Capabilities Overview

Discrete Event Simulation Analysis Software and Services: Mining

Arena – Solutions for Mining

The Mining industry faces a number of complex challenges and systems variability. Arena enables the analysis of alternatives, the visualization of outcomes and ultimately an engineering assessment of future operations performance.

Arena simulation solutions are tailored to deliver strategic operational insights and confidence that a facility’s overall operations will perform as planned.

Strategic Benefits:
- Increased Productivity
- Decreased Downtime
- Virtual Operations Analysis before Spending Capital Budgets

Mining Industry Challenges

Arena has been applied across a variety of surface and underground mining operations globally. Due to the large capital expenditures and complexity, many decisions require significant analysis prior to moving forward. Arena simulation projects have enabled mining companies to reduce capital expenditures by 10-20%. The benefits from utilizing Arena include the following:

- Reduce fuel and water consumption
- Evaluate asset management strategies
- Determine capacity/size of conveyors
- Identify future bottlenecks
- Test impacts of operational rules/controls
- Test Truck/rail capacity
- Improve truck/shovel scheduling
- Transitioning truck and track based systems to long distance conveyors
- Evaluate large, small and unmanned trucking hauling options.
- Sizing of Run-Of-Mine (ROM) piles and the ROM dump hoppers
- Yard/Transport storage capacity for raw and washed coal
- Reclaimer & TLO efficiency
- Usage scenarios of the overflow ROM stockpile
- Impacts of additional dump hoppers and crushers

Business Operations Improvements

- Transportation and Logistics
- Equipment Right Sizing
- Process Rules
- Resource Utilization
**Arena Simulation Software and Services**

Arena can be used to build simulation models of machines, processes or an entire system. This model responds to given inputs much as would be expected in the real world. Using the model it is possible to "experiment" with various ideas and options to get an understanding of how the real system would respond. It can be used to establish mobile equipment requirements, size infrastructure (bins, stockpiles, conveyors, plant, etc), trial new control strategies or to see how the system will perform at different loads or product mix.

Using Arena, a realistic animation can quickly and easily be added for enhanced visualization. This allows decision makers to see the model in action, giving confidence in its accuracy as well as understanding of the dynamics of the system being modeled. In many cases, seeing is believing. Arena simulation enables the analysis of logic and operational rules within your business, that will help determine the best path to solve mining industry challenges as listed at the top of this capability statement. Strategic simulation modeling provides the basis for evaluating opportunities before making capital expenditures to put new business practices or operations into action. The Rockwell Automation team works with mining clients to perform comprehensive what-if, performance and risk analysis around the following areas of interest.

- Warranty Management and Performance
- Supply Chain Control Logic
- Predictive Maintenance Rules and Technology Applications
- Mine/Plant Interface Rules
- CapEx Investments and Utilization to achieve Fuel Reduction
- IT Management and Data Integrity Processes

In short, simulation is a relatively low cost option for improved decision making regarding all aspects of mining operations. It provides managers with a capability to explore options and "try out" proposals before making any real commitment. The Rockwell Automation team can provide the following services to assist in the management and delivery of high quality discrete event simulation projects:

- Model development kickoff and data needs discussion
- Partner/Resource Management
- Functional specification development and follow up as needed
- Functional specification acceptance
- Model development
- Data Preparation
- Verification / Validation
- Scenario analysis / project and results delivery
- Project documentation / user’s manuals
- Hand Off and Training
- Post Hand Off Support
- 3D Animation

The return on investment from an Arena simulation initiative is typically 10-20 times the required investment. Payback from a simulation project is achieved through increased throughput, reduced waste, more efficient utilization of equipment and resources and avoidance of capital expenditures.
Arena Simulation Consulting Team

The Rockwell Automation Arena Simulation team has sold and supported Arena software to most of the fortune 100 companies, and to a large percentage of the Fortune 500. Arena licenses have been purchased and downloaded over 350,000 times over its 30+ year history. Thousands of universities and businesses apply Arena software within their operations modeling and decision support practices, solving a number of problems and challenges.

The Arena Consulting Team has more than 100 man-years of simulation expertise and has supported hundreds of modeling initiatives over the years. Discrete event simulation models in mining, manufacturing, supply chain, healthcare, call center, hospitality and other market sectors have been successfully implemented to enable clients to maximize productivity and improve efficiency in operations. Once completed, Arena simulation models continue to provide value throughout the operations life cycle.

Rockwell Automation - Global Arena Partner Network

Rockwell Automation has a global network of Arena partners that specialize in the sale, deployment and customized consulting services for Arena’s global clients. Global partners hold a variety of professional skills and subject matter expertise across a number of industry sectors. With respect to mining, our partners in Canada, Australia and Brazil have significant mining expertise. Rockwell Automation can easily call upon the experience and expertise of any partner when necessary. Therefore, an engagement with Rockwell Automation is an engagement with a global team of the world’s best simulation experts with mining experience.

Mining Clients

Many mining projects have been successfully delivered by Rockwell Automation and our partners. Projects have covered all aspects of mining operations, including trucking and transportation, oil sands operations, copper and aluminum ore extraction, coal handling, shipping terminals, power generation and distribution and other Mining relevant operations. A selected list of clients/projects is as follows:

- Rio Tinto Aluminum Technology, Iron Ore, Technical Services
- Kestrel Mine Expansion
- Global Alumina
- BHP Billiton Illawarra Collieries
- Tahmoor Coal Chain
- Bengalla Expansion
- Anglo’s Drayton South
- BMA Coal Loader
- Howick Open Pit Mine
- Hay Point & Newcastle Coal Terminal
- Powercoal Cooranbong Development
- GEMCO Upgrade
- Cadia Holdings Pty Ltd Ridgeway Mine