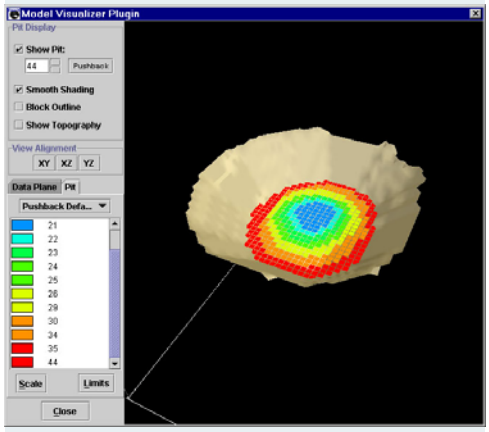
WHITTLE
Strategic Mine Planning

WHITTLE OVERVIEW

STRATEGIC MINE PLANNING TOOLS FOR ENGINEERS, GEOLOGISTS AND MINE PLANNERS

Whittle is the world's leading optimisation and analysis solution for use by engineers, geologists and mine planners. The system incorporates an extensive range of functions for designing ultimate pits and push-backs, for ore blending and scheduling, and for optimising stockpiles and cut-off strategies.



This system is designed to complement the skills of the designer, while still manage the volumes of data that are generated in the strategic planning process. Using the Proteus Environment®, Whittle provides a complete audit trail of the design process and also provides a unique means of communicating the details of the design amongst peers, and throughout the organisation.

Whittle not only provides the best environment for engineers to perform their work, but it also provides the best modelling and optimisation tools. In addition, the system's modular architecture allows users to choose the functions that are most important to them.

FOUNDATION

The *Foundation* module is the centrepiece of the Whittle product suite, provides easy access to essential planning tools for open cut mine planning. In addition, it provides a backbone upon which a growing range of more advanced modules can be added, thus expanding the range of mine planning analysis possibilities.

Foundation enables users to rapidly and easily import, manipulate and visualise resource models, build pit slope, operational and economic models and optimise the pit shapes. Users can run three types of life-of-mine schedules, including benchmark schedules, and graphically analyse the results. Within *Foundation* are two particularly important modules: Buffer Stockpiles and Discounted Pit Shells.

Buffer Stockpiles **-** The use of Buffer Stockpiles can be evaluated, taking into account re-handling costs, stockpile degradation, etc. If the Milawa module is present, it is able to optimise the use of the stockpiles.

Discounted Pit Shells **-** The Discounted Pit Shells module allows NPV value models to be generated for use in pit optimisation. Users can now use either discount by depth factors or discount by mining sequence to investigate alternative optimised pitshells.

WHITTLE MODULES

The growing range of Whittle modules includes:

Multi-Element **-** This extends the capabilities of Whittle to allow up to ten elements to be defined in the model. Individual elements are reported separately and the grades and quantities of each element are available for use in user-defined expressions, graphs and reports.

Mining Width **-** This adjusts pushbacks to allow for mining width constraints. The speed of the process, and its ability to be repeated, means that users can experiment with different mining widths to determine what economic impact they have. Because the process is contained within Whittle, the results can be quickly analysed and compared to other scenarios.

Milawa Algorithm® **-** This module schedules pushbacks in order to maximise NPV or to balance the mining rate. It responds to all production constraints, price and cost models within Whittle and also provides additional controls over the schedule.

Value Expressions - This add-on option allows for increased Representing a different set of assumptions. Whittle keeps track of all the data dependencies for you. You can build highly complex analysis models which can be viewed, accessed, and managed with ease.

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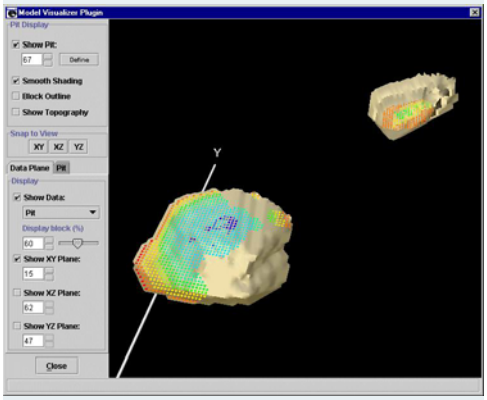
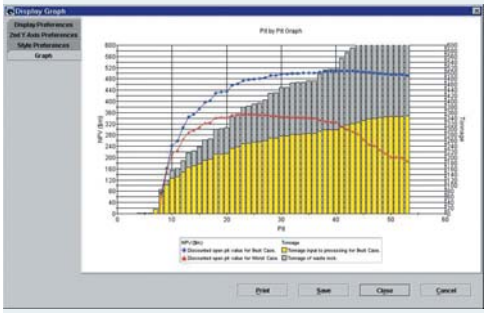
To find out more about how your operation can benefit from Whittle, contact us at info@gemcomsoftware.com, or visit our web site at www.whittle.ca.





Express NPV Output – Especially designed for users of the Express haul road optimisation package, this module creates a special file that allows haul road optimisation to proceed on the basis of maximisation of NPV, rather than cash value.

Pushback 50 – Intended for use by large, long-life mines, this module extends the capabilities of the Milawa Algorithm to allow up to 50 pushbacks to be scheduled.

Pushback Chooser - This module provides greater flexibility in the choice of pushbacks. An Auto-Expert approach to push-back choice, this adds more certainty to the process, and achieves better results much faster than manual methods.

Stockpile & cutoffs - Taking into account all the constraints and settings in Whittle, this module reschedules the mining sequence by optimising the stockpile utilisation and cutoff strategy.

Blending - This module allows blending constraints to be considered in the scheduling of the mine. This is especially useful for coal, iron ore, nickel laterite and any other mines for which ore blending is a requirement.

Multi-Analysis - This module significantly extends the capabilities of Whittle by allowing multiple imported models per project, and branching of the analysis trees thereafter. For example, you can attach several pit slope nodes to an imported model node, each representing a different set of assumptions. Whittle keeps track of all the data dependencies for you. You can build highly complex analysis models which can be viewed, accessed, and managed with ease.

Multi-Mine - Multi-Mine provides schedulers with the ability to choose material from multiple sources in pursuit of carrying out a crucial objective — maximising NPV. Companies that employ the Multi-Mine module will benefit from improved project values through more effective long-term scheduling of multi-mine operations.

The Multi-Mine module allows for the inclusion of multiple mines, all within a single block model. With this system, users will be able to perform a single optimisation over the whole framework, while maintaining individual work constraints for each mine.

Advanced Analysis - The Advanced Analysis module allows Whittle to perform very complex analyses. This is extremely useful to designers who are interested in extensively testing sensitivities and performing risk analysis. Features include the Whittle “Spider Diagram,” and the ability to generate hundreds of life-of-mine schedules by varying multiple input parameters in a single run.