

Grant AFC215-42

Title: Free and Open Source Professional Development for the Mine Ventilation Community: An Innovative Approach to Improving Competence

Organization: Virginia Polytechnic and State University

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Focus Area: Safety and Health Management and Training

Topical Area: Training

Problem Statement and Justification: Catastrophic failures of engineered ventilation controls, or a failure to understand the role of the mine environment on the ventilation system have resulted in multiple fatality incidents many times over the years; most recently, the Sago Mine and Upper Big Branch Mine Explosions highlight the need for improved education and professional development resources. The group of mining professionals with expert competence in ventilation is small and dwindling, despite the fact that most mine engineers will, at some point, be involved in ventilation engineering. For professionals who want to improve their competence there are relatively few opportunities for professional development and even fewer specialized consultants. This proposal aims to develop an innovative set of online tools for underground coal, metal, and non-metal ventilation engineering training with considerable impact on safety in underground mines. This work will involve investigating and collating best practice at state-of-the-art underground mines around the world, and distributing this knowledge via an innovative online course platform. Based on the premise that knowledge should be accessible, the course will be distributed via a free and open source platform. It will be piloted during the project, and a successful platform will be maintained with researchers and professionals adding material for community consumption.

Impact of the Research: The specific aim of this work is to develop a novel and universally accessible professional development platform to enhance safety in underground mines. This work will allow for the dissemination of knowledge, including theory, best practice, and practical application in mine ventilation engineering. Ultimately, the work is targeted toward practitioners with engineering backgrounds, but would also be appropriate for workers engaged in mine ventilation work without any such formal training (e.g., foremen and supervisors). By providing unlimited access to professional development for ventilation professionals catastrophic and routine failures of engineered ventilation systems can be avoided, with a considerable positive impact on underground safety.

Objectives and Research Approach: The primary objectives of this work are to: i) collect and distribute best practice and basic and advanced principles of mine ventilation engineering for the improved competency of the industry; ii) to demonstrate an innovative online platform for professional development in the mining industry; and iii) to enhance immediate mine safety while building a body of knowledge that will continuously enhance safety. The materials developed will be targeted toward the US industry. International case studies and perspectives will be utilized; they will be described in the context of US regulation. The project will identify and disseminate "beyond compliance" controls and best practices. This work is particularly novel because little free and open source materials are available to mining professionals, and none through a formal web-based learning platform. Additionally, the goal of these materials is to highlight theory and application of mine ventilation principles with state-of-the-art case studies to improve engagement and relevancy. The demonstrated successful development in this critical application will provide a guide to other key knowledge areas in mining including sustainability and environment, mineral processing, and rock mechanics and ground control.