
Subject:

Comments for BIP RA

From: Lusk, Braden T [mailto:braden.lusk@uky.edu]**Sent:** Tuesday, January 12, 2016 11:16 PM**To:** Shumaker, Wesley A - MSHA**Subject:** Comments for BIP RA**JAN 12 2016**

Mr. Shumaker,

I tried to submit the following comments to the email address in the announcement. Do I need to go online and submit these, or can I send them by e-mail? The message was rejected. I'd like to send them along. I'd be happy to provide more information about the wall we submitted and the Hubble Breathable air system, but I'm not sure how that material is best supported. Please advise. My comments are below:

Per the MSHA request for information, I am providing a short summary of technologies that are available today for the use of built in place refuge alternatives. Current technology allows for the construction and use of safe haven walls for the purpose of creating safe havens or refuge alternatives in underground coal mines. These walls have a multitude of design options and provide added protection over the currently approved refuge chambers. One such wall is currently under review by MSHA. There are several systems available that provide the ability to deliver breathable air to the built in place refuge alternatives. Some of these methods require holes drilled from the surface while others require a breathable air compressor to supply air through a network of compressed air lines. NIOSH is currently investigating protection alternatives for these compressed air lines. One such system is already approved by MSHA. In addition, NIOSH has completed work regarding the design and implementation of safe haven walls and the life sustaining components required for refuge alternatives. There are systems available that allow for these supplies to be stored within built in place refuge alternatives.

The single largest barrier for use of these alternatives is the disproportional review and acknowledgement process that varies between the two types of systems. Refuge chambers (box and/or tent style) are exclusively reviewed and approved by MSHA personnel at the Approval and Certification Center in Triadelphia, WV (Triadelphia). The review and approval process for these boxes is substantially different than the process for approval of a constructed wall. The constructed safe haven or refuge alternative walls are subject to district approval that are forwarded to Pittsburgh Safety and Health Technology Center (Pittsburgh) for review. In my experience, these applications will be reviewed by one of three divisions within the Pittsburgh complex. These divisions include the Ventilation Division, Mine Waste and Geotechnical Engineering Division, and the Mine Emergency Operations division. MSHA provides guidance on a particular waveform that must be utilized to design refuge alternatives. This triangular 15 PSI waveform has been utilized by designers for both types of refuge alternatives (chambers and built in place). What differs is the interpretation of design factors that should be included in the design. Triadelphia has openly stated that the characteristics of the prescribed waveform allow for analysis and testing at a 15 PSI static load. Pittsburgh has been hesitant to accept any design that does not include a safety factor of 2 for the design load requiring a 30 PSI design load. In addition, various reviewers in Pittsburgh deem it necessary to apply a dynamic load factor to the design load above and beyond the safety factor. Instantly it is apparent that built in place refuge alternatives reviewed by Pittsburgh will be held to a higher standard than refuge chambers reviewed by Triadelphia. This alone makes the design and implementation of BIP refuge alternatives cost prohibitive in most cases when compared to refuge chambers. Furthermore, individual designs will dictate the necessity for dynamic load factors when natural frequencies of structures are compared to loading times for the prescribed loads. This concept is seemingly lost on Pittsburgh reviewers in general. Many designers of these systems have many years of experience designing blast resistant structures with complex interactions to foundations, other building components, etc. This expertise is generally disregarded wholesale when designs are reviewed by Pittsburgh. Engineers by code are required to design within their

competence level, and are required to understand this when stamping plans as a professional engineer. It is difficult to understand why MSHA would want to shoulder the liability of engineering design by materially contributing to engineering designs for which they will ultimately not take responsibility for.

In order for underground coal mine operators to make decisions regarding refuge alternatives that lead to the safest environment for miners, all refuge alternatives need to be held to the same standard for design. The current review and approval process for the two types of refuge alternatives creates a situation where built in place refuge alternatives are held to a higher standard for design when considering design load. It is well documented and established that the maximum pressure likely in a coal dust and/or methane explosion could be much higher than 15 PSI. The 15 PSI prescribed waveform was established by MSHA through recommendations from NIOSH as a maximum survivable explosion. For this reason, arbitrary safety factors do not make much sense. If the desire is to design refuge alternatives to 30 PSI, then designers can develop systems to meet this standard. If the design load is truly 15 PSI, systems should be evaluated as such.

Thanks,
Braden Lusk



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