NHEET

Natural Heat Exchange Engineering Technology for mines

Contact us info@mirarco.org (705) 675 1151 Ext. 5075 www.nheet.ca www.mirarco.org

Overview

Air delivery to deep underground mines often requires costly refrigeration and heating systems that produce large quantities of greenhouse gas (GHG) emissions. **Natural Heat Exchange Engineering Technology (NHEET)** is an engineered low-cost and green solution for conditioning mine ventilation air. Energy from the ambient air temperature cycles is stored in recycled waste rock to provide air at a steady temperature year-round, reducing peak and overall mine ventilation energy demands.

NHEET is inspired by the Natural Heat Exchange Area (NHEA) at Creighton Mine, a rock-filled pit from historical operations that has allowed Creighton to continue its operations at a depth of 2.5 kilometers without using artificial refrigeration.

Benefits

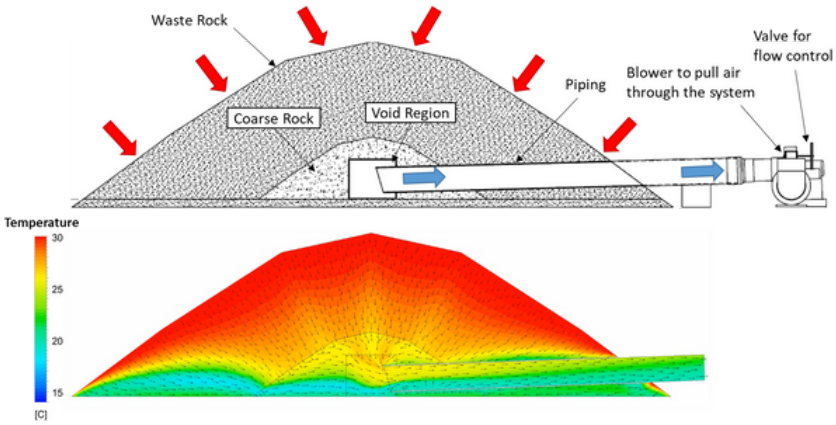
- Low capital and operating cost
- Reduced energy consumption and GHG emissions
- No maintenance
- Reduced mining footprint
- Clean energy

NHEET prototype at NORCAT Underground Centre

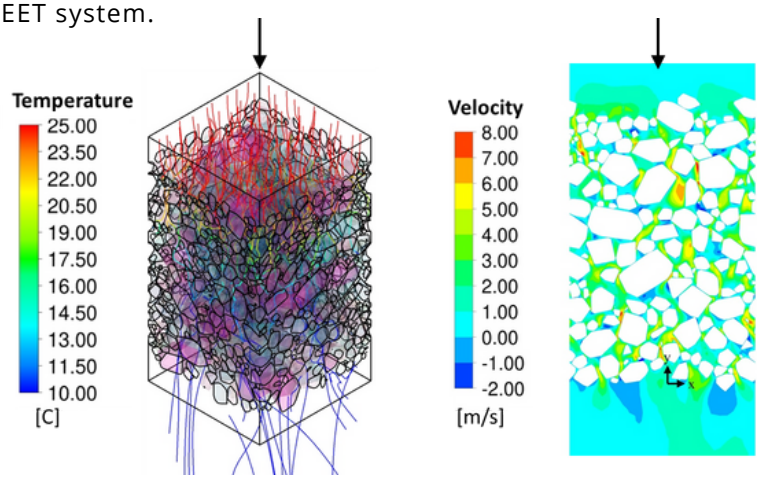
Background

MIRARCO is a not-for-profit research organization that collaborates with industry, private sector, government, academia, and community stakeholders to develop innovative technologies and solutions for the mining industry.

Funded through the Natural Resources Canada Clean Growth Program and by industry sponsors, the NHEET project is a collaborative research effort that aims to assist in the development and integration of this green technology in mines. During the project, MIRARCO has constructed a lab-scale experimental apparatus and a prototype system, developed and validated fundamental and high fidelity numerical models, and established an engineering methodology and tools for designing and constructing a high performance NHEET system.



NHEET prototype diagram and simulation



Particle resolved simulations of flow through a packed bed

In collaboration with:

Canada VALE Teck Centre for Smart Mining AT CAMBRIAN COLLEGE NORCAT