

Preconditioning – a tool to combat face bursts

Preconditioning, a method used to prevent face bursts (explosive releases of energy in the rock mass) has been used successfully at the West Wits operations, Mponeng (since 2000) and Savuka (since 2002). It is now standard practice at these two operations, and forms an important component of the falls of ground campaign.

Preconditioning involves drilling long holes of about 2.4 metres in length, and about 3 metres apart, in the stope face and detonating these ahead of the normal production holes. The explosive energy from the preconditioning holes mobilises existing stress fractures and creates additional fractures ahead of the stop face. This creates a zone of lower-stressed ground immediately ahead of the stope face and, while it does not necessarily reduce the likelihood of a seismic event, it mitigates its effects by acting as a cushion between the seismic event and the working place, preventing the face from bursting and the consequent risk of injury.

Preconditioning also provides a number of operational advantages, including improved face advance and drilling times, as well as the condition of the hangingwall – in effect, the roof of the working place. Drilling times improve because the immediate face is not as highly stressed as a face that is not preconditioned, allowing easier drill stem penetration. Hangingwall conditions improve because the stress fractures become more steeply dipping in relation to the face, and are therefore clamped more effectively by existing horizontal forces present in the hangingwall.

Preconditioning is used in operations which mine the Ventersdorp Contact Reef (VCR) as this is more prone to bursting than the Carbon Leader Reef, the other principal reef mined in the West Wits area, because of the inherent characteristics of the footwall and hangingwall. (VCR is unique because its immediate hangingwall is, unlike other reefs, not a quartzite but Ventersdorp lava.) In fact, no face burst has ever been experienced in the Carbon Reef.

Tau Lekoa is the only Vaal River operation to mine VCR, and, after recently experiencing face bursting in a specific area, management there has started using preconditioning on a limited basis. Results will be monitored and will determine the future of this programme.

