

# Technology News

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## NIOSH MINING PROGRAM

*Milestones in Mining Safety and Health Technology*

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## Safety Pays in Mining: a Web Application that Demonstrates the Financial Impact of Injuries

### Summary

The Safety Pays in Mining web application uses aggregate injury cost data to show cost distributions for typical injuries that can affect mine workers. The cost data are derived from a decade of compensation claims filed by mine workers in Ohio. This web application brings awareness to companies about the unknown costs of injuries and the distribution of these costs.

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### Background

The costs of specific types of occupational injuries in mining are not well known. This information is generally not shared between mining companies nor readily provided by insurance companies. Therefore, companies only have cost information based on previous experience with their own employees. As one example, if a mine never experienced a finger amputation for one of its workers, it would not be aware of the possible costs of this type of injury. In addition, injury costs are unique in that the cost distribution is so wide—just using an average cost does not provide adequate information. Some injuries involve tremendously high costs. Even though the risk of these extremely high-cost injuries is low, mines need to be aware of their potential impact on their financial health.

The Safety Pays in Mining web application (see Figure 1) developed by the

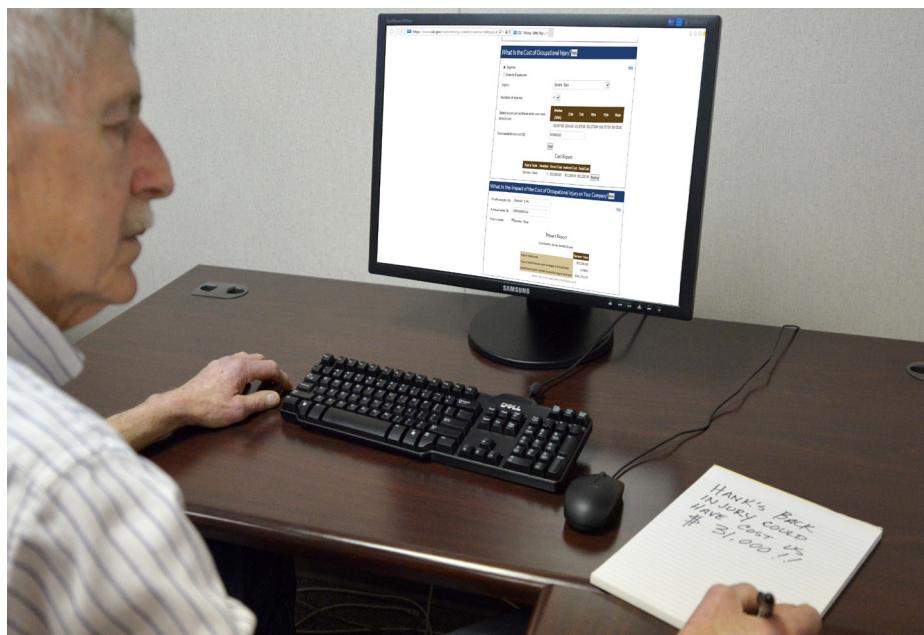


Figure 1: A user calculates the potential cost of an injury using Safety Pays in Mining.

National Institute for Occupational Safety and Health (NIOSH) helps mines to determine potential injury costs and the distribution of these costs. The application groups injuries by type, either by the cause of injury or by the nature of the injury itself. When the user selects one of over 30 injury types, the application provides information on the distribution of costs of workers' compensation claims for that type of injury. Based on other user inputs, the program will estimate the total costs of all projected injuries, including an estimate of additional "indirect" costs, the impact of total injury costs on profits, and examples of ways that companies could spend the savings resulting from preventing injuries.

### How the Application Was Developed

To calculate direct costs, which include medical expenses and lost-time payments, NIOSH researchers obtained cost data for specific injuries from the Ohio Bureau of Workers' Compensation. Compensation claims for (de-identified) mining industry workers from 2001 to 2011 were used for the cost estimates. These claims included both medical-only and lost-time claims for each injury. Only injury types with more than 10 claims were included.

In order to provide a realistic injury cost estimate, researchers also calculated indirect cost estimates. These are costs to the employer which are generally not covered by insurance. Such costs could

include, for example, costs of reduced productivity due to disruption of work or work limitations during injury recovery, replacing damaged equipment, and temporary or permanent replacement of injured workers. The total cost of an injury is the sum of the direct and indirect costs.

In the application, all costs were adjusted to 2015 dollars. Future versions of Safety Pays in Mining will update costs to the most recent calendar years.

### Using Safety Pays in Mining

To use the Safety Pays in Mining web application, you select options from drop-down menus in four sections representing (1) common injuries and activities, (2) cost of injury, (3) impact of injury cost on profits, and (4) how the company could spend the cost savings from injury prevention. Default values are automatically included in most fields to allow you to make general estimates based on Ohio mining claims data, or in case the desired specifics on your company's injuries are not known.

In the "Most Common Injuries and Work Activities for 2015" section, you choose the commodity of interest and an injury summary for that commodity is displayed for 2015. This shows what the most common injuries were and what miners were doing when injured.

The section "What is the Cost of Occupational Injury?" is the main feature of the application (see Figure 2). The user first selects one of two lists of injury types: injury by "nature" or injury by "cause." Injury by nature refers to the type of physical damage to the body, such as back sprains or finger amputations. Injury by cause refers to the manner in which the injury was inflicted, such as exposure to electricity or being struck by an object or equipment. The user selects an injury type, and the distribution of injury costs for that type is displayed.

The user then selects the number of injuries of this type that may occur in the future. In the next step, the user needs to consider the provided information on the distribution of costs, along with the expected number of injuries, in order to select an average cost per claim to enter. The best cost per claim to enter is a matter of judgment that depends in part upon the user's concern about the possibility of experiencing a very high-cost claim. It is also important to consider the expected number of injuries, because a higher number of claims results in a higher chance of a very expensive claim. A note in the web application suggests percentile cost figures to use based on number of total injury claims. You can select the mean cost or one of the cost percentiles for the specific injury type. The report then shows a summary of the injury, the number of injuries, the direct cost, the indirect cost, and the total cost. The user can repeat this process for each injury type and then generate a summary report for all injuries.

### What Is the Cost of Occupational Injury? Hide

- Injury - Nature
- Injury - Cause

Injury - Nature

Sprains - Back

Number of injuries:

1

Select a cost percentile or enter your own direct cost:

Median (50th)	25th	75th	90th	95th	Mean
\$1,400	\$540	\$5,200	\$16,300	\$31,800	\$8,700

Show Note

Estimated direct cost per claim (\$):

\$10,000

Add

#### Cost Report

Injury Type	Direct Cost per Claim	Number	Direct Cost	Indirect Cost	Total Cost	Remove	Edit
Sprains - Back	\$10,000	1	\$10,000	\$21,200	\$31,200		

**Figure 2:** A screenshot from the application demonstrates that the total cost of a single back injury could be over \$31,000.

The section "What is the Impact of the Cost of Occupational Injury on Your Company?" shows how injury costs can affect profits. You enter your company's profit margin and annual sales, or accept the default values based on the commodity selected in the "Most Common Injuries and Work Activities for 2015" section. The resulting impact report shows the total injury cost, the total injury cost as a percentage of annual sales, and the additional sales needed to pay for the injury total cost. The section "How Could Your Company Spend Its Savings from Preventing Injury?" shows different ways your company could use the money otherwise spent on injuries. You can use the default values or input the average amount that your company pays for an annual hearing loss prevention program, a pair of boots, or a hard hat. Based on these values, the web application displays how many of each could be purchased if the injuries were prevented.

### How Mines Can Benefit from Using Safety Pays in Mining

This web application educates users on a wide range of occupational injury costs. Mine companies will find it beneficial to see the distribution of workers' compensation injury costs as well as the indirect costs which are often overlooked. The application demonstrates that even a common injury has the potential to be extremely expensive. Safety Pays in Mining can be used by mine companies to help with determining possible injury costs and prioritizing health and safety interventions.

### Where to Find Safety Pays in Mining

The web application is now available for use on the NIOSH Mining webpage at: <https://www.cdc.gov/niosh/mining/content/economics/safetypays.html>.

## For More Information

For more information on Safety Pays in Mining, contact John R. Heberger ([JHeberger@cdc.gov](mailto:JHeberger@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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