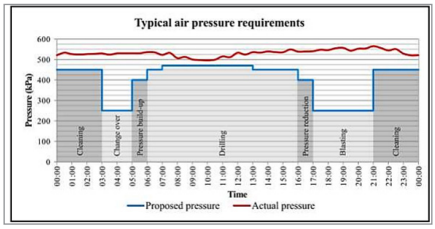
- Drilling – medium to high demand
- Blasting – low demand
- Loading and clearing – high demand

An accurate and reliable flow measurement with a high turndown is needed to cater to these fluctuations.

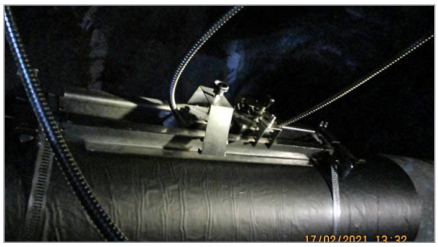
Flexim's non-intrusive gas flow meters are the ideal tool to help mines reduce the costs associated with compressed air supply networks and compressors. The data can be used for immediate interventions – closing off inactive loops as well as contributing to models used for long-term optimization. The energy savings also directly contribute to reducing green house gas emmisions and to mines meeting their ESG commitments.



Schematic of a typical mine compressed air network



Typical schedule of a gold mine's air pressure requirements



Temporary compressed air flow measuring point with the ultrasonic transducers clamped in Variofix P mounting onto the outside of the pipe. Important in this application: The use of damping mats, minimising signal noise.

Mark Middelhoven, Flexim's man for South Africa, proudly presenting measurement results.

A complete measuring system, compact in its rugged case: The portable and battery-powered FLUXUS© G601 with clamp-on ultrasonic transducers and all necessary accessories.

Measuring Points and Instrumentation

Pipelines	typically carbon steel, 6‘‘ – 24‘‘
Medium	Compressed air, pressure ~ 90 psi
Measuring Devices	1 portable clamp-on ultrasonic FLUXUS® G601 gas flowmeter 1 pair of clamp-on ultrasonic transducers type M (Lamb wave), installed in Variofix P transducer mounting

Advantages

- Can be used anywhere on the pipe network, no need for ports or connections
- Portable and easy to carry – no problems in elevators and lifts
- Low flow capabilites ideal for identifying leaks and losses
- Internal meter diagnostics for comfortable evaluation of measurement quality
- Onboard data storage and reporting software
- Maximum flexibility and versatility – can be used to measure other flows including water

For more information, visit
Emerson.com/Flexim

AN_202108_FLUXUS_US

FLEXIM

EMERSON