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NIOSH/NORA: Why Safety and Health Professionals Should be Interested in Work Underway at NIOSH/NORA

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Introduction

The National Occupational Research Agenda (NORA) is a partnership program to stimulate innovative research and improved workplace practices. Unveiled in 1996, NORA has become a research framework for NIOSH and the nation. Diverse parties collaborate to identify the most critical issues in workplace safety and health. Partners then work together to develop goals and objectives for addressing these needs.

NORA has formed eight Sector Councils: Agriculture/Forestry/Fishing, Construction, Healthcare/Social Assistance, Manufacturing, Mining, Services/Public Safety, Transportation/Warehousing/Utilities, and Wholesale/Retail Trade. Each council is made up of representatives from academia, industry, labor, and government. The councils use an open

process to set goals, develop strategies, encourage partnerships, and promote improved workplace practices.

NIOSH/NORA has undertaken an ambitious program to improve safety and health in the workplace. Each of the councils has drafted goals, performance measures, and implementation plans for the nation. These agendas will provide guidance to the entire occupational safety and health community for moving research to practice in workplaces. In addition, a Cross-sector Research Council will be formed to identify opportunities for common research across sectors.

One of the most far-reaching programs supporting the NIOSH/NORA agenda is a national strategy for Prevention Through Design (PtD). One of the best ways to prevent and control occupational injuries, illnesses, and fatalities is to "design out" or minimize hazards and risks early in the design process. PtD includes the design of work premises, structures, tools, plants, equipment, machinery, substances, work methods, and systems of work. To this end NIOSH is leading a national initiative called Prevention through Design (PtD) to promote this concept and highlight its importance in all business decisions.

NORA

The National Occupational Research Agenda (NORA) is an effort facilitated by NIOSH that invites partners to work together to define research priorities, conduct the research and move the results into workplace practice to benefit the health of workers. It is described on the NORA portion of the NIOSH website at http://www.cdc.gov/niosh/nora. NORA was started in 1996 and engaged a number of partners in accomplishing research and outreach activities that could not have been done by any single organization. For the first ten years, NORA priorities were defined as 21 areas, such as, Hearing Loss, Traumatic Injuries, Organization of Work, Special Populations at Risk, and Intervention Effectiveness Research.

As it entered its second decade, NORA was restructured around eight sector groups to enhance research-to-practice (r2p). The thinking was that if we want to improve our impact on the health of workers, we need to meet them where they are. By partnering with corporations, unions, trade associations, professional associations and many others who tend to identify themselves with sectors, we are establishing better communication about the issues that are most important for researchers to tackle, the opportunities to work together to conduct the research, and avenues for applying the research results to reduce the burden of occupational injuries and diseases on workers, employers and the nation.

There are a number of ways that a member of ASSE can be involved. For example, during 2006, NORA invited all stakeholders to submit information about the most important safety and health problems facing workers, how research could make a difference and partners who could work together and/or with NIOSH on the issue. We received many hundreds of comments through the website and in over a dozen NORA Town Hall meetings held around the country, including Puerto Rico. ASSE publications urged members to participate. The comments NORA received can be searched and viewed on the NORA website.

NORA Sector Councils were established in each sector with the initial charge to develop a draft set of priorities for the nation in their sector. They have worked hard, including a number of

ASSE representatives, and most have posted draft strategic plans for their sector on the NORA website for public comment. See if the issues you think are most important are being addressed in an appropriate way and submit a comment to guide the Council toward improving the sector strategic plan.

Councils consist of members who attend the two face-to-face meetings each year and corresponding members who sometimes just receive updates on Council deliberations but who often join the members in workgroups where most of the hard work is accomplished during teleconference calls. Contact Sidney Soderholm or the sector coordinator listed on the website if you would like to join a Council.

The Councils' work is not done. Each Council is considering comments on its draft agenda and preparing a "final" version that will be modified as circumstances change. More importantly, each Council will continue to identify opportunities for individuals and organizations to work together to make progress in the many high priority areas that have been identified. Some of the work that is needed is research but much of it consists of organizations working with each other and/or NIOSH to develop information and then deliver it effectively to employers and workers so they see the value of implementing changes that benefit everyone. These implementation efforts will guide the Councils' future work.

We are serious about NORA being a catalyst for partnerships, with or without NIOSH involvement. In fact, NORA Symposium 2008: Public Market for Ideas and Partnerships is both a conference being held in Denver in July and a Virtual Conference allowing anyone with internet access to view the posters of researchers and other professionals seeking partnerships. These partnerships may be to discuss a research idea, complete a research project or move the results of past work into workplace practice. Attend the Symposium, especially if you live close enough to make the trip conveniently. But even if you don't, participate in the Virtual Symposium during the two weeks after the conference to decide whether any of the opportunities presented in the posters excite you enough to become involved.

Please visit the NORA website, submit comments on documents, offer suggestions or join a Council to make progress on the priorities that have been identified. There are more details about all of this on the NORA website. Any time you would like more information, contact Sid Soderholm at noracoordinator@cdc.gov.

Prevention through Design (PtD)

NIOSH has partnered with the ASSE and many other organizations to launch the Prevention through Design (PtD) National Initiative. The purpose is to develop and implement a PtD Strategic Plan. As occupational safety and health professionals have known for years, eliminating hazards and controlling risks to workers "at the source" or as early as possible in the life cycle of items or workplaces is more effective than dealing with problems after they occur or requiring workers to concentrate on them. This is what PtD is all about – preventing work-related injuries and illnesses by smart design of work premises, structures, tools, plants, equipment, machinery, substances, work methods, and systems of work.

A growing number of business leaders are recognizing PtD as an effective means to reduce worker injuries and illnesses, control workers' compensation costs, increase profits and competitiveness by keeping workers healthy and on the job, and enhance general occupational safety and health. Many U.S. companies openly support PtD concepts, see them as important components of lean systems for products and services, and are developing management practices to implement them.

The ultimate goal of the PtD initiative is to prevent or reduce occupational injuries, illnesses, and fatalities through the inclusion of prevention considerations into all designs that impact workers. Along the way, activities and intermediate goals will be identified through a strategic planning process to provide a path toward achieving the ultimate goal. NIOSH will serve as a catalyst to promote the initiative, but in the end, partners and stakeholders like you must actively participate to make the culture of PtD business as usual in the 21st century.

The approach being taken to develop the strategic plan encourages stakeholder input by industry sector, consistent with the ones used under the National Occupational Research Agenda (NORA). In addition, four overarching functional areas are addressed: Research, Education, Practice, and Policy.

This sector-based / functional area approach to strategic planning was introduced at the first PtD Workshop held in Washington DC July 9-11, 2007. The workshop officially launched the PtD National Initiative and attracted approximately 225 participants from all the NORA industry sectors and diverse disciplines. The workshop included plenary speakers highlighting the success of PtD in several industries; breakout sessions to identify opportunities, barriers and next steps for each industry sector; and cross-industry breakout sessions to map out the top overarching issues for PtD in the functional areas of Research, Education, Practice, and Policy. A draft list of the high-level issues raised is:

- Establish the Business Case for PtD
- Develop and Share PtD Case Studies
- Develop PtD Expertise
- Drive Culture Change
- Establish Links to Sustainability
- Clarify/Influence Liability
- Develop/Identify Standardized Processes and Tools
- Informatics
- Small Business Issues
- Regulations and Standards

As an example of the overarching issue identified as "Develop PtD Expertise," a widely recognized barrier to the implementation of PtD is that most new engineers have little, if any, training on occupational safety and health. As a result, industry expends substantial time and money educating engineers and retrofitting equipment, systems, and facilities to reduce risks from hazards that are not addressed during the design process. Participants at the workshop made it clear that today's U.S. and international businesses have a growing demand for new engineering graduates that possess knowledge in PtD concepts and basic occupational safety and health principles.

The PtD National Initiative is emphasizing the importance of including occupational safety and health and PtD principles in undergraduate engineering school curricula. Teaching such information need not require stand-alone courses in already full curricula. An introduction to simple occupational safety and health concepts and PtD training can be provided to engineers through existing course structure by example and case study, particularly in advanced design classes. Further, authors of engineering textbooks could weave occupational safety and health messages into new editions as they are being written. One of the NIOSH projects underway through the NORA funding mechanism is identifying engineering textbooks that can benefit by adding these messages to new editions.

The output from the July 2007 PtD Workshop will be used to guide and develop a strategic plan that highlights actions and milestones to institutionalize the concept throughout the United States. The workshop proceedings are being published in detail in the April 2008 Journal of Safety Research. The entire journal will be devoted to PtD, and will also include several peer-reviewed technical papers authored by experts in PtD. There is also a newsletter available by email called *PtD in Motion*. Please feel free to offer your comments about PtD or request to be put on the newsletter email list by sending a note to ptd@cdc.gov. Additional information about initiative can be found on the NIOSH website at: http://www.cdc.gov/niosh/topics/PTD/.

NORA Sector Example – Construction

Construction provides a useful case to help describe the benefits of getting involved with NORA. First, many types of safety and health problems and solutions are viewed by professionals as industry-specific, and their own organizational structures reflect this - the large ASSE "Construction Practice Specialty" provides a good example. The ability to frame a research and practice agenda by sector offers the potential to align these interests and perspectives. Second, the approach being used for the second decade of NORA explicitly focuses on the very ambitious goal of "making an impact" by reducing injuries, illnesses, exposures. This is the starting point for developing strategic goals and eventually identifying research needs. Thus the NORA process is designed to prioritize around relevance and impact, and it includes development of performance measures to track progress. Third, the NORA process explicitly acknowledges the key role played by "intermediate" sector groups such as safety and health professional associations (e.g. the Construction Practice Specialty) , construction labor groups and worker organizations, industry trade associations, workers compensation insurance companies, state and federal agencies, industry consensus groups etc. These groups are described as intermediate because they are positioned between researchers on one side and "end users" such as construction workers, contractors and subcontractors, and construction clients on the other. Intermediate groups are the primary customers for research findings, and it is their use of research combined with their influence on end users that brings about the changes that result in improvements in safety and health. Intermediate construction groups are the major representatives on the NORA Construction Sector Council, and developing "intermediate goals" is the most challenging aspect of developing a National Construction Agenda. Intermediate goals are intended to directly address the information, activities, and solutions needed to assist intermediate groups in their day-to-day work with construction workers and contractors in support of strategic goals. NORA is designed so that identification of these intermediate goals then determines what research and research-to-practice efforts will be needed. The take home message is that safety and health

professionals and other intermediate groups have a major role to play in NORA, and that it has been structured to encourage your involvement and to generate solutions that you can use to make an impact.

The NORA Construction Sector Council identified ten "top problems" and developed fourteen strategic goals comprising a National Construction Agenda to address them. Seven address important construction outcomes and seven address contributing factors that cut across and influence the various outcomes. They are listed below:

1-3. Reduce three major sources of traumatic injuries and fatalities: falls, electrocutions, and struck-by and caught between incidents.
4-6. Reduce three major health exposures/illnesses; noise, silica, and welding fumes.
7. Reduce major sources of musculoskeletal disorders
8. Increase understanding of factors that comprise both positive and negative construction safety and health cultures; and, expand the availability and use of effective interventions to maintain safe work practices 100% of the time in the construction industry.
9. Improve the effectiveness of safety and health management programs in construction and increase their use in the industry.
10. Improve understanding of how construction industry organization factors relate to injury and illness outcomes; and increase the sharing and use of industry-wide practices, policies, and partnerships that improve safety and health performance.
11. Increase the recognition and awareness of construction hazards and the means for controlling them through broad dissemination of quality training for construction workers, including non-English speaking workers.
12. Increase understanding of how vulnerable worker groups experience disproportionate risks in construction work and expand the availability and use of effective interventions to reduce injuries and illnesses among these groups.
13. Increase the use of "Construction Hazards Prevention through Design (CHPtD)" approaches to prevent or reduce safety and health hazards in construction.
14. Improve surveillance at the Federal, State, and private level to support the identification of hazards and associated illnesses and injuries; the evaluation of intervention and organizational program effectiveness; and the identification of emerging health and safety priorities in construction.

Each strategic goal has from three to eight intermediate goals, and each of those in turn has from two to seven research or research-to-practice goals. The complete goal language is available at: http://www.cdc.gov/niosh/nora/councils/const/pubprod.html. Examples of some of the intermediate goals for various strategic goals include:

- Work with construction partners to develop and implement a national campaign to reduce fatal and serious injuries associated with construction falls to a lower level
- Promote the availability and use of operator visibility limit information for road construction equipment.
- Increase the availability and adoption of quieter tools and equipment in the construction industry via research and implementation of a "Buy Quiet" campaign.
- Increase awareness about silica hazards and known solutions among construction workers, contractors, owners, and suppliers

- Develop a set of validated measurement methods of safety culture in the construction industry.
- Partner with best practice small employers to identify the most important safety and health management elements and increase the use of programs tailored to small construction employers.
- Study and improve the effect of various workers compensation arrangements and mechanisms on construction injury and illness at the system level.
- Partner with professional associations, surveillance experts, insurance companies, regulatory and consultation organizations to explore, develop, and implement new types of construction-sector hazard, exposure, and performance indicators to supplement current surveillance approaches.
- Develop incentives for architects and engineers to include methods for safer project erection, operation, service and maintenance in facility design plans and specifications.

In sum, NORA is providing a framework for sector stakeholders to work together on a shared subset of important issues. The strategic goals address issues that should resonate with all sector safety and health professionals. The NORA initiative is not just about NIOSH: it is intended to provide a national sector program that each and every stakeholder can be involved with. NIOSH encourages stakeholders to make a commitment to working on at least two strategic goal topics that match your interests. Participation can range from making your job sites accessible to researchers for field research to taking the lead on developing research-to-practice products to developing and sharing case studies on goal topic issues. The NORA Sector Council members will rotate over time so there are opportunities to participate on the council as it takes on a role to discuss implementation. Another option is to participate as a corresponding member on a strategic goal workgroup. There are also opportunities for partnering at the organizational level – such as with the ASSE Construction Practice Specialty. Please join us by contacting the NORA coordinator for the industry grouping you are most interested in.

NORA Sector Example – Wholesale/Retail Trade

In 2005, there are some estimated 21 million workers in the Wholesale and Retail Trade (WRT) sector. In 2004, approximately 843,000 workers were injured. Also in 2004 there were 575 fatalities, more than any other sector. While the injury rates may be low, the actual number of injuries is large by virtue of the size of the workforce. The WRT has one of the most diverse workforces and the sub-sector workplaces. The workforce includes old workers, young workers, full-time workers, part-time workers, experienced workers, and inexperienced workers. The sub-sector businesses include everything from mail-order houses, small “mom and pop” stores, conveniences stores, gas-stations, all the way up to large retail store chains.

The large number of injuries, the diversity of the workforce, and the diversity of the sub-sector businesses create a unique challenge in WRT. Surveillance data has identified “hot spots” in WRT. Based on this, the NORA/WRT sector has drafted the following strategic goals:

- Reduce the incidence and severity of work-related musculoskeletal disorders (MSDs) among wholesale and retail trades (WRT) sector workers.

- Reduce the incidence and severity of injuries from falls and contact-related injuries (FC-RIs) among wholesale and retail trades (WRT) sector workers.
- Reduce the incidence and severity of motor vehicle-related injuries and fatalities among workers at highest risk sub-sectors in the WRT sector businesses.
- Reduce the incidence and severity of injuries and illnesses due to workplace violence among WRT sector workers who work in high risk establishments such as gasoline stations, convenience stores, and liquor stores.

An analysis of the WRT surveillance data reveals some interesting statistics. In WRT highway fatalities are the most prevalent. Sales and related occupations, transportation and material moving occupations rank highest in this group. Within wholesale, transportation incidents and contact with objects and equipment account for 75%. In retail, 80% of the fatalities involve transportation incidents and assaults/violent acts. Homicides are prevalent in Food/Beverage Stores, Gasoline Stations, and General Merchandise Stores.

Injuries in wholesale are highest in grocery and beer/wine/alcohol related businesses. Trunk, upper, and lower extremities account for most of the injuries. In retail, the majority of the injuries are in grocery, department, general merchandise, and building materials/supply stores. Food/beverage, general merchandise, motor vehicle/spare parts, and building material/garden supplies have the highest incidents of trunk, upper and lower extremities. Overexertion, falls, contact with objects, sprains/strains, containers, worker motion/position, floors, walkways and ground surfaces are prevalent

NORA Sector Example –Mining

Although the National Institute for Occupational Safety and Health (NIOSH), was originally created as part of the 1970 Occupational Safety and Health Act, the agency has a comparable role when it comes to mine safety and health. The 1977 Mine Act specifically granted NIOSH rights comparable to those of Mine Safety and Health Administration personnel, in terms of rights of entry to mines, and designated it as authorized to carry out research on mine safety and health issues, with the goal of informing regulatory actions and assisting the mining community in areas such as training and compliance assistance. More recently, the U.S. Bureau of Mines – long a part of the Department of Interior – was incorporated into the Department of Health and Human Services, and its longstanding technology centers and their staff have become part of NIOSH as well, continuing the work programs started under the organic statute.

The mining sector of the American workforce is comprised of over 300,000 workers, plus many more that are in the related oil and gas extraction sub-sector. Among the risk factors that are inherent in the mining environment are falling materials, explosions, fires, powered haulage, electrical dangers, health exposures (coal dust, diesel particulate, silica, and asbestos), noise and ergonomic hazards.

The past two years have presented many challenges for those in the mining industry, in terms of complying with new legislative mandates, new MSHA regulations, and in dealing with a negative public image in the wake of the Sago and Crandall Canyon mine disasters. The 2006 MINER Act created new work for NIOSH, which has already been incorporated into the agency's research

program. Much of this deals with communications and tracking methodologies, as well as issues such as rescue equipment, escape technology and training, efficacy of seals, and ventilation related to dust/gas issues. A technical study panel on the utilization of belt air and the composition and fire retardant properties of belt materials in underground mines are also part of the ongoing work program for mining through NIOSH. A review of Requests for Applications (http://www.cdc.gov/niosh/oep/finding.html) on the NIOSH website demonstrates the avenues through which improvements in underground mine communication, tracking, refuge chambers and Self-Contained Self-Rescue devices ("SCSRs") are being explored through NIOSH's intramural and extramural research program.

In addition to research grants, NIOSH is also communicating with foreign officials to review findings and evaluate alternatives used in other nations' mines to assist emergency communications and tracking. In the FY 2008 supplemental appropriations, Congress provided $10 million to increase the availability of communication and tracking technologies, oxygen supplies, and refuge technologies by enabling extrapolation of these technologies from other industries (including the space program and defense applications) and to facilitate adaptation of prototypes to commercially marketable technology as rapidly as possible.

The pending "S-MINER" Act (S. 1655 and H.R. 2768) contains mandates to direct NIOSH's program of research and technological development. Section 106(b) of the S-MINER Act, which has already passed the House of Representatives, builds on the initial mandates in the 2006 law, and contains the following directives:

> In implementing its research activities in the 5-year period beginning on the date of enactment of this Act, the National Institute for Occupational Safety and Health shall give due consideration to new technologies, and existing technologies that could be adapted for use in underground coal or other mines, that could facilitate the survival of miners in a mining emergency. Such technologies include—
>
> > (1) self-contained self-rescue devices capable of delivering enhanced performance;
> >
> > (2) improved battery capacity and common connection specifications to enable emergency communication devices for miners to be run from the same portable power source as a headlamp, continuous dust monitor, or other device carried by a miner;
> >
> > (3) improved technology for assisting mine rescue teams, including devices to enhance vision during rescue or recovery operations;
> >
> > (4) improved technology, and improved protocols for the use of existing technologies, to enable conditions underground to be assessed promptly and continuously in emergencies, so as to facilitate the determination by appropriate officials of the instructions to provide both to miners trapped underground and to mine rescue teams and others engaged in rescue efforts;
> >
> > (5) improvements to underground mine ventilation controls separating mine entries to be more resistant to mine fires and explosions, particularly in those entries used for miners escapeways;

(6) mine-wide monitoring systems and strategies that can monitor mine gases, oxygen, air flows, and air quantities at strategic locations throughout the mine that would be functional during normal mining operations and following mine fires, explosions, and roof falls, including systems utilizing monitoring sensors that transfer data to the mine surface and the installation of tubing to draw mine gas samples that are distributed throughout the mine and can quickly deliver samples to the mine surface; and

(7) protective strategies for the placement of equipment, cables, and devices that are to be utilized during mine emergencies, such as communication systems, oxygen supplies, and mine atmosphere monitoring systems, to protect them from mine fires, roof falls, explosions, and other damage.

Although Congress can delegate work of this nature to NIOSH, this does not obviate the role or work partnership assigned to the mining sector council of the National Occupational Research Agenda (NORA). As noted above NORA serves as a research framework that has both industry-specific spokes and a larger cross-sectional wheel that connects these sectors and leverages the work product to maximum advantage. Although mining has unique safety and health challenges, much of the sector's work agenda has cross-applicability to other areas including construction and transportation.

The efforts of NORA's mining sector council are complemented by the work of the Mining Safety and Health Research Advisory Council (MSHRAC). Currently, MSHRAC is focusing on defining the research priorities while the NORA mining sector council is engaging in outreach efforts to small mines and contractors involved with the mining industry. Members of ASSE's Mining Practice Specialty are engaged in this process.

MSHRAC and the NORA Mining Sector Council utilizes the same partnership model as other sectors, integrating labor, industry, MSHA and state agencies toward the common goal of protecting the industry's most precious resource: the miner. As noted above, the work plan includes such elements as: hearing loss prevention, personal dust monitors, communication systems, coal mine seals, etc. There are seven strategic goals of the NIOSH mining research program:

1. respiratory hazard reduction,
2. disaster prevention and response,
3. prevention of noise-induced hearing loss,
4. traumatic injury prevention,
5. reduction of cumulative trauma disorders,
6. reduction of hazards associated with ground control, and
7. surveillance and intervention effectiveness.

The work of the NORA Mining Sector Council will complement the contributions of MSHRAC's recommendations and fulfillment of congressional mandates. It will focus on increasing partnership opportunities and outreach, and identification of the needs of small mining operations. Examples of current mining-related research efforts include:

- Machine Safety: NORA's traumatic injury research is being leveraged to develop machine design guidelines and evaluate improved hardware that can reduce injury to personnel operating and working near machinery and mobile equipment. In the last decade, the mining sector reported more than 3,300 lost-time injuries involving belt conveyors, many of these arising from maintenance and repair work. Many fatal accidents also involved traumatic injuries from machinery. The NORA initiative also is developing improved internal traffic control plan guidelines and innovative safety warning devices to protect pedestrians at mine sites, with cross-applicability to highway construction work zones.

- Electrical Safety: Electrical hazards are generally one of the top five leading causes of death to mining sector workers, and approximately five percent of electrical incidents are fatal. The objective of the electrical safety research program is to improve safety by focusing on trailing cables, motors, trolley systems, ground-fault protection, explosion-proof enclosures, and intrinsically safe circuits. Overhead power lines are also a serious electrical hazard at mines relative to large haulage equipment, cranes, and drill rigs. NIOSH is working on overhead power line contract alarms for mobile equipment, which will help sense contact with power lines through the use of a current transformer and an electric field sensor. Additional safety devices, such as insulated load links, are also being investigated. In terms of electrical hazards in gassy mines, laser technology is being considered for measuring methane concentrations at the face areas of these mines, and through a NORA traumatic injury project – Laser Safety in Potentially Flammable Environments – the use of lasers in atmospheres containing flammable dusts and gases, is being investigated. Recommendations from this project may impact consensus standards issued by ANSI (Z136 series laser standards), and those of the International Electrotechnical Commission (IEC).

- Coal Mine Fires: NIOSH is investigating remote methods for addressing coal mine fires through small NORA project at the NIOSH Lake Lynn Laboratory. The work includes evaluating rigid foam and a combination of cement and foam-based technology for improved mine seals. A second phase of the three-year project will involve testing inert gas and gas-enhanced foam against common suppression technology. The third phase will involve testing of jet engine exhaust technology for mine fire suppression. The final phase is reserved for a full range of technology transfer efforts (publications, seminars etc.) and further refinement of technology.

- Hearing Loss Prevention: Noise overexposure is a serious mining industry health hazard because of the unavoidable use of heavy equipment, drilling of rock, and work in a confined area. Approximately 80 percent of miners work daily in an environment where the 8-hour time-weighted average exceeds 85 dBA. NIOSH research shows that, by age 50, 90 percent of coal miners have hearing impairment; nearly half of metal/nonmetal miners are similarly affected. The NORA agenda includes education, surveillance, and intervention, as well as research on engineering controls for noise. The NIOSH health branch has multiple projects underway, including investigating use of water when operating continuous miners and roof bolters to decrease sound levels by at least 5 dB. Hazard awareness training initiatives are also focusing on surface drillers, who are regularly exposed to noise above the 90 dBA-level (the MSHA permissible exposure limit). Collaboration with drill manufacturers is part of the initiative, to look at engineering controls such as partial cabs to protect operators from overexposure during drilling operations. A related project explores blasting practices to measure pressure histories from unconfined detonation of exposures, and examines

audiometric models to determine if they correctly predict risk and damage criteria associated with mining industry impulse noise.

The NORA Mining Sector Council is co-chaired by its private representative, Adele L. Abrams (a Certified Mine Safety Professional and attorney, who represents the American Society of Safety Engineers' Mining Practice Specialty), and NIOSH staff representative Tony Iannacchione, taking over this position from Mike Werner, who retired at the end of 2007.

Summary

NIOSH/NORA has undertaken an ambitious agenda to improve safety and health in the workplace. The first part of this agenda is the restructuring around eight sector councils: Agriculture/Forestry/Fishing, Construction, Healthcare/Social Assistance, Manufacturing, Mining, Services/Public Safety, Transportation/Warehousing/Utilities, and Wholesale/Retail Trade. Each of the eight councils have set or are in the process of setting goals, developing strategies, encouraging partnerships, and promoting improvements workplace practices. One of the most far-reaching programs supporting the NIOSH/NORA agenda is a national strategy for Prevention Through Design (PtD). This program is centered around "designing out" or minimizing hazards and risks early in the design process rather than managing them afterwards. Safety professionals can become involved in any one of these programs. There is a lot of information available on the NIOSH website http://www.cdc.gov/niosh/nora.