



Poster Session 402: Management and Training Issues

Monday, June 1, 2009, 2:00 p.m. - 4:00 p.m.

Papers 322-324

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Evaluating NIOSH Communication and Technology Transfer Strategies for Mining: A Mixed Methodology Approach

L. Elinson, S. Locke, K. Hamre, Westat, Rockville, MD.

Recognizing the importance of translating research findings into practice, the NIOSH Mining Program evaluated its *Technology News* publication series to determine its effectiveness in reaching the intended target audience, transferring knowledge to the mining community, and facilitating changes in mining operations. We implemented a mixed-methodology approach, using the 50 most recent articles in the series to evaluate the effectiveness of *Technology News*. The evaluation included a survey of authors to determine their intentions and expectations in writing the articles; interviews with target audience representatives to assess whether their goals were met; and a content analysis of each article, based on Rogers' theory of diffusion of innovations. Analysis of the author survey indicated that most articles targeted more than one audience, with 65.1% attempting to reach multiple mining commodities, 39.5% reaching out to multiple types of mines, and 93.0% expecting to reach more than one type of mine employee or stakeholder. *Technology News* articles appeared to be reaching their target audiences. Of those individuals requesting additional information on a *Technology News* article, 90.7% were members of the author's intended target audience. Most innovations were disseminated through multiple venues; 4.7% of authors indicated they only used *Technology News* to communicate their innovation. Although 65.1% of authors indicated an intent to convince the reader to adopt and implement the innovation, the content analysis revealed that, in general, authors were using neutral rather than positive language to describe their findings and recommendations. In this presentation, we will discuss additional findings from the evaluation, the utility of the mixed-methodology approach, and how the principles of Rogers' theory of diffusion of innovations were adapted for this project. We also will highlight the efficacy of content analysis and how this methodology can be used in similar applications.

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Estimating the Number of Occupational Safety and Health Professionals Employed at Large U.S. Construction Firms

M. Gillen, NIOSH, Washington, DC.

How many professional industrial hygienists and safety engineers work for the 100 largest U.S. construction firms? In this presentation, we will report on the number of AIHA and ASSE members reported as employed by each of the top 100 construction contractors as listed in the September 2008 McGraw-Hill *Engineering News Record*. These top 100 contractors reported 2007 total revenue ranging from \$629 million for the 100th-ranked firm to \$17.6 billion for the top ranked firm. Small employers (with one to nine employees) are known to dominate the U.S. construction industry, comprising 79% of all establishments and employing 24% of all employees. Less than 1% of all construction firms are large (500 or more employees), and they employ 8.5% of all construction employees. These large employers are likely

to have the most influence in construction safety and health, as they are most likely to employ full-time safety and health professionals on their projects. In addition to discussion of the findings, the we will describe study limitations, and potential implications for occupational safety and health partnering and practice.

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Implementation of IH Metrics in a Petroleum Company

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An industrial hygiene metrics program designed to identify, correct, and communicate key leading and lagging industrial hygiene indicators throughout the company's global operations was implemented. The key indicators are measured and shared throughout the company to develop a standard for facility exposure assessment plans; to identify, track, and correct unacceptable exposures; and to serve as a communication plan to upper management. Leading indicators include the reporting of the number of planned annual samples per a facility exposure assessment plan and quarterly updates on the completion status of those plans. These indicators strengthen the "evergreen" nature of exposure assessment plans through an annual revalidation and listing of completion status among peer business units. Lagging indicators involved the creation of a new term called an "Exposure Incident" and involves the mandatory reporting of instances where inadequately protected workers are exposed to chemical or physical agents at levels exceeding established occupational exposure limits. Exposure Incidents are reported, tracked, and investigated to resolution using an integrated database. Lessons learned are shared with industrial hygienists across the enterprise and HSE managers within the corporation to help reduce the probability of similar exposures occurring at another location. The communication plan is divided into corporate and site-level components. The corporate component captures industrial hygiene metrics on a monthly basis and includes those metrics in the company's monthly HSE performance report. The site-level component defines various industrial hygiene activities that should be captured and communicated to site management on a monthly basis. Standardized report templates, similar to those currently used for safety metrics, were created for the site-level metrics and provide a common medium for industrial hygienists to communicate and compare industrial hygiene activities and incidents globally.

Podium Session 130: Management and Training Issues

Wednesday, June 3, 2009, 1:00 p.m. - 3:40 p.m.

Papers 197-204

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Using a Paired-Comparison Process to Create Relative Rankings of Programs or Assets

J. Yasalonis, S. Stone, LMI, Belcamp, MD.

DoD preventive medicine assets and programs provide services focused on the industrial hygiene, environmental health, and safety aspects of terrorist and disaster response, disease and injury prevention, and health promotion. Preventive medicine centers, laboratories, technical boards, and mission-tailored response teams play a vital role in the overall DoD Force Protection mission by preventing or reducing the severity of diseases and injuries; they provide primary Force Health Protection (FHP) and reduce demand on clinical care assets. Due to their importance in executing FHP, they are included in the DoD Critical Infrastructure Program seeking to identify and protect critical assets and programs. This case study describes development and selection of nine criteria, such as the effect on acute morbidity and mortality and the technical depth, scarcity, and response time of assets, to define criticality of preventive medicine program assets. We will discuss how the Analytical Hierarchy Process was used in paired comparisons of the nine

criteria to assign a numeric weight to each criterion. In addition, we will discuss the techniques used to control subject matter expert evaluation panel bias while they were relating each weighted criteria to specific asset types to produce a relative ranking for the preventive medicine-related infrastructure essential to execution of the National Military Strategy. We conclude that the use of relative ranking can enhance mission assurance and focus protection on task-critical assets. This work illustrates how, with the creation of suitable goals and criteria, this methodology can be used to add analytical rigor and consistency to a qualitative ranking of the importance between and among industrial hygiene, safety, environmental, and ergonomic programs seeking shares of limited resources.

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The Internal Responsibility System -- How It Is Functioning

P. Strahlendorf, Ryerson University, Toronto, ON, Canada; M. Holliday, Michael Holliday & Associates, Ottawa, ON, Canada.

The Ontario Occupational Health and Safety Act (OHSA) is based on the Internal Responsibility System (IRS), a term coined by Dr. James Ham in his 1976 Royal Commission report on the health and safety in mines, and is an OHS management system philosophy. Everyone within an organization has direct responsibility for health and safety as an essential part of his job. It does not matter who or where the person is in the organization, he achieves health and safety in a way that suits the kind of work he does. He does this both singly and cooperatively with others. It is one of the personal responsibilities of a company president to ensure that the entire system of direct responsibility for health and safety within a company is established, promoted, and improved throughout time. Successful implementation of the IRS should result in progressively longer intervals between accidents or work-related illnesses. In 1999, the Ontario Ministry of Labour commissioned the development of an audit tool to measure how effectively the IRS was working in the underground mining environment. The project was guided by a tripartite committee that, once a preliminary tool had been designed, selected six mines (encompassing a relatively wide range in safety performance) to be the subject of a trial audit. The trial audit enabled validation and refinement of the audit tool, which became the property of the Ontario Mines and Aggregates Safety & Health Association. Since the development of this validated tool, we have expanded and further refined the approach and have conducted audits at a number of mines in Ontario and a large electrical utility. In this presentation, we will discuss the results of these audits and what it says about the role of the IRS within the occupational health and safety management system of these organizations.

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Intensive Training Programs in Environmental and Occupational Hygiene: Application and Lessons

R. Eninger, S. Morrill, USAF, Brooks City-Base, Texas.

The U.S. Air Force School of Aerospace Medicine (USAFSAM) annually trains 250 airmen in disciplines similar to civilian industrial hygiene technicians (200 enlisted students/yr) and traditional hygienists (bachelors degree or higher, 50 officer students/yr). The purpose of the intensive training program, which lasts 14 weeks for enlisted technicians and 16 weeks for officers, is to ensure graduates possess adequate knowledge and skills to support Air Force preventive medicine operations through environmental and occupational hygiene activities. We will present selected challenges and lessons learned from managing a large, intensive training program in environmental and occupational hygiene. The primary challenge of the training program is translating classroom and laboratory training into future workplace performance. These challenges include: (1) striking the right balance between practical skills and basic knowledge; (2) instructing students of different learning types; and (3) instructing students with heterogeneous educational backgrounds and academic preparation. There are faculty-related challenges as well, such as (4) dedicating the time and manpower to maintaining a continuously evolving but high quality curriculum; and (5) identifying and maintaining the appropriate breadth and depth of instructor competency and qualification. We propose several solutions that help mitigate programmatic impacts of these challenges. First, the right balance between knowledge and skills is dictated by the stakeholder(s)--they must be identified, and their feedback must be aggressively sought on a routine basis. Second, individual instruction and small-group coaching can identify and considerably assist students with training deficiencies or alternative learning styles. Third, centralized--rather than decentralized--curriculum management appears to have

strengths in keeping curriculum up to date and correlated. Lastly, instructors should have a clearly delineated body of knowledge for which they are responsible, with access to subject matter experts, as required. Although not comprehensive, the proposed solutions have been effective in improving the quality of training at USAFSAM.

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Why Should Workers Participate in the Management of Health and Safety in the Workplace?

V. Lederer, Université de Montréal, Montreal, QC, Canada.

Over time, a multitude of strategies has been developed to measure and analyze risks to workplace health and safety. These methods remain impregnated with the dominant paradigm characterized by a tendency to systematic quantification and a very narrow and legalistic vision of the management of workplace health and safety to the detriment of a more profound consideration of the definition of risks, of occupational health and well being, and of the underlying reasons for the appearance of problematic situations in the workplace. Through examination of the question, “Why should workers participate in the management of health and safety in the workplace”? we will demonstrate the potential of a participative, worker-involved approach to exceed limits imposed by traditional methods of risk evaluation and management in the workplace. This approach fits within the Anglo-Saxon “human factors” theory, and supports the values of democracy, autonomy, responsibility, and confidence. The principle, practical, philosophical, and political justifications for the development and implementation of this approach in Quebec and elsewhere are the improvement of organizational and psychological conditions of a given enterprise, increased productivity, and the notion of a legal and ethical duty being implied in a company’s decision-making process. A company’s attitude regarding participative management of workplace health and safety, the various motivations for its implementation, and the adoption process used to move to the new approach from a company’s usual practices will greatly influence the results of implementation. Researchers agree, however, that participative management of workplace health and safety is about an effective and profitable approach to risk management, making it possible to exceed limits imposed by traditional approaches, the most important of which is the relevance of and adherence to the health and safety regulations in place.

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Occupational Hygiene and Safety Training in Poland: A Success Story of Collaboration with AIHA

J. Grzesik, Institute of Occupational Medicine and Environmental Health in Sosnowiec, Sosnowiec, Poland.

In Poland, a great fraction of the employed population is exposed to hazardous factors. Up to the end of the 20th century, professional training in industrial hygiene was provided only by secondary technical schools, and no possibilities of education on an academic level existed. In 1996, inspired by AIHA and with substantial assistance from members of the International Affairs Committee for Central and Eastern Europe, and especially from Aleksandra Nawakowski - the AIHA Ambassador to Poland - the Institute of Occupational Medicine and Environmental Health launched, in cooperation with the Technical University in Gliwice, a postgraduate certificate program, Studies in Industrial Hygiene and Safety. The certificate program was intended for graduates in engineering; physics; chemistry; technical, biological, and medical sciences; lawyers; and also for teachers and other academics employed as hygiene inspectors or leaders of hygiene departments in large industrial enterprises. The curriculum was developed with help from American university professors and members of AIHA and ACGH. The first two sessions had enrollment made up mostly of mining engineers responsible for safety and hygiene issues in coal mines. Participants in the next sessions covered a broad spectrum of academic faculties, and many of them worked as hygiene inspectors in different enterprises. The graduation ceremonies for the first two sessions were attended by AIHA presidents, and graduates received AIHA Acknowledgement Diplomas. After nine successful sessions, the number of graduates exceeds 200, and the program continues. The 10th session started in the 2008-2009 academic year and has about 40 participants. Worth mentioning is the fact that all graduates are working in the field of occupational hygiene and safety.

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Exploring the Industrial Hygiene Curriculum: Expectations and Perceptions of the Profession

D. Breeding, Texas A&M University - TEES, College Station, Texas.

Although the multidisciplinary profession of industrial hygiene (IH) has been established for many years, and IH practitioners have been prolific in developing the technical tools for recognition, evaluation, and control of workplace hazards, few in the IH discipline have turned the tools and methods of academic research toward the academic curriculum itself. A review of the literature revealed that published research in IH curriculum has been minimal, and that none has considered comparing faculty and employer expectations. Evaluating the nature of the current IH curriculum, and the preferences and expectations of the IH profession for graduates' competencies, is true to the goal of IH practice, i.e., conducting research as a basis for ongoing evaluation and review of existing programs, and using research findings to plan preventive interventions to ensure continued good health of both programs and impacted individuals. This research was an initial, exploratory study to identify and assess the expectations and perceptions of the IH faculty and employers in the areas of IH curriculum content and structure. The expectations and perceptions of IH academic program faculty were compared with those of employers of graduates of IH programs. Characteristics of current IH academic programs were identified, as a baseline for future evaluation of the IH curriculum. Actual and expected undergraduate majors of those entering IH masters programs were identified to aid in targeting effective recruitment programs and efficient resource allocation. The study populations' skill and capacity with computers and the Internet were assessed as an indicator of readiness to incorporate distance learning methodology and electronic media delivery into traditional classroom delivery of industrial hygiene education. Recommendations were given for model IH curricula derived from the survey participants' responses, and for future work.

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Teaching Industrial Ventilation in an Undergraduate Curriculum

G. Gillespie, The University of Findlay, Findlay, Ohio.

The University of Findlay has for more than 15 years offered an undergraduate industrial ventilation course as part of its Environmental, Safety, and Occupational Health Program. While the course includes the study of a number of hazards, including noise, temperature extremes, ergonomics, and radiation, a primary focus is the detailed study of ventilation principles of the control of hazardous gases, vapors, and aerosols. The course includes lectures, case studies analysis, calculations, and problem solving in the topic areas of the principles of airflow; natural ventilation; dilution ventilation; fans; collectors; testing instruments and construction blueprints and guidelines for local exhaust systems; and design of industrial ventilation systems. Ten separate instruments for velocity, flow rate, temperature, etc., are used by the students in the field investigation of university operations such as laboratory hoods, kitchen exhaust, etc. A recent addition to the course, possibly unique in undergraduate industrial ventilation courses, is the construction of a model ventilation system. A 5-hp blower exhausts four main branches, three of which represent the types of hoods (receiving, capture, and enclosing) and the final fit with exchangeable hoods and flanges. The model system allows the actual measurement of the types of situations pictured in the text and to test the equations and relationships described in the text. In this manner, the course allows the lecture of a particular principle, the assignment of homework and case studies about the principle, and now the visualization of the principle with hands-on measurement of hood face and multiple duct locations. The model system allows for the comparison of several types of instruments for the same measurement value.

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WITHDRAWN

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