

**AES/RE/12-05 The Design and Development of CaveCad –
A State of the Art Integrated Cave Management
System**

March 2012 Matheus Jacob Mol

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The Design and Development of CaveCad

A State of the Art Integrated Cave Management System

By

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MSc THESIS

March 2012

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Abstract

This thesis describes and substantiates the design and development of CaveCad, a state of the art integrated cave management system. CaveCad is Rio Tinto proprietary software.

The scope of this project is to design, develop and implement an integrated cave management system for Rio Tinto Underground Technology Centre. A successful outcome will result in the implementation of CaveCad on all Rio Tinto caving operations.

The block caving mining method is being increasingly applied as a mass mining method used to exploit base metals and diamond resources. In block cave mining, geotechnical monitoring is fundamental to the successful management and operation of the mine. Current state of the art in monitoring, although innovative and useful, has lacked the collective integration of multiple systems from which collective information can be used to make unambiguous and timely decisions. This is the reason for the design, development and subsequent application of CaveCad.

In addition to the design and development process of CaveCad, this study includes background information on block caving and cave monitoring, data research on the relevant monitored data types and a comprehensive case study. It also includes software research into the different system components and the testing of the Geotech module, a GOCAD Mining Suite geotechnical plug-in. Finally, the first CaveCad module, which was released in December 2011, is fully described. The report concludes with a discussion, recommendations and a conclusion.

The database and system architecture comprising CaveCad has been successfully designed and developed. However, this thesis does not include the implementation phase as the first released version lacked essential functionality. The estimated release and site implementation date of the updated CaveCad module is March 2012.