

# Tech News

## NIOSH MINING PROGRAM

*Milestones in Mining Safety and Health Technology*

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## EVAD 2.0 Software Helps Identify Hazardous Exposures

### Summary

The EVAD 2.0 software is now available from NIOSH as part of the Helmet-CAM system to help identify hazardous exposures in workplace environments. The software synchronizes playback of video clips and data from almost any type of data logger to allow safety and health personnel to identify the tasks, machines, and locations associated with high exposures. Armed with this knowledge, supervisory personnel can then take actions to reduce or eliminate these identified exposure sources.

By Gregory Cole and William Helfrich



This screenshot from the EVAD 2.0 software shows the expanded multi-channel capabilities of the program. In this example, three separate video channels have been created and are displayed next to their associated exposure plots.

### Background

The ability to log personal exposure via data logging monitors has existed for some time; however, the data from these devices have only revealed the level of exposure and not the specific job activity and work environment (such as equipment running) at the time of the worker's exposure. Recent advances in video recording technology have allowed for the creation of cameras and recording equipment that can be mounted on a helmet (as in NIOSH's Helmet-CAM system) and used to record video, running on battery power, for an extended period of time. Once the user has synchronized the start point of the video and exposure data, the video time index can be combined with the time indexes in the exposure log to determine the job activity in which

the worker was engaged at the time an exposure took place. The newly updated EVAD 2.0 software, a component of NIOSH's Helmet-CAM system, is the first software that enables users to easily combine video and logged exposure data, allowing them to quickly find specific occurrences of high exposure in their workplace.

### Software Development

The goal of researchers from the National Institute for Occupational Safety and Health (NIOSH) Mining Program was to develop software that enables quick searching, playback, and simultaneous

analysis of the logged video and exposure data in order to identify not only the times of high exposure but the specific job activities in which workers were engaged. Based on the success of the EVAD 1.0 software and feedback from the EVAD user community, the functionality and capabilities have been expanded to make a more generic and more powerful tool. The EVAD 2.0 software now allows for the playback of any video stream against any logged data stream, and can import log files for analysis from almost any type of data logging monitor and video from almost any type of digital camera. Once the data and video



Photo by NIOSH

*A NIOSH researcher reviews an EVADE project with a mine worker. An area of interest on the exposure chart is identified and the video window helps isolate the activity where the exposure occurred.*

are imported and synchronized by the user, the software presents a video playback window (or windows) and a graph of exposure amounts from a single or multiple log files. Users can quickly zoom in or out of a graph to a specific segment of interest or the graph can be viewed in its entirety. As the user plays the video or navigates to a specific location, the software automatically keeps the positions in the graphs and videos continuously in sync, allowing the user to quickly view and analyze high-exposure occurrences. In addition to being able to search through the logged video and exposure data, the user can modify a graph's vertical scale and add threshold lines to quickly identify when the exposure exceeded a specific value. As these high-exposure occurrences are found, bookmarks can be created to keep track of them, enabling quick navigation between them. The data and video can span the length of time needed to perform a specific task or can cover a portion of a shift (normally 2–4 hours), depending on the needs of the user.

### Technical Details and Requirements

The video playback system used in the EVADE 2.0 software allows for the viewing of virtually any video that the user's system can play back as long as the appropriate codec is installed. The video codec is typically either already available on the user's computer or is provided by the camera manufacturer.

A wide variety of cameras will work with the EVADE 2.0 software, allowing users to select one that is the most appropriate to their video recording needs. The EVADE 2.0 software was built to handle log files of long duration (8 hours or longer) and to graph the resulting data without causing aliasing even when displaying the graph for the entire log file. This prevents short-term spikes in the exposure data from being hidden when a large time period is viewed. The maximum duration of the time recorded is generally only limited by the camera's file size capacity and the battery life of the camera.

Additional features for version 2.0 include an expanded project editor that allows for the creation of multiple video channels and multiple logged data channels. This allows for multiple cameras and/or multiple data logging monitors to be used, and viewed, in a single study. Two examples of this would be a single

worker simultaneously monitored for both dust and noise exposure or two workers involved in the same task, with both wearing the same type of monitor for comparison. There is also a new capability to create and add custom data importer and analysis functions without the need to recompile and redeploy the program. These functions can be added to EVADE 2.0 to address proprietary or task-specific needs and can, optionally, be shared back to the greater EVADE user community.

### To Obtain the EVADE Software

The EVADE 2.0 software is now available for download from the NIOSH Mining website at [www.cdc.gov/niosh/mining/works/coversheet1867.html](http://www.cdc.gov/niosh/mining/works/coversheet1867.html).

### Next Steps

Efforts will continue to disseminate EVADE 2.0 and the Helmet-CAM technology to industry. This will include creating some instructional videos demonstrating the basic functions and application. The NIOSH Mining Program also hopes to vet and make available to the EVADE user community any custom importer or analysis plugins submitted for sharing by EVADE users.

## For More Information

For more information on EVADE 2.0, contact Gregory Cole ([gpcole@cdc.gov](mailto:gpcole@cdc.gov)), William Helfrich ([whelfrich@cdc.gov](mailto:whelfrich@cdc.gov)) or the NIOSH Mining program ([mining@cdc.gov](mailto:mining@cdc.gov)).

To receive NIOSH documents or for more information about occupational safety and health topics, contact: **1-800-CDC-INFO (1-800-232-4636)**, **1-888-232-6348 (TTY)**, or request information at the CDC website at [www.cdc.gov/info](http://www.cdc.gov/info), or visit the NIOSH website at [www.cdc.gov/niosh](http://www.cdc.gov/niosh).

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