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Occupational Health, Hygiene & Safety

OHHS NEWS

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About us

Nayati international is a non-profit and tax exempt organization committed to working for a better quality of life through research and education. Some of the areas of our interest include Occupational and Public Health Issues, Environment, Consulting, Epidemiological Studies and Surveys, Technology and information sharing etc. With a Board of qualified and committed members, our goal is to educate and train the global community and promote research activities that will continue to enhance the quality of our lives.

From nayati to you

Dear Colleagues,

We at nayati would like to thank you for all the support and the very encouraging feed back we received from you for our first issue. We are particularly glad that you found the venture useful and we sincerely hope that we can consolidate the occupational health and hygiene profession.

While the newsletter was developing, we were also working on the logistics of registering nayati International in India. Our second issue is with you now, albeit a little later than what we planned to. Hope you will support it, as you did before. Please feel free to let us know your suggestions and comments through the reply card or by email to services@nayati.org. It was very encouraging to receive several completed reply cards. It is helping us very much to coordinate our mailing and making sure it reaches appropriate persons and departments. Eventually it will also help bring all the occupational health professionals together which is one of the goals of this project. We request the readers who have not sent the cards, to please do so. It will help us serve you better. Please keep updating us of any changes so that we can continue reaching you.

As we have requested before, we would like to make the newsletter a forum for all the participants in the industry to discuss, express their views and opinions; and share experiences to the benefit of the rest of us. Please feel free to contribute your thoughts about various topics related to the industry that you would like to share with the readership and your peers in India and abroad. We also plan to take the newsletter on line as some of you have suggested - after few more issues and once we feel that we have done a good job of introducing it to most of the Occupational Health community. Although electronic versions are significantly less expensive to publish and distribute, we chose to go with print initially because we feel it is not only the most appropriate way to make an introduction but is more portable and accessible. We would like you to take the magazine and the contents with you, share it with your peers and colleagues and read the articles through at your convenience.

In addition to some very good discussions on management and occupational health research, we have tried to make this issue a little more technical than the last one. We are also trying to include our young scientists and writers in this project by encouraging them to think of health and safety in whatever profession they chose to study. As a start, we have included a small article from one of our young readers who probably would be associated with lot of safety issues in the chemical industry - an article on what she thinks are every day occupational health issues and what we can do to improve.

On a final note, occupational health issues, like public health are best served through community participation. There is a great need for the Indian industry which is competing in the global markets to quickly catch up with the developed world. The most efficient way this can be done is through community empowerment and "participatory action". It is one of our goals to empower the communities to create a safe work and living environment with your support.

Please let us know if there are specific topics of interest that you would like to see us cover. We will do our best to keep you abreast of the current and relevant information.

Thank you and we will stay in touch with our next issue.

Lalitha Burra, Ph.D., CIH
Director, nayati International.

Please send all submissions - articles, news items, letters, sponsorship and advertisement details via email to lalitha@nayati.org.

Our editors' reserve the right to choose the material for publication, to edit for style, content and length of articles.

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Occupational Health Research in Developing Countries:

A Partner for Social Justice

Iman A. Nuwayhid, MD, DrPH

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Occupational health remains neglected in developing countries because of competing social, economic, and political challenges. Occupational health research in developing countries should recognize the social and political context of work relations, especially the fact that the majority of developing countries lack the political mechanisms to translate scientific findings into effective policies.

Researchers in the developing world can achieve tangible progress in promoting occupational health only if they end their professional isolation and examine occupational health in the broader context of social justice and national development in alliance with researchers from other disciplines. An occupational health research paradigm in developing countries should focus less on the workplace and more on the worker in his or her social context. (Am J Public Health. 2004; 94:19161921)

HEALTH AND SAFETY

Innovations in the workplace, with low-cost and locally relevant solutions, have been initiated in several developing countries.[13] However, occupational health remains neglected in most developing countries under the pressure of overwhelming social, economic, and political challenges.[46] The traditional workplace oriented occupational health has proven to be insufficient in the developing world, and tangible progress in occupational health can be achieved only by linking occupational health to the broader context of social justice and national development.[710] In this article, I describe the history and current state of occupational health in industrialized countries to argue that occupational health researchers in developing countries must focus less on the workplace and more on the worker and the worker's social context in which workplace practices are embedded. Leading occupational health research issues are grouped into 2 domains: an internal domain, which focuses on the workplace (micro environment), and an external contextual domain, which examines the wider social and global issues. Figure 1 lists examples of issues that are addressed in each domain.

LESSONS FROM THE INDUSTRIALIZED WORLD

A striking characteristic of occupational health in the industrialized world, and a message frequently disseminated in developing countries, is the contribution of science to progress in occupational health through data collection, ongoing assessment of problems, and innovative technological solutions.[11] However, what is rarely mentioned is the presence in developed countries of a political mechanism that mediates the translation of scientific findings into policies and regulations that are enforced by specialized agencies. In fact, very little progress in occupational health has been or can be achieved without such a mechanism. The history of occupational health in the United States and other industrially developed countries shows that progress has not been linear; occupational health has been influenced primarily by events outside the field, namely social movements and changes in the delivery of health care and perception of health.[11-14] Setbacks and regressions caused by changes in the political mood and the popular attitude toward work-related risks are not infrequent.[12,15] Nevertheless, the occupational health community has succeeded, even in less favorable times, in addressing occupational health issues by participating in a process of risk assessment and risk management that "determines" the validity and strength of scientific findings versus the economic, technological, and sociopolitical feasibility of intervention.[16]

Occupational health researchers in industrialized countries investigate the effect of work on health, depending on a process that translates their scientific findings into policy. A case in point is the current National Occupational Health Research Agenda in the United States, which, in spite of an iterative process of consultation, still focuses on disease and injury, work environment and workforce, and research tools and approaches.[17] Those priorities are limited mostly to the internal domain of occupational health, although the

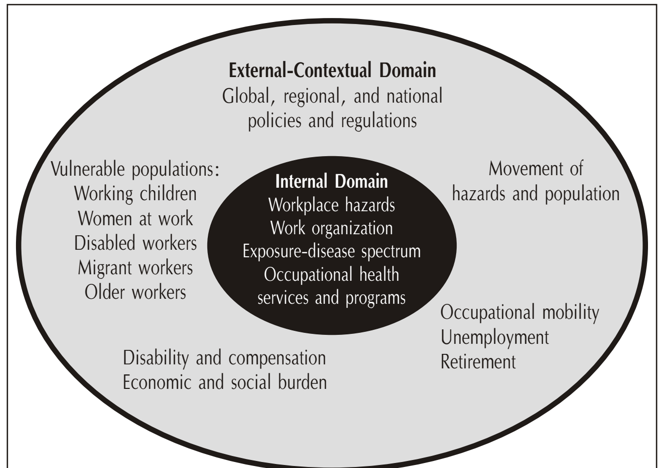

FIGURE 1-Domains of occupational health research.

National Occupational Health Research Agenda encompass the understanding of the health effects of long-term exposure to low hazard concentrations as well as the identifications of early indicators of exposure and subclinical health effects. The workplace-centered approach, although limited, serves well the cause of occupational health in developed countries; this is not necessarily the case for occupational health in developing countries. By contrast, without similar parliamentary or democratic political mechanism(s) and risk assessment processes, the industrialized model cannot be imported to developing countries.[5]

OPTIONS FOR OCCUPATIONAL HEALTH RESEARCH IN DEVELOPING COUNTRIES

Current deficiencies of occupational health in the developing world reported in such disparate locations as Bangladesh,[18] Central America,[19] Lebanon,[20] South Africa,[8] and Thailand[21] are attributed to a lack of governmental interest in occupational health, poor data and data collection systems, and weak enforcement of health and safety regulations.

Occupational health professionals have repeatedly wondered why governments in these countries are relatively unconcerned with occupational health, and why occupational health is absent where it is most needed,[22] particularly given that clear empirical links exist between good occupational health practices, a healthier labor force, and improved productivity. Indeed, workplace interventions such as proper occupational hygiene and ergonomic practices have been presented as one of the tools to break the cycle of poverty, because these improve productivity, salaries, and, consequently, living conditions.[5,23,24] However, this sequence of positive impacts is not clear to decision makers in most developing countries, who still perceive occupational health as a luxury.

Therefore, many occupational health professionals advocate that occupational health research in developing countries focus on gathering and disseminating information on workplace hazards to make a stronger and more convincing case for the importance of occupational health.[25] This claim is further substantiated by the few internationally funded research projects that clearly show an effect on capacity building and change in practices or policies.[19,26-28] It is true that traditional occupational health research is necessary in developing countries. However, there are several reasons why traditional occupational health research is not sufficient.

Although it is true that "assessment of the health impact of occupational risks is important for social recognition of these risks, to plan and facilitate adequate interventions for their prevention and to adequately manage the health burdens they cause,"[29(p265)] the primary obstacle to occupational health in most developing countries remains the lack of a political mechanism that translates information into action. In reality, policymakers in the developing world do not lack information. A casual walk through any type of workplace in most developing countries would easily uncover the range of unsafe practices and occupational hazards. Policymakers are still driven by the need to address other "more pressing" social and health issues[30] that are politically less complicated and more saleable to the general public.

The solution to occupational health problems in developing countries therefore requires not only technological innovation[31] but also significant institutional and legal developments.[32] Occupational health researchers should understand the "political economy" of the labor market at global, regional, and nation state levels.[33,34] They must recognize the leading role of forces fighting for social justice, particularly the role of organized labor, which is instrumental to advancing national occupational health agendas and ratifying international labor laws, notwithstanding the repression they face and their questionable representation of the interest of their constituency in many developing countries.[31-36] Occupational health researchers in developing countries also must be alert to the potentially negative effect of global trade on the health and safety of poor and marginalized workers.[37] Research should contribute to the international call to hold multinational corporations accountable to international ethical occupational health practices.[38]

Consequently, a different research paradigm is warranted for occupational health research in developing countries. The paradigm should make the most efficient use of existing assets and minimize conflict with practical realities. Specifically, instead of focusing on the workplace as an isolated entity and moving outward to the wider social and political arena as done in occupational health

Specifically, instead of focusing on the workplace as an isolated entity and moving outward to the wider social and political arena as done in occupational health research in industrialized countries, occupational health research in the developing world should focus on the social and political issues and then move inward to address the particularities of the workplace

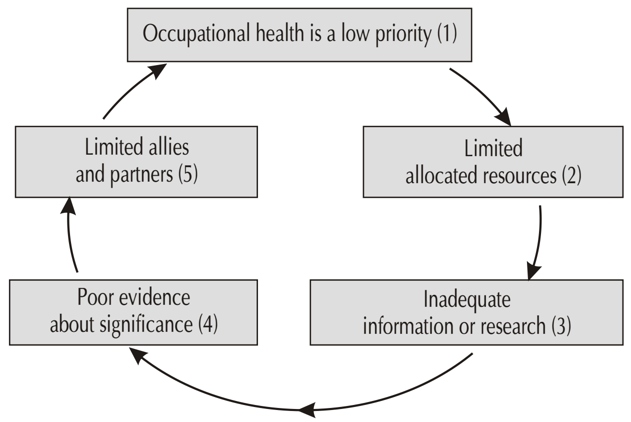

FIGURE 2- The occupational health cycle of neglect in developing countries.

research in industrialized countries, occupational health research in the developing world should focus on the social and political issues and then move inward to address the particularities of the workplace (i.e., from the "external contextual domain" to the "internal domain"). This approach builds a wider alliance up front with social scientists, economists, political scientists, unionists, non governmental organizations, women's organizations, human rights groups, and others as an entry point into the occupational health field. In other words, the occupational health vicious "cycle of neglect" in developing countries (Figure 2) should be broken at the allies' link (step 5) to build consensus[22] and "fundamental change in the attitude" (emphasis added) toward the day-to-day exposure to risk.[39(p532)]

Occupational health research should be "mainstreamed" as an integral component of public and environmental health reseach[7,8,40,41] and placed in its broader social and cultural context[42] by addressing issues such as globalization, the importation of health hazards, women at work, migrant workers, and child labor, in addition to the narrower social and economic burdens of work-related diseases and injuries. This approach underscores the often forgotten multi disciplinary nature of our profession and calls for research that considers social and economic development within the broader public health context.[12,23] This occupational health research approach also would increase the pool of professionals, community organizations, unions, and activists concerned with occupational health. Involving unions and community organizations in defining the occupational health research agenda ensures its relevance to people striving for better working and living conditions in their countries. It also should provide evidence to grassroots intervention programs to improve the working and living conditions of workers in the face of official neglect. By such means, occupational health research may help create responsive political mechanisms within developing countries.

SELECTED ILLUSTRATIONS

Silicosis, asbestosis, lead toxicity, and pesticide poisoning represent striking case studies in which an occupational illness "stepped out" of the isolation of the workplace and into the realm of environmental and public health concerns and, more importantly, into the general public consciousness.[43] These occupational diseases were eventually recognized as social diseases rather than occupational illnesses[44,45] and were thus perceived by the public as scourges against social justice and basic human rights. This transformation in the public's risk and health perceptions led to sweeping reforms in workplace health and safety practice and regulations in the industrialized countries.

Similarly, in the developing world, several innovative, integrative occupational health programs have succeeded in examining the interplay between work and widespread nonoccupational illnesses, such as AIDS and tuberculosis, and thus have succeeded in linking occupational and environmental health.[40,46] Such initiatives are perfect examples of programs that take occupational health research out of its "splendid isolation."[47] Child labor presents yet another example in which partnership with other researchers from the disciplines of social science, public policy, and economics is built to counteract the social and economic basis for child labor.[48]

Two occupational health issues are presented to further illustrate the point that an isolated, workplace-based approach falls short of responding to the challenges of occupational health in developing countries.

Women and Work

In addition to their domestic responsibilities of childbearing, child rearing, and family care, women in the developing world have worked in the agricultural and informal sectors for millennia. However, because their work is usually not valued monetarily in these sectors, it is often discounted and rendered invisible. In the formal sector as well, gender inequalities are commonplace in such areas as limited job opportunities, limited tracks for promotion and leadership responsibilities, and discrimination based on work hazards. Women's work, particularly in the developing world, is not adequately protected by national policies and is generally restricted by traditional social norms and such misperceptions that women's work is less significant, is merely supplementary, or is unskilled. Hence, there is an urgency to "examine the wider impact of women's different productive and reproductive roles on their occupational health."(emphasis added)[49(p39)] Again, this challenge to occupational health transcends the boundaries of the workplace and requires a multidisciplinary approach in which occupational health researchers partner with other social scientists and advocates.

Use of Pesticides

Understanding and minimizing the exposure of farmers and their families to pesticides in the developing world cannot be viewed as an isolated medical problem or a mere technical problem. It requires an understanding of farmers' knowledge, values, and beliefs; of the contribution of the agricultural sector to the overall economy; and of the role and power of international and national agribusiness operating in a country. Occupational health research, therefore, should be part of a larger movement to ensure just and sustainable agricultural development. For example, occupational health should promote integrated pest management practices, organic farming methods, control of the import of illegal or banned chemicals, and more responsibility from agrochemical corporations.

IMPLICATIONS

The call for a different occupational health research paradigm carries 3 major implications. The first concerns the training of occupational health researchers, especially those trained in industrialized countries. Occupational health research from the developing countries has been criticized as not being innovative or as being an extension of research conducted in the country of graduate training, except for suboptimal assessment of exposures and health outcomes.[25,50] This is not an outcome of lack of training; on the contrary, in most cases, it is a direct result of focused individuals with advanced training who, on return to their home countries, had to produce research in a socially and economically constricted environment where human and financial resources are limited and data are lacking. Therefore, in addition to their traditional technical and methodological training, occupational health researchers from the less-developed countries should be exposed to contextual global, social, and political issues and to the quantitative and qualitative research methodologies of economics and social sciences as they relate to occupational health. This additional education will equip them with better tools to understand and explain the world of work and will better prepare them for new, more effective roles as researchers, as well as practitioners and activists, in underprivileged communities.

The second implication concerns the mission statements and research interest of leading occupational health journals. To illustrate, the abstracts of all articles published in 1999 in 4 internationally recognized and professionally recommended occupational health journals were reviewed-2 American (American Journal of Industrial Medicine and Journal of Occupational and Environmental Medicine), 1 British (Occupational and Environmental Medicine), and 1 Scandinavian (Scandinavian Journal of Work, Environment, and Health). The majority of published articles focused on occupational health issues within the workplace (internal domain). Articles that focused on issues within the external contextual domain were less frequent, probably because they migrated to specialized policy and social science journals less accessible to occupational health researchers. Because the occupational health journals play a key role in the scientific training and professional outlook of occupational health trainees from the developing nations, it is vital that these journals offer a more comprehensive and relevant perspective.

The third implication is the need to rethink indicators for achievement and progress in occupational health. Objective indicators, such as fatal and nonfatal work-related health outcomes, are crucial for the measurement of progress in the field,[51] but they cannot be the only yardstick used, especially in developing countries. These countries lack historical data or current surveillance systems. In most, even basic objective indicators appear unattainable, at least in the near future. In terms of occupational health progress and achievement, process (e.g., training of professionals; development of professional theory and methods, programs, advocacy, research, and partnerships) needs to be recognized as much as outcome (e.g., rate of occupational injuries and diseases).

CONCLUSIONS

Occupational health long has been recognized as a complex field,[10] and any attempt to "box" it within a rigid framework that deals only with worker-hazard interaction runs the risk of marginalizing the field. I challenge the claim that occupational health is an unaffordable luxury to be addressed after economic development is secured. Instead, I argue that occupational health is a necessity and call for a revised occupational health research paradigm in developing countries that focuses less on the workplace and more on the workers in their social contexts.[46,52] A contextual, social justice orientation of occupational health research, as opposed to the narrow traditional approach, places occupational health researchers in tandem with other stakeholders in the call for a just and healthy society. In addition, only by becoming a tool for social change rather than a target can occupational health research effectively understand the hazards of work and its effects on workers and the community in developing countries.

This argument echoes what many occupational health professionals from both hemispheres have repeatedly advocated.[6,10,35,50,53] The paradigm argued for here also facilitates more research and collaborative opportunities for occupational health researchers nationally, regionally, and internationally, as reported in a few leading initiatives.[19,26,41,46] Forging a new pathway for occupational health research in developing countries will not be an easy task. However, staying with the prevailing paradigm means a prolongation of neglect, ineffectiveness, and professional stagnation.

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Human Participant Protection

No human participants were involved in this study.

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NIOSH Safety and Health Topic:
NANOTECHNOLOGY

Occupational Health Risks

Occupational health risks associated with manufacturing and using nanomaterials are not yet clearly understood. The rapid growth of nanotechnology is leading to the development of new materials, devices and processes that lie far beyond our current understanding of environmental and human impact. Many nanomaterials and devices are formed from nanometer-scale particles (nanoparticles) that are initially produced as aerosols or colloidal suspensions. Exposure to these materials during manufacturing and use may occur through inhalation, dermal contact and ingestion. Minimal information is currently available on dominant exposure routes, potential exposure levels and material toxicity. What information does exist comes primarily from the study of ultrafine particles (typically defined as particles smaller than 100 nanometers).

Studies have indicated that low solubility ultrafine particles are more toxic than larger particles on a mass for mass basis. There are strong indications that particle surface area and surface chemistry are primarily responsible for observed responses in cell cultures and animals. There are also indications that ultrafine particles can penetrate through the skin, or translocate from the respiratory system to other organs. Research is continuing to understand how these unique modes of biological interaction may lead to specific health effects.

Workers within nanotechnology-related industries have the potential to be exposed to uniquely engineered materials with novel sizes, shapes and physical and chemical properties, at levels far exceeding ambient concentrations. To understand the impact of these exposures on health, and how best to devise appropriate exposure monitoring and control strategies, much research is still needed. Until a clearer picture emerges, the limited evidence available would suggest caution when potential exposures to nanoparticles may occur.

Source (and for additional information):
http://www.cdc.gov/niosh/topics/nanotech/ohrisks.html

CAN MANAGED SERVICES HELP YOUR H&S PROGRAM?

By Abrar Ansari and Jeff Adams

This article was originally published in the May,2006 issue of The Synergist, the Publication of American Industrial Hygiene Association (AIHA). For more information visit www.aiha.org

The pressure of globalization and changes in the regulatory landscape are challenging businesses to alter both their short-term tactics and their long-term strategy to improve top-line growth while reducing expenses. As global business models change, the health and safety landscape is becoming more dynamic and complex, forcing a re-examination of existing models for managing H&S compliance.

Amid these pressures on your organization, as an industrial hygienist, do you have the information and the time necessary to effectively set and efficiently execute your exposure assessment strategy? If not, are you dealing with entering sample data, keeping regulatory reference data current, responding to new demands from the businesses you support or managing H&S system issues? This article aims to review the impact of these business challenges and introduces a new model to address these issues in your H&S program.

BUSINESS CHALLENGE

Three major categories of business change directly influence the development and implementation of effective H&S strategies:

Global Markets: In seeking global market share businesses are increasingly forced to rapidly enter new markets through the development of new plants, sales channels and distribution networks or through mergers and acquisitions. Entry invites competition from other entrants, including government-sponsored entities, while forcing an organization to extend its supply chain and develop new products.

Regardless of the mode of entry, globalization poses a complex set of business issues and forces an organization to evaluate whether it has sufficient knowledge of the local regulations, harmonized business practices and flexible information systems to provide effective H&S compliance in these new markets.

Regulatory Change: Constant regulatory change is a reality of global trade. For example, the Globally Harmonized System for the classification and labeling of chemicals is slated for adoption in the United States by January 2007. GHS not only will have an impact on authoring documents like MSDS,[1] but also will affect industrial hygienists tasked with managing work force exposures to these classified chemicals.

Whether the regulatory change is global in nature (e.g., GHS or Registration, Evaluation and Authorization of Chemicals) or country specific (e.g., the Sarbanes-Oxley Act of 2002, which included requirements to disclose EH&S liabilities), it is imperative for businesses to be able to anticipate, understand and react to the impact of regulatory change through their H&S programs.

NGOs, Quality Programs and IH Metrics: By exerting pressures both subtle and explicit, nongovernmental organizations act as shadow regulators and force companies to publish statistics and metrics on safety and health operations as well as present and predict environmental and energy impacts.

Similarly, voluntary quality management systems such as ISO 14001 and OHSAS 18000 are driving the adoption of quality management programs that address environmental, health and safety issues through standardized and certified processes that demonstrate continuous improvement through increasingly visible metrics.

The net effect of these forces is reshaping the business landscape and how a company manages its H&S assets and liabilities. Enterprises that develop cost-effective H&S strategies that can adapt to and support these dynamic and influential business imperatives will gain a competitive advantage over those that do not.

Technology Opportunity

H&S systems have evolved over time but often have lagged well behind the current state of the art in enterprise business systems (Figure 1). In the H&S arena, this lagging effect has been magnified by the lingering effects of legacy practices. The traditional practice is to quantitatively measure and monitor the high-risk exposures at specific sites as opposed to performing exposure assessments in a comprehensive manner and within the integrated global business context.

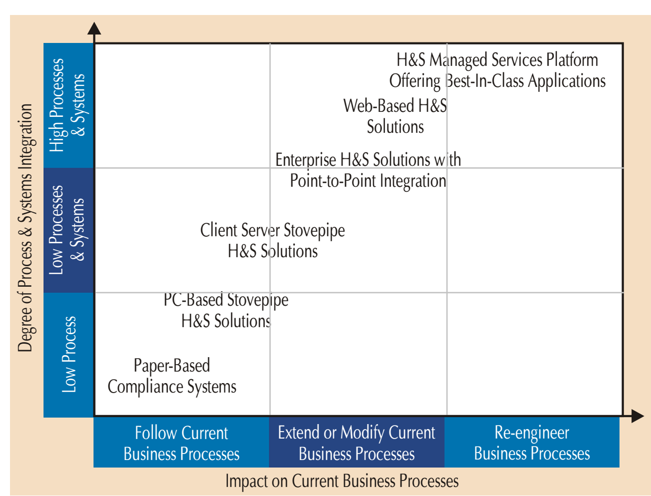

Figure 1. H&S Software re-evalution.

As a result early H&S systems, and many systems still in use today, are stove-piped applications that often are not integrated with other business systems (e.g., human resources or materials management) and do not share data with other EH&S systems or they lack consolidated input from experts whose core business is H&S. This reality ultimately limits the efficacy of an H&S program. In addition, resource-limited H&S departments frequently are challenged to track global regulations and maintain the underlying reference data (e.g., occupational exposure limits) or to determine and share best practices throughout an enterprise, both of which undermine compliance and increase risk.

A Better Way- Managed H&S Services

So, how can industrial hygienists help their organizations meet these challenges while lowering compliance risk and operating costs?

Managed services constitutes one of the fastest-growing segments of the IT-enabled services market and is now an accepted approach to re-engineering business. Managed services is a variation of business process outsourcing. It offers companies a way to reduce the costs and risks of H&S compliance through accessing hosted state-of-the-art applications that integrate back to the business and are supported by domain experts.

This new H&S value proposition is possible because senior managers are exploring ways to reduce costs by outsourcing non-core but dynamic activities (e.g., managing H&S software and supporting hardware, keeping a system current with underlying regulatory data, loading sample data, etc.), while allowing scarce H&S resources to focus on the core, high-value and knowledge-intensive activities of the exposure assessment strategy. This will allow an H&S program and its industrial hygienists, ultimately, to deliver compliance and mitigate health exposure risk at a lower cost.

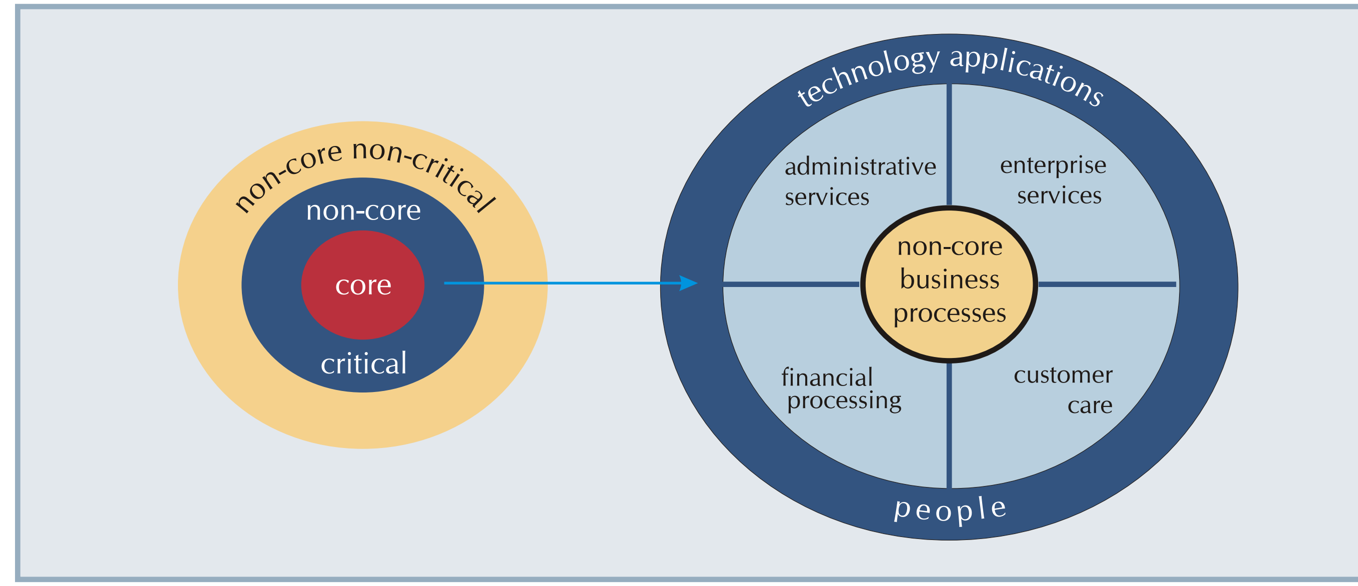

Figure2. Outsourcing non-core activities to a MSP.

Under this model, the managed services provider offers the customer access to a set of H&S applications from a variety of vendors. The H&S applications are hosted and maintained by the MSP. The MSP also can supply subject matter experts who can perform H&S functions that are supported directly by the hosted applications. Figure 2 shows examples of non-core activities that can be migrated outside the enterprise to leverage core assets and activities.

Managed services allows an enterprise to focus on its core competencies while transferring non-core business functions to a third party, who in this case, provides a suite of best-in-class H&S applications to support H&S compliance functions within the customer organization.

An example of a technology platform that can deliver the benefits of managed H&S services is the Exposure Assessment System. EAS was developed throughout the last decade by ExxonMobil as a tool to implement and manage a global exposure assessment system. The system is modeled after the AIHA best practice described in A Strategy for Occupational Exposure Assessment.2

As the systemization of the AIHA best practice, EAS combines worker exposure information to agents with exposure ratings using a risk matrix. The risk-based approach allows industrial hygienists to identify and prioritize H&S exposures across an enterprise comprehensively, thus improving the effectiveness and efficiency of H&S programs. As a managed service, EAS also can be supported by third parties such as consultants for the benefit of the business.

EAS is now commercially available through an agreement between ExxonMobil, AIHA and CGI-AMS. As a hosted application that can be integrated back to other business systems, EAS can eliminate investment in IT infrastructure and IT resources and leverage H&S and regulatory domain experts, thereby allowing a business and its H&S organization to focus scarce resources on business operations and its exposure assessment strategy.

Leading organizations from chemical producers to utilities to transportation companies now are looking closely at how to deploy applications like EAS to gain the cost savings and efficiency benefits inherent in this comprehensive, managed services approach.

Benefits of Managed H&S Services

This model provides a number of important benefits not available under the traditional enterprise application deployment approach:

- Lowest total cost of ownership. By accessing a suite of best-in-class H&S applications maintained by the MSP, enterprises of any size can gain scale and expertise at a fraction of the cost of purchasing each application separately.
- Best-in-class systems share information to reduce compliance risk. Because the MSP administers the H&S applications with H&S experts, the MSP can tailor the mix of applications and services to the needs of the global enterprise without compromising local requirements, which ultimately reduces the risk of compliance.
- Integrated and maintained content aligns H&S programs with business needs. The MSP provides subject-matter experts who stay current with H&S changes, aggregate best practices across sectors and manage the H&S applications with the appropriate content and keep it up to date with regulatory changes.

Summary

Successfully transitioning a major business area such as H&S to a managed services model is a decision that requires careful planning and execution. To reap the full value of this paradigm, organizations should undertake an analysis of their current H&S business model to understand the strategic value that may be obtained with the appropriate application of managed H&S services. The managed H&S services model, however, offers a way to access best-in-class H&S applications and experts, eliminates the cost of maintaining legacy H&S systems in house, improves compliance effectiveness and better aligns the H&S function with business needs.
For more information on availability of the EAS application and user group program, please contact Jeff Adams.

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References

1. U.S. EPA Draft White Paper"The Globally Harmonized System of Classification and Labeling of Chemicals Implementation Planning Issues for the Office of Pesticide Programs.

2. A Strategy for Assessing and Managing Occupational Exposures, Second Edition. Edited by John R. Mulhausen and Joseph Damiano, 1998, AIHA Press.

NIOSH Safety and Health Topic:

Hazardous Drug Exposures in Healthcare

Healthcare workers who prepare or administer hazardous drugs (e.g., those used for cancer therapy, and some antiviral drugs, hormone agents, and bioengineered drugs) or who work in areas where these drugs are used may be exposed to these agents in the workplace. About 5.5 million U.S. healthcare workers are potentially exposed to hazardous drugs, including pharmacy and nursing personnel, physicians, environmental services workers, workers in research laboratories, veterinary care workers, and shipping and receiving personnel.

It seems counter-intuitive that the healthcare industry, whose mission is the care of the sick, is itself a "high-hazard" industry for the workers it employs. In fact, published studies have shown that workplace exposures to hazardous drugs can cause both acute and chronic health effects such as skin rashes, adverse reproductive outcomes (including infertility, spontaneous abortions, and congenital malformations), and possibly leukemia and other cancers. The health risk depends on how much exposure a worker has to these drugs and how toxic they are. Workers can be protected from exposures to hazardous drugs through engineering and administrative controls, and proper protective equipment.

Source (and for additional information): http://www.cdc.gov/niosh/topics/hazdrug/

Exposure Assessments

by Jerome Spear
(As seen in www.ishn.com the January 1, 2006 issue of ISHN magazine)

The exact number of occupational diseases that occur in the United States is unknown; however, most occupational disease cases that are litigated involve multiple defendants. By implementing a systematic exposure assessment and control process, you can help protect your company from such litigation and also protect the health of your employees. The basic steps include the following:

1) Gather information and data to characterize the project site (or facility), process, operations, work force and environmental agents.

The first step in assessing exposures to environmental agents is to have a thorough understanding of the processes, tasks and contaminants to be studied. You can obtain information through observations, the use of direct-reading devices, and interviews with workers, managers, maintenance personnel and other relevant personnel (such as technical experts). In addition, review records and documents (including past exposure monitoring data), relevant industry standards, and/or other literature. The information gathered can then be used to both define similar exposure groups (SEGs) and make the initial judgments on exposures.

2) Define similar exposure groups (SEGs) by process, task, environmental agents and engineering controls.

The goal of defining SEGs is to minimize the variability of exposure monitoring data. For highly dynamic work sites where activities and related exposures may vary significantly from day-to-day (e.g., construction sites), SEGs should be categorized by the tasks or activities being performed. Categorizing SEGs by process, task, environmental agent and engineering controls is often preferred over defining SEGs by title and/or occupation. For example, welding has the potential of generating metal fumes and fluorides in addition to other gases; thus, the SEGs may be defined by the specific welding technique, the type of material being welded and welding consumable, the welding task, the environmental agent, and the engineering controls.

Figure1 - EXPOSURE ASSESSMENT RATING SCHEME

Category	Judgement of Exposure Relative to the OEL
4	Greater than the applicable occupational exposure limits (OEL).
3	50% to 100% of the applicable OEL
2	10% to 50% of the applicable OEL.
1	Less than 10% of the applicable OEL.
Category	**Health Effect**
4	Life-threatening or disabling injury or illness.
3	Irreversible health effects of concern.
2	Severe, reversible health effects of concern.
1	Reversible health effects of concern
0	Reversible effects of little concern, or no known or suspected adverse health effects.
Category	**Uncertainty Description**
3	**Highly uncertain:** Exposure judgement made without any available exposure monitoring data. Adverse effects are uncertain and / or there is no consensus OEL available.
2	**Uncertain:** Exposure judgement made using limited exposure monitoring data from a surrogate SEG, or judgement was made based on exposure modeling. Adverse effects are uncertain and / or there is no consensus OEL established.
1	**Somewhat Uncertain:** Exposure judgement made using limited data representing the same SEG or using substantial exposure monitoring data from a surrogate SEG. OELs are available for the agent.
0	**Certain:** Exposure was profiled using substantial exposure monitoring data avaialbe specific to the SEG. Adverse health effects for the agent are well documented with established OELs.

Based on AIHA's A Strategy for Assessing and Managing Occupational Exposures, 2nd

3) Make your best "judgment" on the exposure profile for each SEG based on available information.

After the SEGs are defined and categorized, a judgment can be made about the exposure profile for each SEG, using the information collected on the agent's toxicity and relevant sampling data that is available. The exposure judgment consists of assigning an exposure rating, health effects rating, and uncertainty rating to each SEG. (See Figure 1.) These qualitative ratings are used to determine the acceptability of the exposure profile, identify the need for additional exposure monitoring, and prioritize the data collection needs.

An exposure rating is an estimate of exposure level relative to the applicable occupational exposure limits (OELs). Exposure ratings assist with streamlining the assessment process, particularly during initial assessments when monitoring data are often sparse.

If there is a lack of exposure monitoring data available, the initial exposure profile may merely be a "best guess," which leads to a highly uncertain exposure rating. The exposure rating may also be based on the relative exposure levels, surrogate data (i.e., exposure data from another SEG) and/or exposure modeling, but the method of judging the exposure level affects the uncertainty rating. Uncertainty is a function of 1) confidence in the health effects data; 2) confidence in exposure rating; and 3) reliability of existing controls. For each SEG, an uncertainty rating is qualitatively assigned.

The health effects rating is based on the toxicity of the environmental agent and is a factor in assessing the exposure risk and prioritizing additional exposure monitoring needs.

4) Determine the acceptability of exposure and/or need for additional exposure monitoring.

For each SEG, categorize the exposure profile as being acceptable, unacceptable or unknown (i.e., not enough information). For unacceptable exposure profiles, determine and prioritize appropriate control measures by risk of exposure (i.e., exposure level and health effects). For acceptable exposure profiles, determine whether routine monitoring is required to ensure the exposure profile remains acceptable. A threshold of 10% of the OEL is recommended (by AIHA) as a trigger for beginning to collect exposure-monitoring data to support the exposure judgment in order to establish adequate confidence in the exposure assessment.

For SEGs that have uncertain exposure profiles, prioritize further exposure monitoring and/or information gathering needs by both the risk of exposure and the uncertainty rating of the exposure profile. The information gathering priority rating is calculated by the following:

Information gathering priority rating = (exposure rating) x (health effects rating) x (uncertainty rating)

The purpose of calculating the priority rating is to establish an information gathering priority ranking among SEGs so that you can efficiently utilize your resources.

5) Collect additional data and re-assess the exposure profiles as needed.

If necessary, conduct additional exposure monitoring, gather more information about the health effects of the agent, and/or obtain other information that would lower the uncertainty rating.

Sampling strategy is important. Exposure monitoring can either incorporate a worst-case sampling strategy or a random sampling strategy. A worst-case sampling strategy involves subjectively selecting and collecting personal air samplings that are considered to represent the worst-case exposure for each SEG. A random sampling approach is a more quantitative exposure monitoring strategy. It results in higher confidence level exposure judgment since a worst-case sampling strategy relies on subjectively identifying the "worst-case" exposure.

Additional exposure monitoring data also allows for the comparison of the exposure profiles of each SEG to determine if any of the SEGs should be re-classified.

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Active versus Passive Air Sampling

By Eddie Salter, SKC Ltd

As first published in International Environmental Technology, Volume 15, Issue 5. (www.iet-pub.com)

One of the most significant developments in air sampling technology in recent years is the evolution of passive samplers. This technology was first introduced to the health and safety profession in 1973 by researchers Palmes and Gunnison. As the applications for this technology have grown and changed over the years, the number and types of passive samplers that are commercially available have escalated. Passive samplers are now a key component in the arsenal of air sampling devices.

Active sampling involves the use of an air sampling pump to actively pull air through a collection device such as a filter. Passive sampling, however, does not require active air movement from a pump. Airborne gases and vapours are collected by a physical process such as diffusion through a static air layer or permeation through a membrane. Most passive samplers used by health and safety professionals operate on the principle of diffusion; therefore, they are referred to as diffusive samplers.

There are several advantages of each system – active and passive, such as size and weight and thus worker convenience and initial cost. However, two prime factors affecting reliability (discussed later) are very important.

In the main, active sampling is pretty much independent of wind speed; diffusive samplers however do not work at all well under minimal air movement conditions or in the other extreme, high wind conditions. Most active sampling for gases and vapours is personal on sorbent tubes that have a back up section; this enables a quality and reliability check to be performed under certain defined guidelines and leads to very reliable quantification. Most diffusive samplers do not and are not capable of this.

Operating Principle of Diffusive Samplers

The operating principle of diffusive samplers is the movement of contaminant molecules across a concentration gradient. Simply, the airborne contaminants diffuse from an area of higher concentration in the workplace environment to an area of lower (or zero concentration) in the collection device. Fick, a pioneering researcher, is credited with defining the rate at which chemicals diffuse. Fick's First Law of Diffusion is represented by the following formula:

$$Q = D\,(A/L)\,C\,T$$

Where:
Q = amount collected (ng)
D = diffusion coefficient (cm2/min)
A = cross-sectional area of the diffusion path (cm2)
L = diffusive path length (cm)
C = airborne concentration (mg/m3)
T = sampling time (min)

Note that the diffusion coefficient (D) is specific to the contaminant being sampled. Each contaminant has it's own diffusion coefficient determined by it's unique chemical and physical properties. The parameter (A/L) is specific to the sampling device and is determined by the sampler's geometry. The product of D X (A/L) is the theoretical sampling or uptake rate of a diffusive sampler for a specific compound.

In recent years, there have been a number of initiatives to experimentally verify the sampling or uptake rates in a testing laboratory and validate the performance of the sampler under various environmental conditions. This provides a more reliable assessment of the overall accuracy and precision of the sampling device. Samplers with documented validation studies should be used for compliance or legal applications.

Types of Passive (Diffusive) Samplers

There are two broad categories of passive samplers on the market today that operate on the principle of diffusion: (a) samplers requiring laboratory analysis and (b) direct-reading devices. Direct-reading passive samplers are typically based on colourimetric techniques. The length of the colour band or the intensity of the colour change is read on a scale or compared to a chart to determine concentration levels.

Passive colour tubes are a good example of a direct-reading passive sampler. These tubes simply insert into a holder and clip onto a worker's lapel. The target compound diffuses into the open-end of the tube, combines with the reagent and produces a colour change that is read from the tube scale in part-per-million-hours (ppm-hrs).

The user simply divides the reading by the number of hours sampled to determine the ppm exposure.

Passive samplers that require laboratory analysis typically use a solid sorbent material or chemically treated paper to collect airborne contaminants. When validated, these methods can be as reliable as active sampling methods. Passive samplers containing solid sorbent are used widely today for workplace sampling. The most popular samplers contain charcoal sorbent and are used to collect organic vapours such as benzene, toluene and xylene. Following sampling, the analytical laboratory can remove the solid sorbent, extract the collected contaminants and analyze by gas chromatography.

Research is ongoing into the use of passive samplers containing solid sorbents for low-level determinations in indoor air quality and ambient air studies. For these applications, the sampling and analysis method must allow the measurement of sub-part per billion (sub-ppb) levels.

The use of chemically treated filter paper is a growing trend in passive samplers. With these samplers, the filter paper simply serves as a substrate for a chemical reagent. The compound of interest diffuses onto treated filter paper, combines with the chemical reagent and produces a stable compound for subsequent analysis. Passive samplers based on this principle of operation are typically used for chemicals that are not effectively trapped on untreated sorbents. For example, the 2004 ISO 16000-4 standard specifies a passive sampler that contains a filter material treated with 2,4-dinitropheny hydrazine (2,4-DNPH) to collect formaldehyde vapours.

Thermal desorption works by driving the contaminant off the sorbent by subjecting it to a high temperature. Because the contaminant is not diluted by a desorption solvent, the entire mass of contaminant collected can be introduced directly into the analytical instrument (rather than an aliquot of a solution).

As a result, thermal desorption can be used to measure very low airborne concentrations, often subparts per billion. Indeed, thermal desorption is specified in EPA methods for measurement of low-level volatile organic compounds in indoor and ambient air following collection with sorbent tubes.

At the present time most published methods specifying thermal desorption are for samples collected with sorbent tubes. The future undoubtedly will see an increase in the use of thermal desorption techniques following sample collection with diffusive sorbent samplers.

The new Ultra badge now offers the convenience of a passive sampler with the sensitivity of thermal desorption. It is designed to sample ppb and ppt levels of VOCs over time for attended or unattended short and long term sampling.

This product is ideal for vapour intrusion studies where volatile chemicals in buried waste emit vapours that may migrate through the sub surface and into air spaces in overlying buildings. In most cases these 'indoor chemical concentrations' are low, however may be needed to be measured.

Reliability of Passive Samplers

Passive Samplers are a very easy option for users and an unobtrusive device for wearers. Caution should be exercised, however, when selecting a passive sampler for compliance or legal applications. The performance of passive samplers can be affected by a number of environmental factors. Stagnant air (i.e. face velocities less than 25 ft/min) can significantly reduce the sampling rate of a passive sampler. Alternatively, high air velocities may disturb normal diffusion in samplers that do not contain a wind barrier. Very high concentrations of the target compound or interfering compounds and/or high humidity may also limit the capability of the sampler to adsorb or retain the contaminant for subsequent analysis. Reverse diffusion may also be a factor whereby some chemicals diffuse onto the sorbent but are not adequately retained. This can be a concern in areas of transient peak exposures.

Sampling time is also an important consideration when using passive samplers. Users should follow closely the supplier's recommendations for minimum and maximum sampling times. These guidelines will help to ensure that the sampling time is sufficient to collect enough contaminant for laboratory detection without overloading the sampler.

Passive samplers that have been tested and evaluated by the manufacturer, OSHA, or an outside laboratory and are used within operating guidelines are a reliable sampling tool. The overall sampling and analytical error of these devices is comparable to that of active sampling methods.

• MDHS 88 Volatile Organic Compounds in Air

Passive Samplers in Workplace Health and Safety Programmes

• 8-hr TWA Exposures
Passive samplers that have been validated for designated compounds as a reliable, cost-effective and easy means of assessing 8-hour exposure levels. They eliminate the expense of pumps and related accessories and the time for training, calibrating and maintenance.

• Short Term Exposures
OSHA-validated methods using passive samplers typically stipulate a minimum sampling time of 5 minutes. This allows passive samplers to be used to assess short-term exposure limits (STELs) of designated compounds.

• Indoor Air Quality
Some passive samplers have been evaluated and found to be acceptable for indoor air sampling. Due to the low contaminant levels in this environment, the minimum sampling time is 24 hours. If the samplers are being hung in an area, users should ensure that there is adequate air movement to avoid starvation of the sampler (as described above).

Passive samplers are a worthy consideration.

References:

- EN 4821 1994 Workplace Atmospheres - General Requirements for the Performance of Procedures for the Measurement of Chemical Agents.
- EN 838 Workplace Atmospheres – Diffusive samplers for the Determination of Gases and Vapours – Requirements And Test methods.
- EN 1232 Workplace Atmospheres – Pumps for Personal Sampling of Chemical Agents – Requirements and Test Methods.
- EN 1076 Workplace Atmospheres – Pumped Sorbent Tubes for the Determination of Gases and Vapours – Requirements and Test Methods.
- MDHS 88 Volatile Organic Compounds in Air
- EN 16000-4 Indoor Air- Part 4 – Determination of Formaldehyde - Diffusive Sampling Method.
- EN 13528 – 1/2 Ambient Air Quality – Diffusive Samplers for the Determination of Concentrations of Gases and Vapours.
- BS ISO 16107 Workplace atmospheres – Protocol for Evaluating the Performance of Diffusive Samplers.

NIOSH Safety and Health Topic:

Organic Solvents

Solvents are substances that are capable of dissolving or dispersing one or more other substances. Organic solvents are carbon-based solvents (i.e., they contain carbon in their molecular structure). Millions of U.S. workers are exposed to organic solvents that are used in such products as paints, varnishes, lacquers, adhesives, glues, and degreasing/cleaning agents, and in the production of dyes, polymers, plastics, textiles, printing inks, agricultural products, and pharmaceuticals.

Many organic solvents are recognized by NIOSH as carcinogens (e.g., benzene, carbon tetrachloride, trichloroethylene), reproductive hazards (e.g., 2-ethoxyethanol, 2-methoxyethanol, methyl chloride), and neurotoxins (e.g., n-hexane, tetrachloroethylene, toluene). Many different classes of chemicals can be used as organic solvents, including aliphatic hydrocarbons, aromatic hydrocarbons, amines, esters, ethers, ketones, and nitrated or chlorinated hydrocarbons.

Source (and for additional information):
http://www.cdc.gov/niosh/topics/organsolv/

NIOSH Safety and Health Topic:

Office Environment & Worker Safety & Health

Maintaining a healthy office environment requires attention to chemical hazards, equipment and work station design, physical environment (temperature, humidity, light, noise, ventilation, and space), task design, psychological factors (personal interactions, work pace, job control) and sometimes, chemical or other environmental exposures.

A well-designed office allows each employee to work comfortably without needing to over-reach, sit or stand too long, or use awkward postures (correct ergonomic design). Sometimes, equipment or furniture changes are the best solution to allow employees to work comfortably. On other occasions, the equipment may be satisfactory but the task could be redesigned. For example, studies have shown that those working at computers have less discomfort with short, hourly breaks.

Situations in offices that can lead to injury or illness range from physical hazards (such as cords across walkways, leaving low drawers open, objects falling from overhead) to task-related (speed or repetition, duration, job control, etc.), environmental (chemical or biological sources) or design-related hazards (such as nonadjustable furniture or equipment). Job stress that results when the requirements of the job do not match the capabilities or resources of the worker may also result in illness.

Source (and for additional information):
http://www.cdc.gov/niosh/topics/officeenvironment/officeenvironment.html

3 Workers die after entering drain line

Criminal case booked against three water board officials, two contractors

Staff Reporter

HYDERABAD: Three labourers died after reportedly inhaling poisonous gases when they entered a drainage line to take measurements at the instance of officials at Marredpally here on Saturday. The Marredpally police booked a criminal case against three officials of the Hyderabad Metro Water Supply and Sewerage Board and two contractors under Section 304-A (causing death by negligence) of IPC in connection with the incident. Work pertaining to the 20-feet-deep drainage line from Reddy Wines to YWCA near Judges Colony was completed a year ago. Though it was not put to use, drainage water accumulated up to a height of five feet. "The drainage has nine manholes but all have been sealed. We believe that poisonous gases like methane formed since the drain had not been exposed to light or air for a year," Marredpally Inspector B. Karunakar Reddy told The Hindu . Water works officials, accompanied by representatives of Ramkee Company that executed the work, came to take measurements of the drainage line. They initially called in a local labourer Narasimha, 30, and asked him to go inside carrying a tape. Negligence alleged The unsuspecting worker opened a manhole cover and slid down using a rope. "As Narasimha did not respond to their calls for 10 minutes, the officials called two more labourers - Venkatesh and Aravind - but the latter, too, did not come back," the Inspector said. Panicky officials and contractors then pressed into service a few more workers who entered the drainage line only to find Venkatesh and Aravind dead. Narasimha was rushed to Yashoda Hospital where he was kept on a ventilator as he had slipped into a coma. He died a few hours later. Aravind was from Bihar and had none to claim his body. Relatives and co-workers of the victims gathered in large numbers at the hospital and lashed out at officials for allegedly not taking precautionary measures. Venkatesh is survived by wife Indiramma, two daughters and a six-month-old son.

As published in The Hindu dated April 16th, 2006

Alerts are publications of National Institute of Occupational Safety and Health (NIOSH), USA

"Alerts briefly present new information about occupational illnesses, injuries, and deaths. Alerts urgently request assistance in preventing, solving, and controlling newly identified occupational hazards. Workers, employers, and safety and health professionals are asked to take immediate action to reduce risks and implement controls."

In view of some of the recent accidents in confined spaces, we have included the following information to reinforce the recommendations to prevent fatalities in confined spaces.

Following is an "Alert" isued by National Institute Occupational Safety and Health (NIOSH), USA

Source (and for additional information):
Source: www.cdc.gov/niosh/86110v2.html

REQUEST FOR ASSISTANCE IN PREVENTING OCCUPATIONAL FATALITIES IN CONFINED SPACES

NIOSH ALERT: January 1986

DHHS(NIOSH Publication No: 86-110

SUMMARY

This Alert requests the assistance of managers, supervisors, and workers in the prevention of deaths that occur in confined spaces. Confined spaces may be encountered in virtually any occupation; therefore, their recognition is the first step in preventing fatalities. Since deaths in confined spaces often occur because the atmosphere is oxygen deficient or toxic, confined spaces should be tested prior to entry and continually monitored. More than 60% of confined space fatalities occur among would-be rescuers; therefore, a well-designed and properly executed rescue plan is a must. This Alert describes 16 deaths that occurred in a variety of confined spaces. Had these spaces been properly evaluated prior to entry and continuously monitored while the work was being performed and had appropriate rescue procedures been in effect, none of the 16 deaths would have occurred. There are no specific OSHA rules that apply to all confined spaces. Recommendations for Recognition, Testing, Evaluation, and Monitoring, and Rescue of Workers are presented. Other National Institute for Occupational Safety and Health (NIOSH) publications on this subject as well as a source for additional information and assistance are also presented. January 1986

Confined Space
Volume 1 | Issue 2 | October to December 2006.
OHHSNEWS

BACKGROUND

The deaths of workers in confined spaces constitute a recurring occupational tragedy; approximately 60% of these fatalities have involved would-be rescuers. If you are required to work in a:

SEPTIC TANK	SILO	REACTION VESSEL
SEWAGE DIGESTER	VAT	BOILER
PUMPING/LIFT STATION	DUCT	PIPELINE
SEWAGE DISTRIBUTION or HOLDING TANK	UTILITY VAULT	PIT

or similar type of structure or enclosure, you are working in a CONFINED SPACE. The Occupational Safety and Health Administration (OSHA) defines a confined space in 29 CFR 1926.21 as "any space having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere." The NIOSH Criteria for a Recommended Standard .... Working in Confined Spaces dated December, 1979, defines a confined space as: ...a space which by design has limited openings for entry and exit; unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy. Confined spaces include but are not limited to storage tanks, compartments of ships, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.

CASE REPORTS OF FATAL INCIDENTS

Case #1 - RECOGNITION AND RESCUE
(FATALITIES = 1 WORKER + 1 RESCUER)

On December 29, 1983, a 54-year-old worker died inside a floating cover of a sewage digester while attempting to restart a propane heater that was being used to warm the outside of the sewage digester cover prior to painting it. Workers had wired the safety valve open so that the flow of propane would be constant, even if the flame went out. The heater was located near an opening in the cover of the digester. When the worker attempted to restart the heater, an explosion occurred that vented through the opening. The worker crawled away from the heater into an area that was oxygen deficient and died. A co-worker attempted a rescue and also died.

Case #2 - RECOGNITION AND RESCUE
(FATALITIES = 1 WORKER + 1 RESCUER)

On March 8, 1984, a 20-year-old construction worker died while attempting to refuel a gasoline engine powered pump used to remove waste water from a 66 inch diameter sewer line that was under construction. The pump was approximately 3,000 feet from where the worker had entered the line. The worker was overcome by carbon monoxide. A co-worker, who had also entered the sewer line, escaped. A 28-year-old state inspector entered from another point along the sewer line and died in a rescue attempt. Both deaths were due to carbon monoxide intoxication. In addition to the fatalities, 30 firefighters and 8 construction workers were treated for carbon monoxide exposure.

Case #3 - RECOGNITION AND RESCUE
(FATALITIES = 2 RESCUERS)

On October 4, 1984, two workers (26 and 27 years old) were overcome by gas vapors and drowned after rescuing a third worker from a fracturing tank at a natural gas well. The tank contained a mixture of mud, water, and natural gas. The first worker had been attempting to move a hose from the tank to another tank. The hose was secured by a chain and when the worker moved the hose, the chain fell into the tank. The worker entered the tank to retrieve the chain and was overcome.

Case #4 - RECOGNITION AND RESCUE
(FATALITIES = 1 WORKER + 1 RESCUER)

On December 5, 1984, a 22-year-old worker died inside a toluene storage tank that was 10 feet in diameter and 20 feet high while attempting to clean the tank. The worker entered the tank through the 16 inch diameter top opening using a 1/2 inch rope for descent. Although a self-contained breathing apparatus was present, the worker was not wearing it when he entered the tank. The worker was overcome and collapsed onto the floor the tank. In an attempt to rescue the worker, fire department personnel began cutting an opening into the side of the tank. The tank exploded, killing a 32-year-old firefighter and injuring 15 others.

Case #5 - RECOGNITION AND RESCUE
(FATALITIES = 1 WORKER + 1 RESCUER)

On May 13, 1985, a 21-year-old worker died inside a waste water holding tank that was four feet in diameter and eight feet deep while attempting to clean and repair a drain line. Sulfuric acid was used to unclog a floor drain leading into the holding tank. The worker collapsed and fell face down into six inches of water in the bottom of the tank. A second 21-year-old worker attempted a rescue and was also overcome and collapsed. The first worker was pronounced dead at the scene and the second worker died two weeks later. Cause of death was attributed to asphyxiation by methane gas. Sulfuric acid vapors may have also contributed to the cause of death.

Case #6 - RECOGNITION AND RESCUE
(FATALITY = 1 RESCUER)

On June 7, 1985, a 43-year-old father died while attempting to rescue his 28-year-old son from a tank used to store spent acids from a metal pickling process. The tank was out of service so that sludge could be removed from the bottom. The son collapsed in the tank. The father attempted a rescue and also collapsed. The two were removed from the tank; the son was revived, but the father died. The cause of death is unknown.

Case #7 - RECOGNITION (FATALITY = 1 WORKER)

On July 2, 1985, a crew foreman became ill and was hospitalized after using an epoxy coating, which contained 2-nitropropane and coal tar pitch, to coat a valve on an underground waterline. The valve was located in an enclosed service vault (12' x 15' x 15'). The worker was released from the hospital on July 3, 1985, but was readmitted on July 6, 1985; he lapsed into a coma and died on July 12, 1985, as a result of acute liver failure induced by inhalation of 2-nitropropane and coal tar pitch vapors. A co-worker was also hospitalized, but did not die.

Case #8 - RECOGNITION AND RESCUE
(FATALITIES = 1 WORKER + 3 RESCUERS)
On July 5, 1985, a 27-year-old sewer worker entered an underground pumping station (8' x 8' x 7') via a fixed ladder inside a three foot diameter shaft. Because the work crew was unaware of procedures to isolate the work area and ensure that the pump had been bypassed, the transfer line was still under pressure. Therefore, when the workers removed the bolts from an inspection plate that covered a check valve, the force of the waste water blew the inspection plate off, allowing sewage to flood the chamber, and trapping one of the workers. A co-worker, a supervisor, and a policeman attempted a rescue and died. The first two deaths appeared to be due to drowning and the latter two appeared to be due to asphyxiation as a result of inhalation of "sewer gas."

REGULATORY STATUS
As stated in the Regulatory Program of the United States Government (Confined Spaces [29 CFR 1910], page 282 dated August, 1985), "there are no specific OSHA rules directed toward all confined-space work, forcing OSHA compliance personnel to cite other marginally applicable standards or section 5(a)(1) in cases involving confined spaces. For this reason, OSHA field personnel have frequently and strongly recommended the promulgation of a specific standard on confined spaces." In the document Criteria for a Recommended Standard .... Working in Confined Spaces, the National Institute for Occupational Safety and Health (NIOSH) has provided comprehensive recommendations for assuring the safety and well-being of persons required to work in confined spaces including a proposed classification system and checklist that may be applied to different types of confined spaces.

CONCLUSIONS
The case studies described above are summarized in Table 1

Based on the information derived from these case studies, NIOSH concludes that these fatalities occurred as a result of encountering one or more of the following potential hazards:

- lack of natural ventilation,
- oxygen deficient atmosphere,
- flammable/explosive atmosphere,
- unexpected release of hazardous energy,
- limited entry and exit,
- dangerous concentrations of air contaminants,
- physical barriers or limitations to movement, or
- instability of stored product.

In each of these cases there was a lack of RECOGNITION and TESTING, EVALUATION, and MONITORING prior to entry nor had a well-planned RESCUE been attempted. These incident reports suggest that RECOGNITION of what is a confined space in conjunction with the proper TESTING, EVALUATION, and MONITORING of the atmosphere and development of appropriate RESCUE procedures could prevent such deaths. These three steps are discussed below.

NIOSH investigations indicate that workers usually do not RECOGNIZE that they are working in a confined space and that they may encounter unforeseen hazards. TESTING and EVALUATION of the atmosphere are typically not initiated prior to entry and MONITORING is not performed during the confined space work procedures. RESCUE is seldom planned and usually consists of spontaneous reaction in an emergency situation.

Table1

CASE	DATE	TYPE OF SPACE	TYPE OF HAZARD	WORKER	RESCUER	TOTAL	COMMENT
#1	12/29/83	Sewage digester	Oxygen deficiency	1	1	2	---
#2	3/8/84	Sewer line construction	Toxic atmosphere; physical hazard	1	1	2	38 others injured
#3	10/4/84	Fracturing tank	Oxygen deficiency	0	2	2	2 rescuers drowned
#4	12/5/84	Toluene storage tank	Toxic atmosphere; explosion;limited entry and exit	1	1	2	15 others injured
#5	5/13/85	Waste water tank physical hazard	Toxic atmosphere;	1	1	2	Rescuer died two weeks later
#6	6/7/85	"Spent" acid storage tank	Toxic atmosphere	0	1	1	Rescuer was father of worker
#7	7/2/85	Underground waterline, valve area	Toxic atmosphere	1	0	1	Worker died of acute liver failure; another worker ill but recovered
#8	7/2/85	Sewage pumping station	Physical hazard; toxic atmosphere	1	3	4	2 died of drowning; 2 of asphyxiation
			TOTALS	**6**	**10**	**16**	**53 OTHERS INJURED**

RECOMMENDATIONS
In light of findings to date regarding occupational deaths in confined spaces, NIOSH recommends that managers, supervisors, and workers be made familiar with the following three steps:

1. RECOGNITION
Worker training is essential to the RECOGNITION of what constitutes a confined space and the hazards that may be encountered in them. This training should stress that death to the worker is the likely outcome if proper precautions are not taken before entry is made.

2. TESTING, EVALUATION, AND MONITORING
All confined spaces should be TESTED by a qualified person before entry to determine whether the confined space atmosphere is safe for entry. Tests should be made for oxygen level, flammability, and known or suspected toxic substances. EVALUATION of the confined space should consider the following:

- methods for isolating the space by mechanical or electrical means (i.e., double block and bleed, lockout, etc.),
- the institution of lockout-tagout procedures, ·
- ventilation of the space,
- cleaning and/or purging,
- work procedures, including use of safety lines attached to the person working in the confined space and its use by a standby person if trouble develops,
- personal protective equipment required (clothing, respirator, boots, etc.),
- special tools required, and
- communications system to be used.

The confined space should be continuously MONITORED to determine whether the sphere has changed due to the work being performed.

3. RESCUE
Rescue procedures should be established before entry and should be specific for each type of confined space. A standby person should be assigned for each entry where warranted. The standby person should be equipped with rescue equipment including a safety line attached to the worker in the confined space, self-contained breathing apparatus, protective clothing, boots, etc. The standby person should use this attached safety line to help rescue the worker. The rescue procedures should be practiced frequently enough to provide a level of proficiency that eliminates life-threatening rescue attempts and ensures an efficient and calm response to any emergency.

Additional information on related topics can be obtained at www.cdc.gov/niosh/alerts2/html

NIOSH Safety and Health Topic:

Confined Spaces

"Confined Space" refers to a space which by design has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy. Confined spaces include but are not limited to storage tanks, compartments of ships, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.

Source (and for additional information):
http://www.cdc.gov/niosh/injury/traumaconf.html

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OHHSNEWS

OCCUPATIONAL HEALTH AND SAFETY AT HOME

House hold chores, most of the time, are not categorized as "Occupations" and are neither considered as risk factors nor are governed by regulations. With urban living and lifestyle changes that are influencing our daily routines, it has become necessary for all of us to pay more attention and become aware of issues related to "Occupational Health at home". Here are a few ideas that would make our and our helpers' lives healthier:

1.Always use protective gloves when handling corrosive cleaning agents. Provide and set aside a pair of gloves for house-keepers when using corrosive liquids for jobs like cleaning bathrooms, floors etc., and make sure the rooms are well ventilated. Several of the cleaning agents contain hazardous chemicals which may cause skin and respiratory problems.

2.Educate and instruct workers not to mix bleach with any other cleaning agent and not to mix different cleaning agents together. There could be a release of toxic and hazardous gases like Chlorine or Chloramine.

Several episodes, some fatal, of exposures to such gases leading to respiratory distress syndromes and other respiratory effects have been reported due to use of incompatible cleaners.

3.Provide or set aside a pair of garden-gloves to gardeners when handling pesticides, insecticides, fertilizers or any other chemicals. Instruct them to wash hands thoroughly as soon as the job is completed.

4.Trash and garbage are sources of several infectious and other diseases. Keep garbage and trash in closed containers and inside houses for as short a time as possible and dispose in proper manner. Provide gloves for garbage collectors so that they do not disperse contaminants and become infected or become sources of infection.

5.Dispose sharp objects separately in closed containers or well wrapped and not along with house hold garbage to avoid garbage collectors getting injured or infected.

6.Use dust masks during intense cleaning and dusting activities. Dust, mites and other particles are known to exacerbate asthma related respiratory problems and some may be sensitized to such contaminants.

7.Encourage workers and contractors coming to work in your home to follow basic precautions. Such as- electricians to not insert electric wires into live sockets without plugs and not to work near pools of water, carpenters to wear safety glasses & foot protection and not to leave sharp objects like nails dispersed after work, construction workers to have proper foot and waist protection when lifting heavy weights, janitorial services to wear proper gloves during cleaning etc.

8."Take-home-contamination" or "Fouling one's own nest"- is when contamination is brought home from work place which exposes immediate family members eg. Persons working in environments with hazardous agents like Lead, Asbestos, Mercury, pesticides, industrial chemicals and infectious agents might carry contaminants on their clothing, tools and shoes.

In such instances, it may be necessary to not only change work clothes before coming home, but also not to wash such clothes at home but have them professionally laundered. Sometimes a shower before coming home may be needed to ensure contaminants are removed from hair and skin.

9.Fix water leaks immediately to avoid mold growth in moist and humid areas which may result in respiratory problems for some individuals.

10.Maintain floors and bathrooms dry to avoid falls and injuries particularly for the elderly.

11.Have a small fire extinguisher handy in the kitchen or atleast make sure the apartment building provides one in each hallway.

While several of these points are basic and common sense oriented, we tend to overlook them mostly because of lack of awareness. A little motivation, education and teaming with neighbors to accomplish these small tasks will make the lives of several people around us better. Returns in the form of increased work efficiency and gratitude from the workers for the concern shown more than compensate the small investment on our part.

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