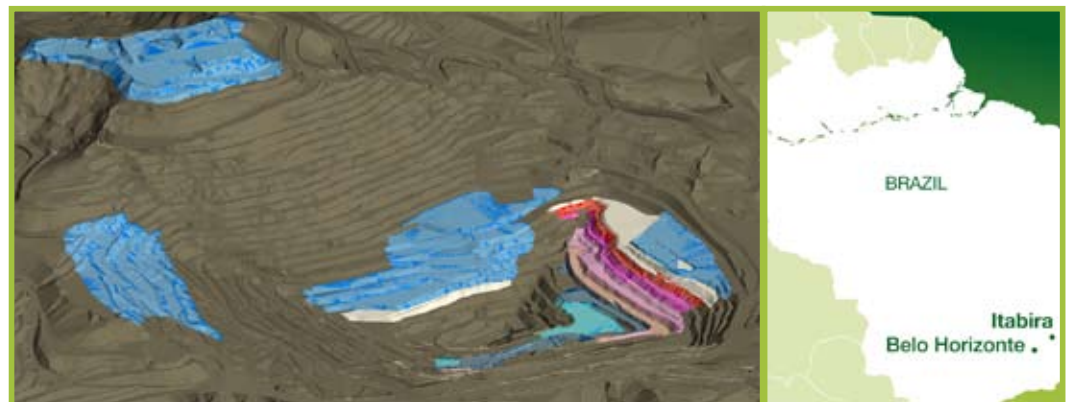


Vale schedules the Itabira operation with Maptek™ Chronos

Brazil is the world's largest iron ore exporter. The majority of this ore comes from two regions, the Serra dos Carajás in Para State in the north, and the Quadrilátero Ferrífero further south in Minas Gerais State.



Mine planning blocks displayed on screen, haematite (red) and itabirite (blue)

CARAJAS ORES

The Carajás ores are found within Archaean iron formations, while those in Minas Gerais are hosted by Palaeoproterozoic banded iron formations. The Itabira District is located 80 km to the northeast of Belo Horizonte in Minas Gerais.

The iron ores of the Itabira district occur both as hard, high grade haematite and as friable lower grade itabirites that must be upgraded. In addition the orebodies are mantled by detrital and lateritic material.

The haematite ores are interpreted to be due to hypogene enrichment of the itabirites, while the friable ores are the result of supergene leaching of silica and iron enrichment.

The Vale Company, created in 1942 and privatised in 1997, is the biggest diversified mining company in the Americas, with a presence in 13 Brazilian states and 5 continents, and operating 9,000 kilometres of railroad and 8 maritime terminals.

Vale is the world leader in the iron ore and pellet market, and the second largest producer of manganese and pig iron.

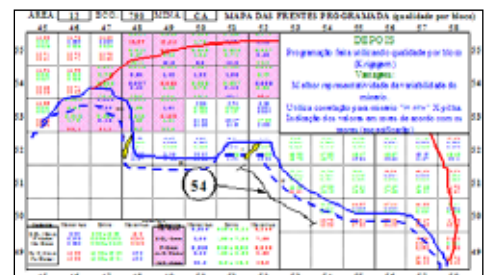
The Itabira district was the original home of Vale activities and involves several operations, principally Cauê and Conceição. Cauê has been in production since 1942; Conceição commenced operation in 1957.

Maptek has been involved with Vale projects since 1997 when Maptek Vulcan™ was introduced for drillhole database, advanced geological modelling and geostatistics.

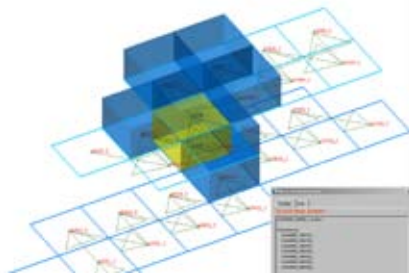
Vale's Itabira operation uses Maptek Chronos for daily and weekly blending schedules, evaluating the chemical quality and size requirements for the ore concentrator, and assigning loading equipment for mining iron ore.

The Chronos schedules help the miners adhere to the mine plan, and contribute to better utilisation of the mill facilities, by being able to track and control the formation of homogenised stockpiles and direct feed to the concentration plant.

Chronos allows Itabira to generate a variety of reports on the formation of homogenised stockpiles, as well as weekly and annual reports on the quality, and to perform statistical analysis, such as Standard Deviation, Superior Limit and Inferior Limit. Graphical visualisation facilitates tracking of stockpiles, and enhances studies of adherence and determination of correlation between insitu material and scheduled stockpiles.



A standard Chronos book of blocks can be printed as a guide for the excavation operators in the field.



Precedences are set using a lava script that indicates the mining direction between blocks and in between benches.

The rows highlighted in yellow represent constraint grade fields, to which the planners must pay specific attention.

LOOKING AHEAD

Future projects include implementation of Chronos for short-term mine planning at the Conceição Mine, concentrating on the following aspects:

- Destinations (Ore and Special Product Circuits, Waste Piles)
- Average Haulage Distance
- HE : IT and waste : ore ratios
- Equipment Productivity
- Participation by Area

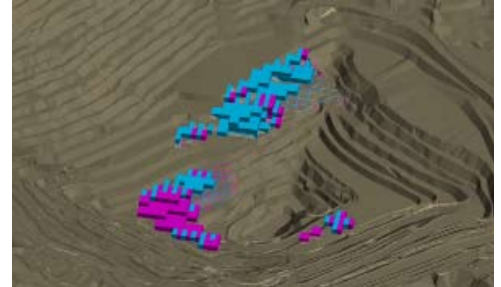
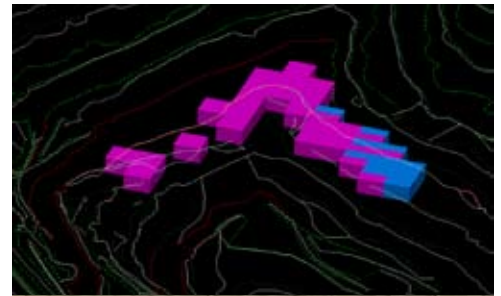
Stockpile reconciliation is conducted through statistical methods to determine new control limits. A graphical representation of the generated numbers can be created. All available geological information can be used along with topographical updates. Reports are dispatched to update the Vulcan Chronos database.

At Itabira, monthly mine planning solids were calculated with a CLava script in a 25m x 25m x 15m block model, with some blocks 12.5m x 12.5m x 6.5m.

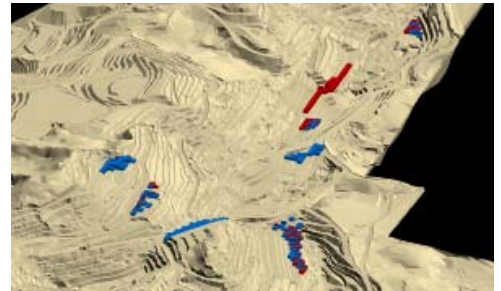
Thirty-five grade constraints are used to optimise 2 destinations simultaneously:
 CE (HE, IT) – Conceição
 CA (HE, IT) – Cauê

Each day of the Period Summary dynamic reports represents a haematite or itabirite stockpile, showing specific tonnage and quality.

A detailed visualisation can be generated with a horizontal geological section, current topography and solids representing the blocks scheduled in the monthly plan.



Printouts and Vulcan 3D visualisations aid the planners. Scheduled blocks are here shown as solids and outlined blocks represent those not scheduled.



Vulcan 3D mine plan showing scheduled blocks (red = haematite, blue = itabirite)