

The Correlation between Safety Practices in Construction and Occupational Health

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Abstract: Over recent years, safety has become a way of life for construction and industrial workers in the US. A new safety culture has emerged. In fact, the incidence rate for all recordable nonfatal injury and illness for construction workers has decreased from 13.1% in 1992 to 5.4% in 2007 (BLS, 2002)(BLS, 2008). This decline is due to standards set forth by the Occupational Safety and Health Administration (OSHA) and the efforts of owners, contractors, subcontractors and designers (Farooqui, 2008). The benefits of safety programs are widely apparent and become more evident as companies focus on improving these programs. Are there benefits to focusing on occupational health and wellness of the workers? The Occupational Safety and Health Act of 1970 defines occupational safety and health standard as, “a standard which requires conditions, or the adoption or use of one or more practices, means, methods, operations, or processes, reasonably necessary or appropriate to provide safe or healthful employment and places of employment” (OSHA, 2009). OSHA regulations do not delineate between occupational safety and occupational health, therefore legal compliance does not involve promoting the health of workers. Under OSHA incident reporting guidelines, injury and illness are recorded under the same category (OSHA, 2003). The health and safety programs being implemented need to include a wider scope than just preventing injuries and fatalities. The scope of occupational health should include the physical and mental wellness of workers, including illness and disease, as a result of working conditions or situations to which they are exposed, also encompassing the treatment or diagnosis of problems through medical testing and health surveillance. The health and wellness of workers should be equally important as safety to the construction and industrial industries since it can affect the bottom line of

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companies. An unhealthy worker or work environment, often leads to lost productivity for companies, lost wages for employees and unsafe working conditions. An even greater cost to companies can be long-term costs of workers compensation and litigation. Furthermore, occupational health of workers has an impact on the workers' wellbeing, state of mind, overall attitude and morale; therefore the safety, quality of work and inevitably the profitability of the company is affected. This paper explores the possible benefits of focusing on the occupational health and wellness of construction and industrial workers as a separate category from safety. Could the development of an international occupational health standard be a useful tool for construction and industrial industries?

Key Words: Occupational Health; Safety; Wellness; Health Monitoring; Health Surveillance

INTRODUCTION

Since the Occupational Safety and Health Act of 1970 there has been a push for 'safe and healthful' working conditions in the workplace (OSHA, 2009). Significant advances have taken place in the construction and industrial fields in the area of occupational safety. The term 'safety culture' has even emerged for the emphasis on safety that is taking place within many companies. Creating a safety culture is the process of implementing programs within a company with a safety officer and/or committee with regular meetings and training sessions. Often, daily safety meetings or briefings take place to ensure there is a focus on safe work practices. Companies recognize the need for a total commitment to safety so much so that safety has become part of the strategic planning for many construction companies (Goetsch, 2003 page 34). There are reputable statistics and data to show that the rate of workplace accidents leading to injury and death has decreased due to these efforts. Even with the dramatic improvements in safety there are still a large number of injuries and fatalities in the construction industry each year (Farooqui, 2008). Perhaps safety programs, or the safety culture need to incorporate a wider scope for their health and safety programs. The effort on safety seems to have left very little concern and resources for the *health* aspect referred to as occupational health and safety. The OSHA regulations and enforcement within the construction industry have more to do with safe work practices, equipment and procedures, and very little to do with maintaining health among company personnel.

Injuries lead to a high percentage of the lost productivity and the high cost of workers' compensation and healthcare. Illness and disease contribute to these costs, as well as decreased productivity and litigation costs that can seriously hurt a company. The occupational health, or in general, the health of workers should be of utmost concern for employers. There should be a wider scope of health and wellness within the construction industry in order to control and mitigate the occurrence of illness and disease caused within the construction and industrial sector. Standards must be set for health and wellness in order to improve the occupational health of workers which is a higher standard than merely making the workplace safer.

Workers in the construction industry are exposed to a wide variety of health risks and chemical hazards affecting health. These can include asbestos, silica, lead, welding emissions, roofing and pavement tar, engine exhaust fumes and many other possible hazards. The unpredictable environment in the construction industry can complicate the control of these hazards and lead to varying exposure to health risks. The inherent changing environment of the construction industry emphasizes the need for occupational health programs that implement preventative practices, health monitoring and medical surveillance (Smallwood, 2001). The current occupational health risk prevention involves merely periodic evaluations of hazard exposure levels in the field. A more proactive and ongoing occupational health standard is needed to ensure the health of construction workers. Provisions for increased medical and health surveillance through regular examinations, blood tests, x-rays, and medical evaluations should be established for the occupational health of construction workers. Increased cost due to implementing health programs will be

mitigated by the off set in long-run savings from decreasing long-term healthcare cost and litigation cost in the same manner that accident prevention has decreased these costs in the construction industry.

The costs of occupational health problems in the construction industry are a mounting concern to the construction and industrial fields. The asbestos related costs to the construction industry due to litigation have been estimated at nearly \$200 billion (Butler, 2002). Recently, the amount of health-related claims for mold related illnesses has increased dramatically, causing concern that it may be the successor to asbestos related problems plaguing the industry (Grosskopf, 2006). If proactive health standards were established these problems could have been reduced, which can be translated as cost savings to companies. Obviously, before occupational health standards can be established there is a need for research on occupational health of construction and industrial workers, but we can make some conclusions based on the data and statistics currently available.

LITERATURE REVIEW

Literature review into occupational health practices in the construction industry shows that health and safety are lumped into the same category usually with no delineation between the two. Another finding is that reporting for occupational health is not a separate category for OSHA reporting. Reporting for illness is lumped into the same category as injury on the form 300 for OSHA. This reporting method does not account for the unique aspects pertaining to occupational health as it relates to illness and disease. Separate illnesses can be distinguished on the incidence reports, but moreover, the reporting of data is not separated from occupational injuries (OSHA, 2003).

The parameters of occupational health and safety programs do not have a line of demarcation between risks to injury and risks to health. For this reason, the health aspect of occupational health does not get the required attention to pursue stronger preventative measures and health monitoring.

The goal of most safety programs is to focus on the prevention of accidents and injuries. Each year the goal is to have decreased accidents and injuries by implementing a safety program that is proactive in preventing accidents and injuries by training employees in safety awareness. The safety records are reviewed periodically to identify problem areas and revisions are made to the safety program in order to alleviate the problems. The safety records, in most cases the OSHA 200 (300) logs, include both injury and illness but are used for the safety programs which are geared toward preventing accidents and injuries (Shahbodaghlou, 2000).

The National Occupational Research Agenda (NORA) has developed goals for the improvement of occupational health and safety programs in the construction industry. They outlined this plan in their October 27, 2008 revision of their agenda. This agenda defines many health risks and offers preventative measures to accomplish goals. The agenda also discusses surveillance of health risks (NORA, 2008). OSHA guidelines are undergoing revisions to currently identified health hazards which are making considerations for increased health monitoring and medical surveillance guidelines (OSHA/NIOSH, 2009).

RESEARCH ON EFFECTIVENESS OF SAFETY PROGRAMS BASED ON OSHA STANDARDS

OSHA Reporting statistics from local companies have been compiled to show the effectiveness of implementing quality safety programs. Gate Concrete Company, a precast concrete company in Jacksonville Florida, provided their OSHA recordable safety data for 2002 through 2008 (See Table 1).

Table 1: Gate Concrete Products Company OSHA Reporting 2002-2008

Year	OSHA Recordable Incidence Rates	OSHA Recordable Injuries	Lost Work Day Incident Rates	Days Away, Restricted or Transfer Rates
2002	23.65	67	2.47	16.94
2003	20.22	64	1.89	12.63
2004	15.31	41	0.74	12.97
2005	12.94	36	2.15	8.63
2006	6.71	15	0.89	3.58
2007	5.55	13	1.71	5.55
2008	2.84	7	0.00	2.84

Source: Gate Concrete Products Company, 2009

Gate focused their efforts on reducing OSHA recordable safety occurrences, and greatly reduced their incidence numbers in all categories of reporting. They are a successful example of how the implementation of safety programs can improve the safety of the workers. Gate has set a higher standard than reducing incidences, and focused on reducing OSHA recordable numbers. The reduction in all categories seen between 2002 and 2006 is a result of implementing a new safety program.

Comprehensive safety programs have yet to be fully developed and are far from being fully implemented by companies, yet this study shows that there are great benefits realized from these programs. Other examples with similar outcomes from safety programs are the Jacksonville-Port facility and Archer Western Contractors.

These examples of combined occupational safety and health programs are effective, but the main focus is still on short term prevention of incidences of injury and illness. An occupational health program with a focus on monitoring, surveillance, and prevention would be a helpful addition to safety focused programs. Occupational health programs would mitigate the long term ill-health effects that can be caused within construction occupations and the costs associated with them.

RISK ASSESSMENT

Under OSHA regulations, 'acceptable levels of exposure' have been established for occupational health risks so that adverse health effects are not caused (OSHA/NIOSH, 2009). This is fine in a setting that has constant variables such as a manufacturing facility. In the construction industry there are no two jobs or jobsites that are alike. This constant change makes it very hard to measure the levels of exposure that workers are subjected to. Health hazards are measured through various means to determine the exposure levels, but the exposure levels on construction sites could change from day to day or even hour to hour. Workers may be placed in an environment that has been tested as a safe exposure one day and the next day variables on the site have caused the exposure levels to be unsafe. Occupational health risks are very difficult to assess using the current methods of environmental exposure levels. The only way to truly know how much exposure workers are getting is through medical testing for that health hazard.

One of the major problems in occupational health hazard prevention is the illness and disease that occur are due to long-term exposure. Slow developing diseases such as cancer show up long after the exposures have occurred. Risk assessment could be better handled through exposure levels in individuals. OSHA has shown some initiative in this area through the lead risk prevention through the blood-lead level testing to prevent overexposure to lead (OSHA, 2006). The buildup of harmful agents in a person's blood or urine or fluid levels is a better indication of the risk to which they are being exposed. The blood lead level monitoring initiated by OSHA is a reaction to health problems arising due to lead exposure. A proactive solution to assessing health risks should be implemented in order to detect the risks and prevent initial problems from arising.

RECORDING HEALTH RISKS

Another inherent challenge within the construction industry when dealing with occupational health is the recording and reporting of health hazards and illnesses caused. Many illnesses do not require immediate, or any, medical attention therefore they do not constitute as an 'incident' and are not reported. Due to the way the industry has developed and the nature of construction workers there is excessive 'willful underreporting' of occupational health problems. Workers will not report problems for fear of missing work, or a promotion in a competitive market (Leigh, 2000). This leads to illness that goes unreported until an accident or incident occurs and a report has to be filed. Most likely, this category of incidents gets reported as an accident or injury not as an illness and is treated only as a safety incident. This is one example where health issues can lead to safety hazards in the construction environment. Underreporting of illness means that preventative measures are not taken and early treatment is not carried out to lessen the advancement of conditions. Missed workdays could be increased as a result of development of illness and disease that may have been prevented if reported at earlier stages. Due to the nature of the claim that occupational health problems are grossly underreported, it is difficult to get supporting quantitative evidence. Proof in this claim could only be shown through a health surveillance standard of practice that records and reports these problems through systematic health monitoring and testing procedures.

OSHA HEALTH GUIDELINES

Under the health guidelines of OSHA developed by NIOSH, OSHA and DOE, several hazardous chemicals are listed to provide information about the possible risks they pose and the standards and guidelines associated with them. Each of the chemicals is identified for the purpose of summarizing "pertinent information about chemicals for workers and employers as well as for physicians, industrial hygienists, and other occupational safety and health professionals who may need such information to conduct effective occupational safety and health programs" (OSHA/NIOSH, 2009). Under each of the chemical substances there are subcategories identifying the chemicals and associated exposure limits, health hazard information, exposure sources and control methods, medical monitoring, workplace monitoring and measurement procedures, personal hygiene procedures, and protection measures. The medical monitoring section has subsections for medical evaluation, periodic medical examinations and biological monitoring, and medical examinations recommended at the time of job transfer or termination. The medical monitoring section for most of the chemicals is preempted with this introduction:

Workers who may be exposed to chemical hazards should be monitored in a systematic program of medical surveillance that is intended to prevent occupational injury and disease. The program should include education of employers and workers about work-related hazards, placement of workers in jobs that do not jeopardize their safety or health, early detection of adverse health effects, and referral of workers for diagnosis and treatment. The occurrence of disease or other work-related adverse health effects should prompt immediate evaluation of primary preventive measures (e.g., industrial hygiene monitoring, engineering controls, and personal protective equipment). A medical monitoring program is intended to supplement, not replace, such measures. To place workers effectively and to detect and control work-related health effects, medical evaluations must be performed (1) before job placement, (2) periodically during the period of employment, and (3) at the time of job transfer or termination (OSHA/NIOSH, 2009).

Under several of the chemical categories there is a section for medical surveillance under which the following statement is made: "OSHA is currently developing requirements for medical surveillance. When these requirements are promulgated, readers should refer to them for additional information and to determine whether employers whose employees are exposed to [chemical hazards] are required to implement medical surveillance procedures." This statement shows the concern for increased health promotion, but that standards have yet to be implemented. This leads to lack of compliance and implementation and use by companies (OSHA/NIOSH, 2009). The guidelines set forth in these sections are not regulations, only suggestions for practices when dealing with the associated chemical hazards.

MEDICAL AND HEALTH SURVEILLANCE

OSHA standards do not include an in depth health monitoring or health surveillance standard or guideline. The health guidelines and procedures that OSHA has established are merely recommendations for risk management. OSHA's Medical Surveillance section of standards really entails only medical monitoring guidelines; there are no standards for compliance to be followed by law. Medical monitoring under OSHA is the monitoring or identification of occupational health problems through standard health assessments and physical examinations. Under the medical monitoring guideline a pre-placement medical evaluation is done to establish a baseline health condition and indicate any pre-existing condition. Medical evaluations at regular intervals of three to five years, or more frequently if required by Federal, State or local standards, are recommended to be performed. Also, biological monitoring, which is described as "sampling and analyzing body tissues or fluids to provide an index of exposure to a toxic substance or metabolite" (OSHA/NIOSH, 2009), is a recommended procedure, yet there are no established tests for biological monitoring in place for a majority of the identified hazards. Medical surveillance is only recommended for workers whom are known to be exposed to hazardous chemicals (OSHA/NIOSH, 2009). However, all construction workers should be given some form of medical monitoring at regular intervals in order to ensure they are in a healthy work environment.

The key to successfully monitoring occupational health is to follow the progression of the health risks through medical testing and health surveillance. Health surveillance and its benefits are best explained in the following quote:

"Health surveillance enables the identification of those employees most at risk from occupational ill-health. It should not be confused with health monitoring procedures such as pre-employment health checks or drugs and alcohol testing but it covers a wide range of situations from a responsible person looking for skin damage on hands to medical surveillance by a medical doctor. Health surveillance detects the start of an ill-health problem and collects data on ill-health occurrences. It also gives an indication of the effectiveness of the control procedures. Health surveillance is needed to protect workers, identify as early as possible any health changes related to exposure and warn of any lapses in control arrangements" (Hughes, 2007 page 297).

ILLNESS AND DISEASE PREVENTION

The goal of an occupational health program should be to prevent illness and disease caused by work conditions. Potential risks and hazards need to be identified through testing and surveillance programs. The appropriate equipment, procedures and treatments associated with those risks and hazards should be identified and used to eventually prevent health problems. Occupational health problems should move from treatment to early detection with the ultimate goal of prevention (Van den Broek, 2003). In construction the identification of risks is particularly challenging due to the constantly changing factors of the construction environment; hence, a regular scrutiny of work conditions should be incorporated in an occupational health program.

OSHA has identified many toxic substances with associated health risks as guidelines that can be followed (OSHA/NIOSH, 2009). Substances such as asbestos and lead have been identified as major risks, and therefore, in depth programs have been developed for these hazards. OSHA established a Lead in Construction standard in 1993 that requires blood lead levels in workers exposed to lead to be monitored by employers. Safe exposure levels and blood lead levels have been established as a baseline for surveillance and monitoring of employees (CPWR, 2009).

More recently, the Center for Disease Control (CDC) published the National Occupational Research Agenda (NORA) revised as of 2008. NORA establishes criteria for occupational safety and health research

and practice in the US construction sector. It has identified several critical health issues in construction such as: noise and hearing loss, silica exposures and illnesses, welding fumes and illnesses, and musculoskeletal disorders. In the NORA program, strategic goals are set for each of the hazards to reduce health risks through surveillance of exposure and treatment of health effects caused by exposure. The overall goal of most of the hazards is to reduce the effects of the problems by 33% over an established baseline (NORA, 2008)

For an occupational health program to be effective in construction the standards will have to be not only hazard specific, but trade and even job specific. Programs such as an occupational health matrix developed by Constructing Better Health (CBH) in the UK would be most effective for preventing illness and disease in construction. The health matrix identifies a range of health assessments and they are matched with specific job profiles. It is then used by health professionals to monitor, diagnose, and treat workers with occupational health problems (Paton, 2008). The CBH Health Assessment Matrix can be accessed at www.constructingbetterhealth.com.

IMPLEMENTING HEALTH STANDARDS

In the US, OSHA is the regulating authority for occupational safety and health. All standards and regulations are through compliance with OSHA. International occupational safety standards, such as the European based Occupational Health and Safety Assessment System (OSHAS) 18001, which have been adopted throughout the world, have largely not been recognized as viable regulations by OSHA in the US (Farooqui, 2008). This rejection by the enforcing authorities may be the largest barrier of entry to an international occupational health standard.

In the UK, a health assessment matrix for the construction industry has been developed by Constructing Better Health (CBH). The matrix matches a range of health assessments so that construction companies can match them with specific job profiles. The health matrix is designed to work in collaboration with accredited health service providers that that can provide health screening services set out by the CBH standards (Paton, 2008). A similar standard would be beneficial in establishing consistency in an international occupational health standard to be implemented in addition to safety programs.

The UK's Health and Safety Executive has established the Control of Substances Hazardous to Health Regulations (COSHH). This legislation is similar to OSHA substance regulations established to protect employees from exposure to harmful substances. COSHH requires employers to assess health risks and implement and monitor effective controls. COSHH regulations offer benefits to employers and employees through: improved productivity due to lower levels of ill-health and more effective use of materials; improved employee morale; lower numbers of civil court claims; better understanding of health and safety requirements (Hughes, 2007).

CONCLUSION

The construction and industrial sectors of the workforce are exposed to many occupational health related risks in their workplace. The recent focus placed on safety has been a necessary addition to the construction culture, and has shown to provide tremendous benefits to workers and companies. With such an immense amount of risks and variables in the construction environment, there is still much to be desired when dealing with all of the health risks. The bundling of occupational safety with occupational health has created an assumption that the health of workers is given full consideration through occupational safety and health programs. Occupational health standards separate from safety standards could yield great benefits in the forms of decreased costs for companies, higher quality of work, safer workplaces, healthier workplaces and increased productivity. It is important that an international standard be established for construction due to the fact that there are health risks wherever construction occurs. Before any standards can be established, there is still a great deal of testing and research that needs to be done in order to develop a useful program.

Innovative companies will need to develop test programs and work with employees in order to successfully improve occupational health conditions.

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