

IDEAS

Steady-state solutions for mining operations



The challenge: You have multiple projects to design and implement—which process modeling tool do you choose?



The Solution: Measure. Simulate. And profit.

Imagine this scenario. You have multiple projects to design on three different continents, incorporating several new processes that you are being asked to evaluate and recommend. How can you make a recommendation if your modeling tool doesn't contain the process in question? How can you be sure that the model you create will accurately reflect the operation of the real plant? How can you ensure that the process you have labored to design will be built and started up, error free and with operators who understand it? You need IDEAS, a world-leader in simulation and process modeling for mining operations.

Benefits

- Powerful steady-state capabilities
- Ready-to-use unit operations, allowing users to simulate mining and processing operations
- Depth of personnel to support project throughout life cycle

Our tool

IDEAS is easy-to-use simulation software that has powerful steady-state capabilities. From truck and shovel and conveyor operations to thickeners and tailings, and everything in between, IDEAS includes all the unit operations to model your mining operation.

Our people

Unlike other mining simulation tools, IDEAS is supported by a large, multibillion dollar company that has the depth of personnel to support a project throughout its life cycle.

Our development staff includes Ph.Ds and technical experts who are continually expanding the capabilities of IDEAS to include new processes and features. In a world where process technology is constantly evolving, these experts make sure that IDEAS is up for the challenge.

Our team ensures that old models will open seamlessly with new versions of the software. Thus old models can be maintained for years at a minimal cost.

Our full-time customer support and training personnel provide outstanding technical support with quick turnaround time. We deliver IDEAS training in multiple languages

right at your plant site, no matter where it is in the world.

We also have a dedicated project support team consisting of dozens of simulation experts that can be mobilized to model any large mining project.

At ANDRITZ AUTOMATION we understand that simulation is a key enabling technology for your mining operation. We know that the major investment in simulation is not the tool itself—it's the time your company invests in supporting the tool, the time it takes for your people to learn the simulator.

The decisions that are made as a result of simulation have a broad financial impact, much greater than the cost of the tool itself. You have to be able to trust the long-term viability of the simulator—and the resource team that supports it.

That's what makes IDEAS the right choice. It's not just an "off-the-shelf" software package. When you invest in IDEAS, you get so much more than the tool. You get the support of a team that understands your industry. With your vision and our technology, the possibilities are limitless.

Success story

Client:

- BHP Billiton

Simulation objective:

- Process modeling

BHP Billiton is the world's largest diversified resources company, with over 40,000 employees working in more than 100 operations in 25 countries. As such, when it came to picking a simulation standard, BHP Billiton wanted the best solution available.

And that solution was IDEAS. After a rigorous nine-month evaluation process, BHP Billiton's Stainless Steel Material Group standardized on IDEAS steady-state modeling software from a field of eight competing packages.

One of the key reasons BHP Billiton chose IDEAS is because, in addition to the software's technical capabilities, it is backed by ANDRITZ, a company with the depth of personnel and resources to respond to BHP's current and future simulation needs.



"Adopting IDEAS was a big step for us, but we're glad we took it," said Tim Newton of Simulus and one of the members of the evaluation team that helped select IDEAS. "It [IDEAS] improved our efficiency and helped us do much more for our clients. We love the ease of duplicating and rearranging model components, the rapid solve times, and the great flexibility. The team at ANDRITZ has impressed us with their prompt technical support and ongoing development program."

Simulation is an important aspect of process engineering, which helps BHP Billiton develop process technology, improve operational performance and advance their world-class projects.

"I found IDEAS to be a great timesaver. In one job using a full plant model, I completed 32 case studies in a day, with very large feed rate changes. IDEAS was extremely forgiving and the model converged without problems. In other packages, this work might take perhaps a week. The seamless cut and paste ability in IDEAS has helped save a great amount of time when developing models. In my experience, this feature alone could halve the time required to develop a plant model."

Eric Roche, Mining Consultant
Australia

"The great advantage of the IDEAS model is ready duplication and rearranging of model components. It is also easily traceable and transparent, with no requirement for programming code. It is very fast to run; a 3-year simulation with 10-minute step size is complete within about 10 minutes."

Brett Muller
Simulus



The challenge: To design a process that you know will work before you commit capital

The solution: IDEAS™ steady-state simulation

IDEAS helps you create a “virtual plant,” in which process designs, modifications and retrofits can be fine-tuned and verified, in faster than real time, before you commit any capital costs.

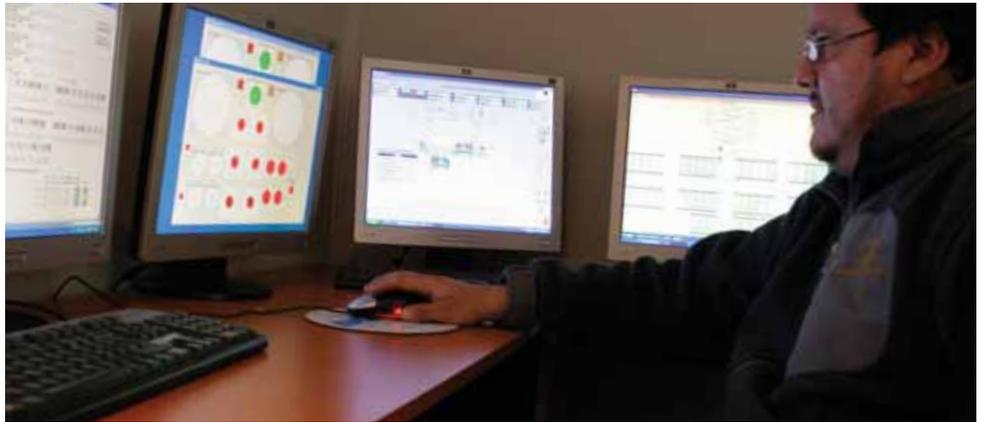
The modular structure of IDEAS means that you don't have to buy a full-performance, plant-wide package when you only need to simulate a small area. IDEAS can be customized by our process experts specifically for your industry, process and site.

IDEAS features a flexible and easily customized material database that contains the properties for components commonly used in the mineral industry.

IDEAS has the ability to perform steady-state mass and energy balances, track components, compounds and element flow and concentration, and handle particle size distributions.

“We love the cut and paste, and H-block capabilities. For the type of options study we're frequently involved in, we see IDEAS as being extremely useful for rapidly cutting out and replacing large areas of the process with different alternatives. Even large models have a tendency to converge from scratch, for the first time, quicker than we have come to accept as the norm.”

Hatch



IDEAS has been used successfully to model complex plants that include truck and shovel operations, conveying, crushing and grinding, flotation, high pressure acid leaching, heat recovery circuits, neutralization, countercurrent decantation (CCD), autoclaves, precipitation, filtration, separation, solvent extraction and electrowinning.

Easy-to-use graphical interface

IDEAS has an intuitive design and functionality. The copy-and-paste capabilities allow users to quickly cut and replace process areas to examine alternatives.

Speed of design

Within IDEAS there is the unlimited capability to create new objects from existing building blocks. This means that users can build new operations quickly, without programming, and can create their own fully customizable libraries. In addition, IDEAS has fast model convergence, enabling a user to simulate hundreds of case studies per day.

Global mass balance

IDEAS reports the overall elemental and component balance of your design. Because IDEAS is object-based, any errors in your assumptions are quickly identified right down

to the object level to achieve pinpoint analysis and correction.

Multiple scenario definition

IDEAS acts as a superior tool for “what-if?” analysis of mineral production and optimization. Multiple scenarios for input variables can be defined in an Excel spreadsheet. IDEAS will automatically execute all scenarios defined in the Excel spreadsheet and output mass and energy balance data for each scenario to other Excel spreadsheets. Steady-state models can link to operating costs, complex production logic, and discrete simulation of discontinuous events.

Material property component selection and manipulation

IDEAS provides every metallurgical compound that users would require to design a plant. For example, the industry-standard HSC database is accessible from IDEAS and contains over 30,000 components. IDEAS has teamed up with the world's best thermodynamic software providers such as Virtual Materials Group (VMG) and OLI Systems (OLI). Users can model rigorous multi-component Vapor Liquid Equilibria (VLE) in organic and aqueous solutions through the use of the IDEAS-OLI and IDEAS-VMG products.



Track elements, subcomponents and ions

IDEAS includes an Element Selector object that automatically generates a list of all elements in use throughout the worksheet. In addition, the user also has the option to track ions with valences (for example, Fe²⁺, Fe³⁺, etc.). IDEAS enables users to track 100 elements and 50 subcomponents/ions throughout the model.

Perform particle size distribution

IDEAS performs PSD calculations for an unlimited number of components throughout the entire process model.

Elemental flow monitoring

IDEAS allows users to monitor elemental concentrations, which are reported in wt%, g/L, or mole/L in any selected phase. Elemental concentration in g/L can be reported at either the stream temperature or a user-defined reference temperature.

Reaction design and manipulation

IDEAS includes an enhanced reaction interface in which the user can enter all reactions in a single window and easily manipulate them. IDEAS also has an auto-balancing feature to make sure reaction equations have been en-

tered correctly. For each reaction, a user can enter basis component selection, heat of reaction, and yield objectives. Reaction objectives may be specified in conversion, concentration units, and an equilibrium constant.

IDEAS also has the flexibility to define chemical reactions. Depending on user needs, process reactions can either be user-defined (for most process analyses) or performed separately by a first principles model (such as OLI or VMG).

Handles multiple processes in a single platform

IDEAS can model continuous, semi-continuous and discrete processes within the same platform. IDEAS has the unique ability to incorporate external code (in a computer language of your choice) into a model. This means that your investment in previously developed code is not wasted, but enhanced by IDEAS.

Full project life cycle capabilities

As the complexity of a project advances, steady-state models created in IDEAS can be converted to a dynamic environment to include detailed specifications and process control logic.

Benefits

- Easily create new objects from existing blocks
- Cut and paste entire process areas
- Achieve fast model convergence
- Perform global mass and energy balances
- Define multiple scenarios, with data output to Excel
- Access all metallurgical compounds required to design a plant
- Track elements, subcomponents and ions
- Define and track particle size distributions
- Monitor elemental concentrations
- Easily enter and manipulate reactions
- Model continuous, semi-continuous, and discrete processes
- Convert steady-state models to dynamic environment

The challenge: You've modeled the process —will the design apply to the actual operation?

The solution: IDEAS™ Simulation

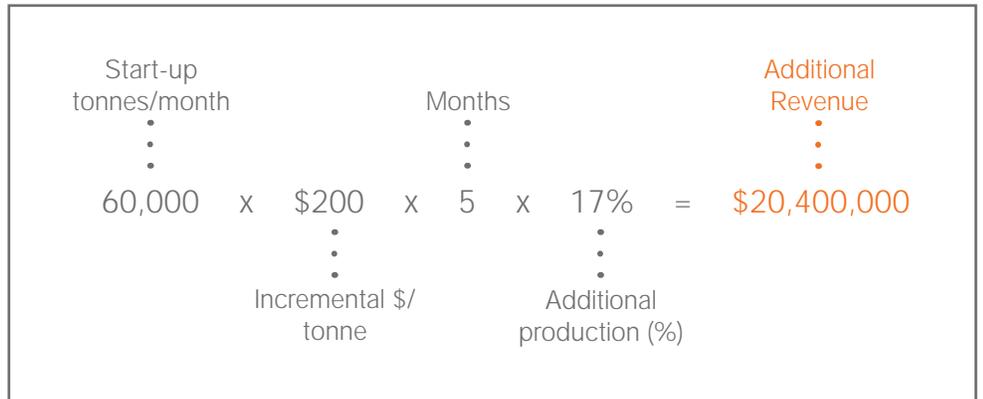
You've designed, tested, and verified your process. Now it's time to take that design and make it a reality. IDEAS is more than just a steady-state modeling tool. It enables users to convert steady-state models into a dynamic environment, allowing you to advance your project to the next phase while reducing risk to your people, resources, and investment.

Control logic (DCS) verification

IDEAS is an excellent tool for staging, testing, and validating control logic—identifying and correcting errors to help you achieve a faster and smoother start-up. In fact, studies have shown that using simulation to help with start-up can correct up to 82% of control logic problems before field implementation.

Advanced control verification

During the staging process, the IDEAS simulator can be used to test advanced process controllers, such as BrainWave®.



▲ Increase your revenue

Sample calculation, showing return on investment of simulation on start-up.

Operator training

IDEAS works much the same way as a flight simulator, providing your operators with realistic, hands-on training modules—reducing the risk to both themselves and your equipment. IDEAS can model any vendor equipment and is able to communicate with every DCS or PLC supplier, so that your operators train on the same graphics and logic that they will use in the actual plant. IDEAS can help train operators months before the actual plant is up and running. It helps produce better trained operators who will start up new pro-

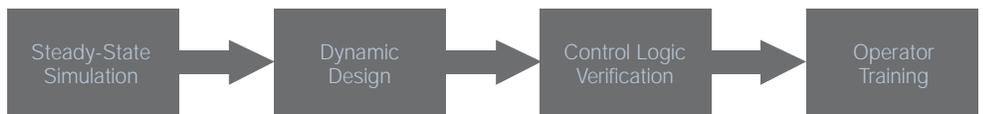
cesses faster, react more wisely to plant upsets, and be more productive.

Smooth start-up

IDEAS has helped mining operations worldwide achieve start-ups that are faster, smoother, safer—and more economical. Using IDEAS helps you improve production targets and your projected start-up schedule. In many cases, plants have realized a 200% increase in return on investment by implementing IDEAS.

Benefits

- Test and verify design concepts, quickly, and at low cost and risk
- Stage and test control logic to achieve faster start-up
- Train operators without risking their safety or plant equipment



Success story

Client:

- Beca AMEC

Simulation objective:

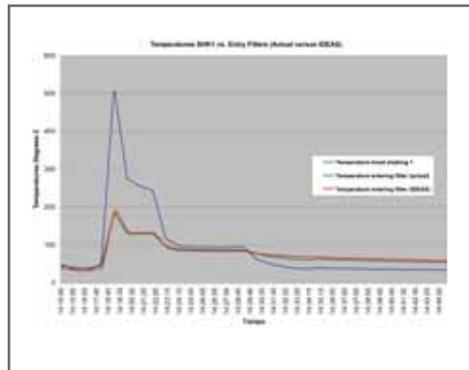
- Process modeling

When Beca AMEC was contracted to design a new off-gas system for a nickel smelter in New Caledonia, the designers decided to first model the system with IDEAS. The IDEAS model provided an incredibly accurate prediction of what was eventually measured in the installed system.

“Recently, we got a temperature profile sent from site with the new off-gas system, to compare to our design calculations using IDEAS — which showed remarkable agreement,” says Suzanne Hay, chemical engineer with Beca AMEC. “The blue line is the temperature profile entering the off-gas system, red is the prediction of temperature entering the baghouse using our IDEAS model and green the actual temperature entering the baghouse.”

The off-gas system was a novel design for the site because it involved extracting heat from the off-gas using duct length and ma-

▼ IDEAS process model.



terial, rather than some form of mechanical heat extraction.

This provided considerable cost savings for the smelter, but the client wanted the design checked thoroughly because it was so different to its existing off-gas systems. The temperature loss was critical to the success of the design because the gas needed to be down to a certain level at the inlet of the baghouse to protect the bags.

During the study phase, a model was built in IDEAS, incorporating as much data relevant to heat loss as possible. The smelter provided typical temperature profile data from the batch-wise process (a “shaking” ladle) for the gas entering the off-gas ducting.

Various scenarios were run through the model to finalize the length of ducting required. When all was said and done, the IDEAS model proved to be crucial to determining the final design of the off-gas system.

“We found excellent agreement between what was predicted using an IDEAS model and what has since been measured as the new installed system operates.”

Adrian Dickinson
Beca AMEC

“I wouldn’t do any process design without IDEAS. You can cover the full range of mineral processes, from leaching to water treatment. The IDEAS model serves as a storage place for information about the process, and it is easy to use to extract hidden process characteristics and information. In my 10 years of use, the IDEAS software people have always provided excellent technical support. Over the years, the software has improved steadily and greatly as a tool to model mineral processes.”

Sergei Panasiuk
Wardrop Engineering

Automation Solutions

To help you achieve operational readiness



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