Software for Mine Ventilation, Cooling and Environmental Control
VUMA Software is part of the BBE group. VUMA employs a team of software developers and support staff dedicated to the development, training and maintenance of world-leading software packages for mine ventilation, cooling and environment control.

VUMA (Ventilation of Underground Mine Atmospheres) has developed a suite of 3D interactive simulation programs that accurately predicts environmental conditions. VUMA can be used with confidence for ventilation optimisation, planning and life of mine designs.

**VUMA3D-network**

- VUMA3D-network is an interactive network simulation program that is used for the simulation of steady-state environmental conditions encountered in underground mines.

**Simultaneous simulation of:**
- Airflow
- Air thermodynamic behaviour
- Gases (including radon and DPM)
- Dust emissions.

**Applications include:**
- Planning/design
- Verify environmental performance parameters
- What-if scenarios
- Energy optimisation
- Dust/gas tracing
- Fault finding/trouble shooting.

**New features:**
- **Blast module**
  - Clearance/tracking of contaminants
  - Determine blast clearance time.
- **Fire module**
  - Considers combustion effect of fire on network, i.e. ventilation flow turnaround
  - Simulates the success of possible firefighting scenarios
  - Simulates existing fire control measures, e.g. doors installed to control a conveyor belt fire.
VUMA3D-coal

- Functions in the same way as VUMA3D-network but has been developed to satisfy the specific needs of coal mines
- Used for the simulation of steady-state environmental conditions encountered in underground coal mines
- Solves airflow and pollutant (dust, gas, smoke) distributions interactively throughout a coal mine ventilation circuit
- Represents coal mine layouts and mining methods.

VUMA3D-live

- Based on VUMA3D-network and interfaces with on-line monitoring of underground conditions
- Uses a limited number of measured/instrument inputs obtained from the mine SCADA system to predict real-time environmental conditions throughout a mine.

Benefits include:
- Real-time monitoring
- Visualisation of underground ventilation conditions
- Alarm when abnormal conditions are detected
- Forward prediction of conditions
- Daily reporting
- Forward emergency planning and response
- Planning energy conservation and changeover strategies
- Risk analysis.

VUMA3D-coolflow

- Mine water circuit modelling tool accounting for the full thermodynamic interaction of the water reticulation network with the ventilation system
- Water flow is distributed as a function of pressure and the thermal effect of all network components (pipes, turbines, dams, etc.) is included to assist the optimal control of thermal energy systems
- Import VUMA3D-network models into VUMA3D-coolflow

Applications include:
- Effectiveness of cooling distribution strategies
- Predict network system losses quantified per component
- Simulates chilled water dams with ice melting
- Effects of chilled water in production zones
WHY USE VUMA?

- VUMA strives to remain the mine ventilation software package of choice through continuous development, servicing our clients, their needs and ensuring our products’ accuracy.
- Import directly from various mine plan formats and utilise tools to “clean up” and modify networks faster.
- VUMA has been developed by international leaders with over a century’s combined experience.
- VUMA’s algorithms were developed using measured data from some of the world’s deepest mines.
- For enhanced accuracy the solution algorithm assumes compressible air heat.
- VUMA’s solution engine contains effective and specialised modelling algorithms for all types of mining activities in hard rock and coal mines.

WHY SIMULATE?

- Ensure safe mine environments
- Optimise existing ventilation and cooling resources
- Reduce primary ventilation system power
- Minimise major ventilation capital expense surprises.

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