PS.02 Measuring the Economic Burden of Occupational Fatal Injuries in the United States, 1990-1995—Biddle EA

Traumatic occupational injuries claimed the lives of over 30,000 American workers from 1990-1995 as reported through the National Traumatic Occupational Fatalities (NTOF) surveillance system. Fatalities represent the worst possible outcome for a worker and the highest burden to society. According to the National Safety Council, the median value of life lost to occupational fatality in 1997 was $890,000. As with nearly all other studies, these losses are an aggregate value and shed no light on the variations in costs for differing worker characteristics or circumstances of the event. The ability to make these distinctions can aid in prioritizing efforts to prevent these devastating events.

Numerous theoretical models to measure the cost of occupational fatalities to society have been developed. The cost of illness method is the most commonly adopted approach for legal proceedings and formal policy analyses. This method is divided into two components, direct and indirect costs. Direct costs are actual dollar expenditures associated with the fatality while indirect cost is the value of lost output due to decreased productivity. The value of productivity losses can be calculated using a Human Capital approach by determining the present value of a future stream of output valued at market earnings.

This project developed a user-friendly computer program to calculate the Human Capital cost of fatal injuries reported through NTOF. The model provides comprehensive national estimates for the economic burden of all occupational fatal injuries and specific estimates for the burden on selected groups (e.g., specific industries, occupation groups, and teenage workers). Finally, this model provides an additional reliable basis, economic risk, for targeting and evaluating the effectiveness of investments in prevention of occupational fatalities.

PS.03 The Practicality of Using Fault Tree Analysis to Improve Mine Safety—Kerkering JC, Coleman P, Beus M, Iverson S, Stewart W

Many mining safety research projects are multi-faceted. It is therefore difficult for management and researchers to determine where to focus their research efforts. Fault tree analysis may provide an effective tool.

Fault tree analysis is a systematic safety analysis tool that proceeds deductively from the occurrence of an undesired event (accident, injury, equipment malfunction) to the identification of the causes of that undesired event. Bell Telephone Laboratories first used this tool in the 1960s. The aerospace and nuclear industry then successfully adopted it to enhance the safety of their operations. These early applications, however, required large computers and expensive software and were on predominantly deterministic, static, closed systems quite unlike the open-ended and ever-changing work environment encountered in mining. Our research explored the feasibility of extending fault tree analysis to the dynamic mine environment. One recurring mine safety problem, the blockage of an ore pass, was analyzed using a currently available and inexpensive fault tree program on a personal computer. The analysis identified basic and intermediate events that led to the failure of the ore pass; it graphically depicted the interrelationship between these various subordinate events as well as the various cut sets and the minimal cut set (all members are necessary for the occurrence of the top event). Focus groups were used to estimate relative probabilities of occurrence for each of the basic events. A sensitivity analysis on these probabilities showed the basic events (wrong ore-size to grizzly-opening ratio, excessive moisture or finer content) having the greatest influence on ore chute blockage. This suggests these events should be first addressed in a program of safety research designed for most efficiently preventing the ore chute blockage. This research shows that it is feasible with personal computers and inexpensive software to use fault tree analysis to improve mine safety.

PS.04 The Economic and Social Impact of Work-Related Carbon Monoxide Poisoning—Chenoweth BA, Lim KC, Nadeau MR, Roy JC, Surette RI

Background: The Maine Workers' Compensation Board (WCB) reported an average of eight cases of carbon monoxide (CO) poisoning per year (1994-1998). In 1999, the Maine Department of Labor (MDOL) received reports from the Maine Agricultural Safety and Health Program (ASHP) of two incidents where twenty-two workers required medical treatment. One incident occurred at a plant where workers were exposed to CO from propane-powered forklifts. The other involved workers using propane-powered floor buffers.

Purpose of Study: The objective of this study is twofold: 1. Demonstrate to employers the benefits of the MDOL "SafetyWorks" program, which offers training to employees to recognize and prevent CO poisoning, at no cost to employers. 2. Develop a generic research protocol to assess the economic and social impact of work-related injuries.

Methodology: The sample (n=39) consisted of 1998-1999 cases of CO poisoning from the databases of the WCB and the ASHP. Medical cost indicators such as the use of a hyperbaric chamber measured the economic impact of these cases. Other cost indicators included loss of income and OSHA fines. The injured workers were interviewed by telephone to assess any social impact of these injuries.

Results: Of the 39 cases investigated, medical costs for 33.3% of these cases were not available because no Workers'

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ABSTRACTS

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