

AGC 3.0 – Minprovis brings AGC to Australia

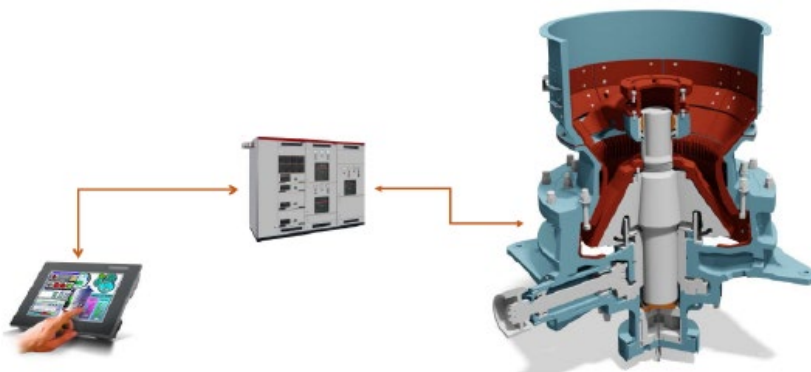
An innovative solution to control material size, shape and quality

We often think of plant feed as being homogeneous, uniform and well suited for steady state operation however in reality the normal day to day operations of a mineral processing circuit finds plant feed to be variable in size, shape and physical properties.

These variances are caused by numerous factors including mining in different pit areas, operating at different depths, upstream crusher performance, circuit screen efficiency and even current site weather conditions. Each variance can result in the crusher's feed material changing substantially. Crusher performance itself is also subject to change depending on liner condition and wear rates. It is evident that crusher performance (specifically crusher throughput and crusher product size distribution or PSD) can change rapidly and true steady state operation is seldom achieved for continuous periods.

What can be done to overcome this challenge?

To optimise crusher performance in real time, traditionally highly subjective manual crusher setting changes are made based on limited data usually gleaned from a visual observation of the crusher product on the belt or a rough evaluation of crusher power draw and hydraulic pressure. The outcome of this approach is mixed and provides no clear cut, quantifiable data to support any scientific decision-making process. The crusher's performance tends to be sub-optimal, and the throughput not homogenised.

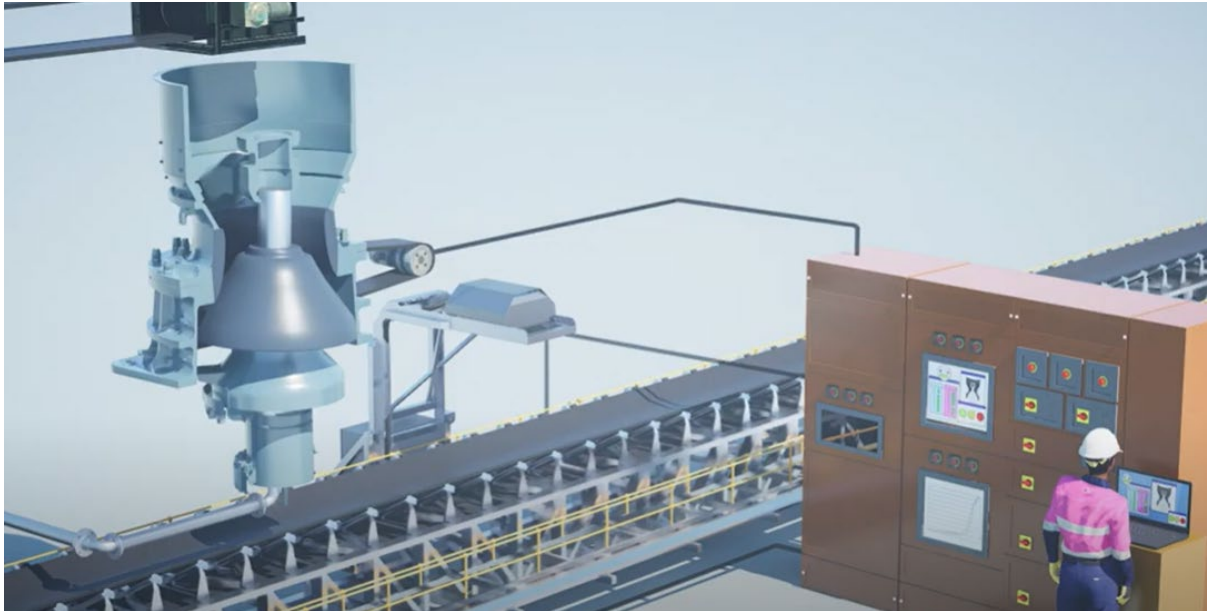


To resolve this issue, Minprovis have a system that automatically analyses the crusher product belt and provides documentable numerical data reflecting crusher performance based on current feed ore characteristics, enabling a real-time adjustment to ensure optimal production. The system requires no manual intervention and accommodates not only feed material property changes but also crusher liner wear profile variances.

Minprovis have assembled a Kawasaki ZI-2100 Cone Crusher in their Perth based workshop and connected it to the Active Gap Control (AGC) system for prospective clients to view without going to site. This system needs to react quickly to changes in the crusher circuit and prove its worth in terms of increased production quality and production rate, exactly why the AGC system was developed. In-house tests using the ZI-2100 cone crusher and the AGC system lived up to expectation and was able to modify crusher operating parameters in all cases resulting in an optimal, steady state operation.

What does the Minprovis Active Gap Control System look like?

The system, as per the schematic, uses an advanced particle size analysis camera to accurately assess crusher product size distribution and production rate on a continuous basis. Using this information, changes to the crusher settings are made. When coupled with a Kawasaki ZI Cone crusher, these changes can be made on-the-fly, meaning no reduction in feed rate nor stopping of the upstream circuit equipment required in order to affect the required gap setting change.



The system ensures that the optimal PSD is always achieved and overcomes circuit instability brought about by:

- Feed material property changes
- Feed material moisture content variances
- Crusher Liner wear profile
- Upstream crusher performance variances
- Upstream and closed-circuit downstream screen efficiency changes

What does that mean for your operation?

Ensuring optimal crusher size distribution has multiple benefits to the overall operation. These may vary based on the exact operating conditions and circuit layout but general benefits include:

- Improved liner wear profile and achievable life
Since the AGC system always ensures the crusher is operating within its ideal design gap setting, crushing chamber wear profiles can be improved and the problems associated with poor crusher wear profiles (hollowing of the mantle or bowl liner) avoided.
- Downstream efficiency improvements
Since the performance of downstream equipment is heavily dependent on it receiving the ideal feed size distribution from the upstream crusher, large improvements can be made when screens and size classification equipment run within well controlled operating parameters.

- Overall Product Quality and Throughput increases
Since “design” crusher gap settings are selected to maximise plant performance, for example generation of lump vs. fines in iron ore, or liberation of high value minerals, by monitoring and ensuring operation at the ideal crusher setting, the overall product quality is likely to increase. Additionally, since the AGC circuit design limits recirculating loads by operating at the optimal crusher settings, material is crushed to the right size the first time, preventing multiple passes through the circuit. This increases achievable plant capacity while reducing circuit OPEX costs due to recirculation inefficiencies.

How to see AGC in action?

Click here to see a unique animation of the AGC system in use. You can also see the Kawasaki ZI-2100 Cone Crusher and the AGC in action at Minprovis in Welshpool, WA where it is on show in their substantial workshop. <https://www.youtube.com/watch?v=Ct6Yy0i3buw>.

Contact John Minnaar or Chris Hartman at Minprovis to discuss, the unique requirements of your application and develop a crushing solution that is able to meet and surpass your comminution targets. Turn your plant feed into a homogeneous, uniform and optimised steady state operation.