MAPTEK™ Vulcan™

Vulcan block models optimise blending

Maptek™ Vulcan™ helped Titan Roanoke produce low alkali cement, reducing waste while complying with stringent new emissions regulations.

The Titan America Roanoke Cement Company in Troutville, Virginia operates an open pit quarry specialising in limestone and shale production. Cement products are distributed to regional construction industries.

Since 2011, Titan Roanoke has focused on reducing waste from stripping, and at the same time producing low alkali cement for customers.

Low alkali cements are Portland cements with a total content of alkalis not above 0.6%. This is particularly beneficial where concrete is at risk of deterioration, for example when in contact with soil, groundwater or seawater.

Low alkali cement is also recommended when reactive aggregates are used to reduce the effect of alkali-silica reaction which can result in expansion leading to cracking.

Challenge

Recently proposed EPA regulations in the USA will require cement companies to drastically reduce sulphur emissions.

Seeking a way to better control these emissions, Titan Roanoke began using Maptek™ Vulcan™ to generate block models to identify concentrations of SO_3 gas in the host rocks.

Vulcan block models allowed Titan Roanoke to pinpoint seams of rock with different chemical compositions which could be mixed to achieve the target chemistry of raw material stack for cement kilns.

Solution

Geological block models ensure the chemical composition for each block is well known before mining.

By blending material from different blocks mined, Titan Roanoke was able to reduce the alkali in the raw materials to 0.6%, and significantly reduce SO_2 emissions when the raw materials are burned in the cement kiln.

Results

In 2014, for the first time, Titan Roanoke was able to provide low alkali cement to meet customer requirements.
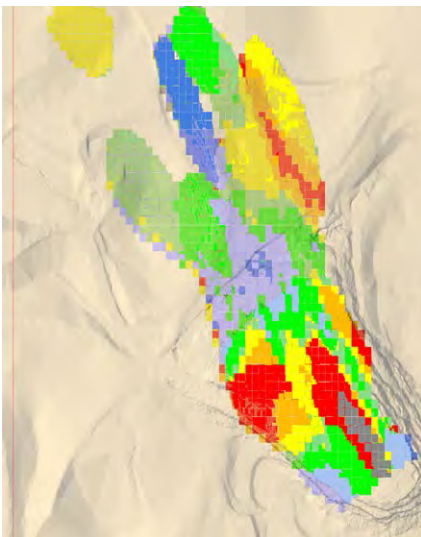
Vulcan block model defining geology in the quarry (above) and blocks by chemical characteristics guide mining to achieve optimum low alkali product (right)