

## Mini Design Instructions

---

Students work in the same small groups (6 people) throughout the course to solve three open design problems. Each mini design builds on the skills developed in the previous mini design.

- The first mini-design involves a pressure loss and fan power scenario, and students develop a design process.
- The second mini-design involves a ventilation network scenario (using simulation software), and students develop a design process, select and use engineering tools.
- The third mini-design involves a mine heating and cooling scenario (using simulation software), and students develop a design process, evaluate engineering tools and identify the tools' limitations.
- Groups are given 3 hours in class to complete a mini design, with a one day extension at home for their report write up.

The culmination of this group work is a final project, which builds on the skills that students developed during the mini designs.

### Mini Design #1:

Students must manually calculate the pressure loss and fan power requirement through a vent, taking into consideration not only parametric values, but also factors such as economical (e.g., capital cost, excavating cost and operating cost) constraints.

### Mini Design #2:

Students must repeat Mini Design 1 but with a more complicated ventilation network. This exercise cannot be completed manually; therefore, students must work and optimize their ventilation system using simulation software such as VentSim.

### Mini Design #3:

Students build on Mini Design 2 by taking into consideration heating and cooling systems for their ventilation network. This again is completed using simulation software such as VentSim.