

REPORT ON OCCUPATIONAL HEALTH STANDARDS
FOR THE CONSTRUCTION INDUSTRY

To the Assistant Secretary
Occupational Safety & Health Administration
U.S. Department of Labor

Submitted by the
Advisory Committee on Construction Safety & Health

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INTRODUCTION

Background

During the past several years, it has become apparent that the health standards promulgated by the Occupational Safety and Health Administration (OSHA) for the protection of workers have been difficult to apply to the construction industry. Testimony presented to the Advisory Committee on Construction Safety and Health has made reference to the need for resolution of difficult problems created by the medical examination, medical records, field monitoring, and certain other parts of the OSHA occupational health standards.

On May 16-17, 1979, an entire meeting of the Advisory Committee on Construction Safety and Health was devoted to these issues. At that time, witnesses described the differences between construction work and factory work and referred to the difficulties experienced by construction employers and employees in attempting to comply with the

OSHA health standards. Further testimony cited examples of conditions unique to the construction industry such as a transient work force, short tenure with a given employer, inability to standardize and centralize medical records, and lack of control over environmental conditions.

Deliberations by the committee resulted in a consensus that most OSHA health standards were developed for and are best suited to the needs of manufacturing plants where employment is steady and the working environment is more stable and predictable. This led the committee to conclude and to recommend that a separate set of health standards be developed to meet the special conditions of the construction industry.

The Assistant Secretary of Labor for OSHA responded to the committee's recommendation by requesting that a Subgroup on Health Standards be formed within the Advisory Committee on Construction Safety and Health. In a letter to the Committee dated July 18, 1979, the Assistant Secretary said: "In recognition of these difficult pro-

blems, I request that a subgroup on health standards be formed within the Advisory Committee on Construction Safety and Health. The subgroup should thoroughly review the problems mentioned above and should submit a written report containing its findings and including recommendations that would provide the necessary protection to employees.

"The report should be in a form that OSHA can utilize to provide guidance for the development and application of future health standards to construction."
(See Appendix A.)

The committee subsequently appointed the following subgroup among its members:

- Fred Ottoboni, Chairman (State)
- Roy Steinfurth (Employee)
- James Pakenham (Employer)
- Bruce Hollett (Federal)
- Gene Canham (Public)

The subgroup was assisted by experts and consultants from business, labor, government, and the occupational medical profession. These individuals are listed in Appendix B of this report.

The report includes a discussion of the major problem areas that construction employers and employees have encountered in attempting to comply with OSHA health standards. The report also contains recommendations aimed at facilitating compliance for employers while improving protection of workers.

DISCUSSION OF PROBLEMS AND THEIR SOLUTIONS

Permissible Exposure Limits (PEL)

In reviewing permissible exposure limits, it was agreed that the concept of limiting the exposure of employees to toxic materials is the appropriate means for controlling both acute and chronic health effects.

Because all employees deserve equal protection against the effects of a given toxic material, the same exposure limits should be applied to all industries, including construction. However, measurements of exposure levels should not be the only method for judging compliance by construction employers. In some construction activities a better method would be to require specific work practices which have been proven to provide a worker exposure which is equal to or less than the permissible exposure limit.

The decision-making process necessary to determine whether a particular work operation complies with permissible exposure limits involves, for each individual situation, both air sampling and laboratory analyses. These activities require time, but must be completed before a work operation can be evaluated and the adequacy

of protective measures determined. Testimony from both labor and management described construction work as temporary, subject to ambient weather conditions, and changing daily with respect to environmental contaminants and physical locations of work operations. Thus, the combination of industrial hygiene lag time and changing and unpredictable environmental conditions on the job means that very often by the time the industrial hygiene results are available, the job that was sampled has been finished and the workers reassigned.

From the standpoint of worker protection, then, the use of exposure level measurements alone is not always the best way to protect workers. Construction standards should include provision for use of specific work practices as an alternative to some of the sampling and laboratory sequences required to comply with the permissible exposure limits. Such an approach would allow an employer or a material supplier to develop and publish work practices based upon legitimate measuring and monitoring of actual field operations. Based on such field monitoring, these work practices would be designed to assure that permissible exposure limits were not exceeded. The effectiveness of

the work practices would be checked in the routine course of field work by employers, and by both OSHA and NIOSH. Reliable work practices should be accepted by OSHA in lieu of some of the monitoring required by the standards.

In summary, it was agreed that the concepts underlying the permissible exposure limits were appropriate for application to the construction industry. However, monitoring should not be the only criterion for judging compliance. Reliable work practices which ensure that the PEL's are not exceeded should be developed and accepted by OSHA for use in lieu of certain monitoring requirements.

Regulated Areas

Many of the health standards promulgated by OSHA require the employer to establish "regulated areas." The regulated area is defined somewhat differently in each standard, but in general its boundaries are defined either by the permissible exposure limit or simply as a geographical area where there is a potential exposure to the subject toxic material. Arsenic, DBCP and benzene are examples of standards where regulated areas are defined as areas where airborne exposure is in excess of the PEL without regard to the use of respiratory protection. In these cases, air monitoring is required to establish the boundaries of the regulated area. The standards for coke oven emissions and the 14 carcinogens define the regulated area in terms of use: an operating battery or an area where a carcinogen is manufactured, processed, used, re-packaged, released, handled or stored. Three of the standards--asbestos, cotton dust and lead--do not include the regulated area.

The standards utilize the regulated area to define the zone of potential exposure where special controls are mandated. These include posting, restriction of access,

prescribed environmental and medical monitoring, prohibition of eating, smoking and drinking, provision of showers, lunchrooms, and special training. While the standards without regulated areas do not specifically restrict entry and exit, they do somewhat define areas of special hazards through mandatory environmental monitoring, posting, and medical and environmental controls.

The segregation of certain areas where potential exposure to toxic materials exists is a good approach to worker protection in the construction industry. Restriction of access limits the number of exposed workers, and thus cuts the costs of protective equipment, special hygiene facilities and the other cost items associated with the supervision of exposed workers.

It is important to note that the definition of the regulated area must be drawn with great care to limit its size to only those areas where the purpose of worker protection is served. Testimony before the full committee on May 16 and 17, 1979, brought out that the arbitrary establishment of the boundaries of a regulated area, as is the case with the standard on coke oven emissions, created a serious economic burden for construction con-

tractors and their employees. OSHA's December, 1978 draft, "Supplemental Statement of Reasons," relating to the application of the OSHA coke oven emissions standard (1910.1029) to construction which was presented to the full committee during the May, 1979, meeting, is an example of desirable change from the point of view of both construction labor and management.

When the committee's recommendations of May 17, 1979, are incorporated in OSHA's December, 1978, draft, they will reduce unnecessary costs by defining only potentially hazardous areas as regulated areas and will allow work to proceed normally outside these areas.

In summary, the segregation of certain areas is a good approach to worker protection; however, these areas should be defined as narrowly as possible.

Notification of Use and Notification of Emergencies

Many OSHA health standards require the employer to notify the OSHA area director in writing of the use of the materials which are the subject of the standard and of any emergency situations where release of the material may have created a hazard to employees. The fourteen carcinogens, vinyl chloride, acrylonitrile, and benzene, are examples of standards which require the reporting of both use and emergency situations. The standards for arsenic and DBCP require the reporting of use, but not emergency situations. Asbestos, lead, cotton dust, and coke oven emissions are standards which do not contain reporting requirements.

The time period allowed for the employer to notify the area director differs considerably among the standards. In the standards for the fourteen carcinogens, there is no grace period for notification of use after March 1, 1974. These standards state that after this date, the specified information must be reported in writing to the nearest area director. Further, any changes in the information originally submitted to the area director or incidents which result in the release of the regulated materials

must be reported within 15 calendar days. The acrylonitrile standard, on the other hand, allows 30 days for notification of use and 72 hours for the reporting of an emergency. The arsenic standard allows 60 days for notification of use; notification of emergencies involving arsenic is not required.

Most often, the notification of use is tied to the establishment of a regulated area. As noted earlier, the conditions under which a regulated area is required vary among the standards. In essence, such an area is required whenever a material is used, handled, processed, or stored, or in some cases, when a given airborne level is exceeded.

The subgroup expressed some conflict with the concepts behind these reporting requirements. It is reasonable for OSHA to be made aware of the use of potent chemicals and emergencies involving these materials when employees may have been overexposed. The reporting requirements also serve the purpose of ensuring that the employer is aware of the use of certain toxic materials and is attentive to any incidents involving these materials. On the other hand, the value of the current reporting procedure is dubious at worksites where the reportable material is not under the control of the construction contractor, but is

controlled by the owner of the facility, and at worksites with multiple employers where some contractors may be using a reportable material.

In the situation where the reportable material is not under the control of the contractor, there is a question as to whether the construction contractor would ever be aware of the presence of a reportable material. An example would be a construction contractor employed to install a roof on a plant which is in operation and producing one of the reportable materials. As a rule, the contractor will not be familiar with the process, the plant environment, the toxicity of the materials involved, or the protective measures required. In this case it is not reasonable to require the contractor to notify the area director of use and of emergencies as prescribed by the standards.

A better alternative would be to require the plant owner to notify the construction contractor of the owner's use of a reportable material. The owner should also be required to notify affected contractors as well as OSHA of emergencies. The construction contractor should probably not be under any burden to report to OSHA in the situation where that contractor has no control over the

use of the material. This alternative is desirable, because the plant owner, who is in the best position to know of the presence of the material, can best discharge the responsibility of notifying both OSHA and the contractor. As a result, contractor employees will not be victimized by the unnecessary ignorance of their employers and the contractor can more accurately plan for the costs of the required hazard control program.

In the situation where the reportable material is under the control of a construction contractor, the subgroup felt that both use reporting and emergency reporting were not adequate for multiple employer worksites. Here, one employer using a reportable material can endanger employees or other contractors even though the current OSHA reporting requirements are satisfied, because the other contractors have no way of knowing that reportable materials are in use. A comprehensive labeling regulation could alleviate this problem. OSHA should consider making contractors on multiple employer worksites responsible for notifying all of the other contractors on the worksite of the use, handling, processing, or storage of reportable materials.

The grace period for notification of the OSHA area director also was the subject of comment. While the standard for the fourteen carcinogens apparently requires immediate reporting of use, the arsenic standard allows 60 days. This longer period may not be appropriate for construction projects where the use of a reportable material may continue for only a few hours. In the development of health standards specifically for construction, a reduction of the grace period to reflect the transient nature of some construction processes should be considered.

In summarizing the application of reporting regulations to construction, the idea of reporting use to OSHA was seriously questioned as to its value in terms of prevention of accidents or illnesses. A far better approach would be to have owners notify contractors of both use and emergencies when such materials are under the control of the owner. Similarly, user contractors should notify other contractors of both use and emergencies on the same worksite. There was no objection to the reporting of emergencies to the OSHA area office as is currently required.

Emergency Planning

A number of the OSHA health standards have defined the term emergency as the unexpected or massive release of the materials which are the subject of the standard (vinyl chloride, acrylonitrile, coke oven emissions, DBCP, benzene). The standards for vinyl chloride, acrylonitrile, and DBCP, require that the employer develop a written operational plan for emergency situations. These plans usually include respirator requirements for employees engaged in correcting emergency conditions, and evacuation requirements for employees not engaged in correcting the emergency.

Most of the OSHA standards refer to emergency procedures or plans under the respirator section. A few refer to these procedures under the sections on training and medical surveillance. Three standards, benzene, acrylonitrile and DBCP, include employee training requirements for emergency first aid.

As currently written, these emergency procedure requirements are somewhat unrealistic for the construction industry. For example, when the toxic material is not under the control of the construction contractor, emergencies could occur with no evacuation warning or other notice of immediate

danger to construction employees. A vinyl chloride plant undergoing a structural modification or repair by an outside contractor is an illustration where such a condition could arise. A solution to this problem would be for the standard to be rewritten so that the owner of a facility is required to notify any construction contractor on the site where hazardous exposures and emergency conditions are possible. This notification should include emergency evacuation plans, signals and other information necessary for the protection of contractor employees if an emergency occurs in that part of the facility which is under the control of the owner.

Another situation not covered by these provisions in the standard is where one contractor on a multiple contractor worksite is using a material with requirements for emergency procedures. Conceivably, an emergency could occur where only the employees of the single contractor using the toxic materials would be aware of the need to evacuate or to take immediate protective steps. A more practicable approach would be to require employers using such materials to notify both the owner of the facility and the other contractors on the site of these emergency pro-

cedures. In this way the employers of all the employees on the site would be in a position to develop their own emergency responses and to instruct their employees accordingly.

In summary, the sections on emergency procedures could be made more relevant for the construction industry by requiring that: (1) owners notify contractors on the worksite of their emergency plans when the toxic material is under the control of the owners; and (2) a contractor notify the owner and the other contractors on the worksite of emergency plans when the toxic material is under the control of the contractor.

Medical Surveillance

Every OSHA health standard contains a section on medical surveillance. Generally, these sections require initial and periodic (usually annual) physical examinations aimed at determining predisposition to, or the effects of exposure to, toxic material covered by the standard. Additionally, these sections require that certain information be provided to the physician by the employer, such as a copy of the standard involved, the employee's duties, the employee's anticipated or representative exposure level, a description of the personal protective devices used, and any information from previous medical examinations of the affected employee. These sections of the standards also require the employer to instruct the physician to administer certain specified tests and supply the employer with a written opinion listing any detectable medical conditions which would place the employee at increased risk of material impairment of health resulting from exposure to the toxic material or from the employee's use of respiratory protective equipment.

The sections differ among the standards in the requirements covering the conditions which specify when and to whom medical examinations must be given. Table 1 shows these different conditions.

TABLE 1

Triggering Factors and Time Periods Allowed in the OSHA Standards for Initial Medical Examinations.

<u>Standard</u>	<u>Triggering Factor</u>	<u>Time Allowed</u>
Asbestos	Any Exposure	30 Days following employment
14 Carcinogens	Anywhere material is used or stored	Before assignment to work
Coke Oven Emissions	Inside regulated area	Within 30 days of assignment
Acrylonitrile	At action level	At initial assignment
DBCP	In regulated areas (at action level) subject to emergencies	At initial assignment
Arsenic	At action level	Within 30 days of assignment
Cotton Dust	Where cotton dust is present	Before assignment to work
Lead	At action level	Above action level 30 or more days per year
Vinyl Chloride	At action level	At initial assignment
Benzene	At action level	Before assignment to work

For the construction industry, medical examinations are considered a major economic and logistical problem. The primary reason is that employee turnover in the construction industry is high as compared to the manufacturing industry. In construction, employees may be hired for anywhere from one day to many years. One employee may work for three to ten employers throughout the country in the course of a year. The attempt to superimpose initial and periodic physical examinations on such a pattern of employment presents severe problems for both employees and employers.

For the employee, one problem is the potential for multiple medical examinations by different physicians in a single year. Overuse of X-ray and other medical procedures are potentially harmful. Travel to and from the physician's office and the waiting time must be borne by either the employee or the employer. While all construction workers are not now subject to repeat examinations because of noncompliance by employers or refusal by employees -- or because current standards require examinations for only a few materials -- testimony indicates that this problem currently does affect certain groups of employees whose work is impacted by

existing standards. It is important to note that if OSHA's standards development effort continues in its current pattern, an increasing group of workers will be subject to multiple medical examinations.

Another problem from the point of view of the employees and their representatives is possible discrimination or exclusion from work based upon medical judgment which may or may not be uniform among employers or even in a given medical office. The OSHA standards usually do not specify exactly what constitutes passing or failing an examination. Whenever possible, standards should give specific guidance to physicians in this respect. The workers' compensation laws in most states are not compatible with these OSHA health requirements because they do not compensate employees who may be forced out of their trades by failure to satisfy the details of medical examinations. It is very important to recognize that workers in the construction industry, because they routinely change employers, may be required to take an OSHA "initial" medical examination several times per year throughout their working lives. Sooner or later it is possible that such a person will not be allowed to work for medical reasons which may be quite arbitrary.

There appears to be no mechanism in the OSHA standards which will prevent an employer from utilizing these medical examinations to exclude all but the most hardy human specimens. OSHA standards that require medical examinations should specify that physicians only give the employer an opinion regarding the employee's ability to perform or not perform the job from a medical standpoint. The specific values of medical testing and evaluation are confidential matters between physician and patient.

Testimony taken from physicians at subgroup meetings supported the need for medical examinations; Dr. Selikoff and Dr. Yodaiken on September 24 and 25; Dr. Clark Cooper and Dr. Grandjean on November 26, and Dr. Englund on January 9. All commented on the complexity of this issue in construction. All stated the need for baseline medical examinations. The use of appropriate periodic medical surveillance was recognized by all as desirable, although it was considered necessary to exercise judgment in choosing the type and frequency of these exams. ~~Aside from the question of how to implement the medical surveillance requirements was the overriding concern that there were insufficient qualified health professionals available to meet such a demand.~~

Good preventive medicine requires knowledge of environmental conditions on the job by the physician and the ability of the physician to follow the employee over time and to initiate treatment or change the employee's working conditions for the good of the employee. Achieving these objectives is difficult in construction. Employees who work for short periods are sometimes terminated before the complete results of the examination reach the employer. The multiple employer and multiple physician situation destroys the value of continuity of medical records. Neither the physicians involved nor the employers involved have the opportunity to provide the employee with the benefits of a useful medical record system because records are often scattered over a wide geographical area with no provision for communication between physicians and/or employers.

Another problem is the necessary time lag between making the appointment for the examination and the examination itself. On some jobs, this time period delays the startup or the progress of work, because employees cannot be put to work until the examinations are completed and the physician's report has reached the employer.

The cost of the examination itself is also worthy of consideration. Testimony indicated that employers may be

charged anywhere between \$40 and \$2000, depending upon the examining physician's interest in a given patient and the instructions given to the physician by the employer. These circumstances will make it necessary for employers and physicians to develop a special health awareness in order to meet the objectives of the standard and, at the same time, avoid costly medical procedures that may go beyond the scope of the standard involved. Liability considerations complicate these issues and tend to force health professionals to make decisions which err on the safe side from the legal viewpoint.

The lack of qualified medical resources is an additional concern according to representatives of the medical profession and the construction industry who testified before the subgroup. Witnesses indicated that at the present time, physicians willing to accept OSHA physical examinations are difficult to locate in some parts of the country. Trips of 50 miles between the site and the physician's office are not uncommon in some areas. Assuming that the hundreds of health standards yet to be promulgated by OSHA will also contain requirements for medical examinations, the impact on the physician resources in this country will be large.

While it was agreed that OSHA had the best interests of employees in mind when mandating initial and periodic examinations, there was disagreement in the subgroup and among the experts who testified before the subgroup that these best interests could be achieved in the construction industry. From the preventive point of view, an overdependence on medical control systems in lieu of environmental control systems may harm employees more than help them. The reasoning behind this statement is that frequently diseases of occupations develop slowly as the result of continued environmental exposures. The fragmented and imperfect medical system created by the standards in the construction industry is unlikely to discover these diseases while the exposure is taking place and is even more unlikely to be able to stimulate the necessary environmental control systems. A good example is the use of coal tar pitch in construction. Because the employees and the jobs are never permanent, this cancer hazard can move from job to job without being detected early enough by medical examinations to protect the employees involved.

While the current medical surveillance and record-keeping requirements as they apply to the construction

industry suffer from the problems mentioned above, there are certain trades' workers whose exposure to toxic substances requires medical monitoring. Some short-term and long-term exposures need medical monitoring.

Individuals who are constantly exposed to silica sand, asbestos, toluene, benzene, etc., could be required to undergo medical examinations and could be certified as having completed the necessary examinations so as to avoid duplicative "initial" examinations. The record-keeping requirements could be centralized either in national depositories or in regional clinics. Such centralized records would provide a continuous body of information as well as verification that the individual worker has in fact met the medical surveillance requirements for his trade and/or exposure.

The subgroup recognizes the differing nature of workplace exposures of various crafts in the construction industry and recommends that OSHA take this into consideration when evaluating the need for medical surveillance and recordkeeping in construction.

New standards for the construction industry should recognize the impracticability of attempting to include a re-

quirement for medical surveillance in every health standard. Instead, attention within NIOSH and OSHA should be directed toward developing a generic standard for physical examinations and the identification and documentation of hazardous materials, processes, and work practices in the industry. Additionally, these agencies should mount a major effort to develop and publish economical and practical methods of controlling these hazards so that the work environment can be made inherently safe. New standards should emphasize environmental controls and deemphasize dependence on medical controls unless they are necessary.

The larger part of medical surveillance in construction should be aimed at discovering or solving special problems where the medical expertise and cost is justified in terms of results. For example, studies of selected groups of workers doing specific jobs, studies within large corporations where medical records can be kept and jobs are repetitive, and studies of union groups are capable of determining cause and effect relationships and therefore able to justify the use of funds and medical resources.

At present, there is no existing mechanism to provide a continuous medical history for construction workers. However,

the requirement for preplacement and periodic examinations can be met responsibly only through such a system of records and certifications as alluded to by several speakers during the course of our meetings. OSHA should encourage development of these mechanisms through grants and requests for research. Even when these mechanisms are in place, the concerns of workers and employers over inequities in the compensation and liability realm may defeat their effectiveness unless legislative reform is instituted in these areas as well. A cornerstone of whatever course of action is taken must be the fair and equitable dealing with workers who have been exposed over the course of their employment to many health hazards. Their rights to work and to confidentiality of their medical records must be protected. Discriminatory hiring practices would negate any benefits from medical examinations.

Recordkeeping

Most current OSHA health standards (asbestos, lead, benzene, vinyl chloride, etc.) require the employer to retain written records of environmental exposure monitoring and the results of employee physical examinations. Two of the health standards, cotton dust and the "14 carcinogens," require only the retention of medical records. Retention time requirements among the standards vary up to a period of 40 years.

A primary purpose for requiring an employer to maintain medical records is to provide the means for monitoring the effectiveness of a given standard in protecting employees. Additionally, medical records plus environmental monitoring records enable long-term studies of the adequacy of a standard. Other purposes of the recordkeeping requirements are to enable OSHA to assess the employers compliance with the monitoring and medical provisions of the standards, to establish baseline and periodic medical data upon which a physician can make diagnoses, to provide the physician with information to assist in the determination of disease progression, and to provide the employee with information about his or her own exposure levels and medical findings.

Many workers are exposed to toxic materials or harmful physical agents in their workplaces. OSHA feels that data collected in employee exposure records and medical records will increase the employees' recognition of these hazards. Additionally, it is OSHA's position that the goals of occupational safety and health are not adequately served if employers do not fully share the available information on toxic materials and harmful physical agents with employees. Until now, lack of this information has often meant that occupational diseases and methods for reducing exposures have been unknown to some employers. OSHA believes that by giving employees and their physicians the right to see relevant exposure and medical information, employees will be able to identify worksite hazards, particularly workplace exposures which may impair their health or functional capacity. Increased awareness of workplace hazards will also make it more likely that prescribed work and personal hygiene practices will be followed.

It is the committee's opinion that the requirements for medical and environmental recordkeeping will need revision if they are to meet the goals of enhancing con-

struction worker health and at the same time be economically practical for employers.

To be effective, medical records must have a relationship to environmental records. To assess the protection provided by an environmental standard, health efforts must be correlated with levels of exposure and occupational history. This may not often be possible in construction work where employment is temporary, the work location is continually changing, and environmental exposures are subject to the variability of wind and weather. Workers may use or be exposed to a given material for short periods of time, in some cases only a few days. These combined variables make it extremely difficult to accurately characterize any particular worker's exposure.

Some construction firms are created to carry out a project and then are dissolved. For this reason, a great many of the medical records will be lost. There is also no provision for making use of these records in the future, except that they be sent to NIOSH. Most likely, these records will simply fill up government warehouses at significant cost to the taxpayers and to the employers who originally collected them.

Because construction workers change employers regularly as described above, the records that are not lost through closure of the construction firm will be scattered among surviving construction firms located throughout a geographical region or sometimes throughout the country. These records also will have little value for epidemiological purposes or other long-term studies.

The construction industry requires a different approach to reaching the goals of recordkeeping. This new approach should include two major concepts. The first concept is the specialized study which utilizes a fraction of the industry to obtain necessary answers. This would be in lieu of the current blanket mandate that all employers keep records with the idea that NIOSH or OSHA may someday wish to come in and review them as part of a study. The specialized studies would be designed to achieve the same ends at lower cost. In other words, specialized studies could check on the effectiveness of OSHA standards, control methods, or be used to develop safe, low cost, work practices.

The second concept is that of a centralized record-keeping system. In construction, medical records will have no value if they are scattered and lost. Only a centralized system can overcome this problem. Similarly, the data in records will not be useful for medical or epidemiological purposes unless they are collected according to some uniform format which includes relevant medical, environmental and demographic information.

Because of the complexities discovered in review of the medical surveillance and recordkeeping sections, this committee strongly suggests that members of labor and management actively involved in construction be invited to participate in the formation of possible solutions.

Exposure Monitoring

Monitoring of environmental exposure levels by the employer is required by every one of the health standards except the 14 carcinogens. While the language varies among the standards, initial monitoring is normally required for all workplaces where any biologically significant exposure is possible. The need for and the rate of subsequent periodic monitoring is based upon the levels found and the relation of these levels to action levels and permissible exposure limits that are specified in the standards. None of these monitoring requirements, or even the concept of environmental monitoring, was questioned by the committee. As a general rule, monitoring was considered necessary to a comprehensive worker protection program.

However, several exceptions to this general rule should be included in the development of health standards for construction. First, as described in the earlier section of this report entitled, "Permissible Exposure Limits," safe work practices should be developed and accepted by OSHA for use in lieu of the sequence of air testing, comparison with permissible exposure limits, and initiation of control

action which is required by the standards. Because of the transient nature of working conditions in construction, both the worker and the employer would be better served in many cases by simply using an acceptable work practice at the start of a job where a potential exposure exists, and dispensing with the costly and time consuming monitoring process. The advantage is that the worker is protected from the first day of exposure and the employer is not required to pay for monitoring a work operation which may be completed before the results of the monitoring are available.

The second exception to this general rule has to do with the situation where contractor employees are potentially exposed, but the toxic material is under the control of an owner. For such cases, standards for construction should require that the owner provide historical and current monitoring results to the contractor before the initiation of work so that the contractor can plan his preventive program as an integral part of the job.

Additionally, owners are often obligated under existing standards to conduct periodic monitoring to

protect their own employees regardless of the presence of contractor employees. Any new standards for construction should require owners to conduct all of the periodic monitoring for on-site contractors where the toxic agent involved is under the control of the owner.

In summary, the committee agreed with the need for environmental monitoring as part of effective worker protection programs. Construction standards should allow for use of accepted work practices in lieu of monitoring and also require owners to provide both initial and periodic monitoring data to contractors when the toxic material is under the control of the owner.

Protective Workclothing

All of the health standards except cotton dust include requirements for protective garments, faceshields, goggles, footwear and other items of equipment to be worn by the worker for skin or eye protection. These requirements follow a common pattern in that they assign the responsibility for purchase, cleaning, maintenance, storage, and use to the employer.

The conditions which trigger use of this equipment vary from one standard to another. Acrylonitrile, benzene and DBCP require use when skin or eye contact may occur. In the arsenic standard, protective equipment is required when the possibility of skin or eye irritation exists or when working inside regulated areas. For the fourteen carcinogens and for coke oven emissions, use is required inside regulated areas. The need for protective equipment for asbestos, lead and vinyl chloride is determined by the level of contamination of the ambient air.

Testimony supported the need for protective clothing. The issues that surfaced were: flammability and quality of paper garments; heat stress from protective clothing; and the scientific documentation for requiring protective clothing.

In developing standards for construction, OSHA should review the toxicological literature with great care to ensure that the important routes of entry to the body are identified, and that preventive measures directly relate to control of the hazard. Additionally, OSHA should consider past practices of industry with regard to types of protective clothing that are practicable, and also recognize that the cost of protective clothing goes far beyond the purchase of the clothing itself and includes the costs of storage lockers, change rooms, and laundering.

With regard to clothing, heat stress, flammability and durability are important. Heavy or impervious clothing, while often required, contributes to heat stress in hot environments. Use of flammable or heat fusible clothing, such as paper, plastic or polyester, may be dangerous around hot work. Flimsy clothing, such as certain throwaway coveralls, frequently tears and loses its protective value.

In summary, OSHA standards should be more precise about the need for protective clothing. Such standards should require solutions to the problems of heat stress, clothing flammability and clothing quality that are created by certain jobs.

Employer Information and Training

All of the health standards except asbestos contain specific requirements for education and training of employees. The language varies somewhat among the individual standards, but these education and training requirements, particularly in the later standards such as acrylonitrile, include:

- a) Provision of training by the employer at the time of initial assignment and at least annually thereafter.
- b) Information on the quantity, location, manner of use, storage, and the nature of operations which could result in exposure, and any necessary protective steps.
- c) The purpose, use, and limitations of respirators and other protective equipment.
- d) The purpose and description of the required medical surveillance program.
- e) The emergency procedures required by the standard.
- f) Information on engineering and work practice controls and the employee's relationship to these controls.
- g) The information contained in certain appendices to the standard.

h) A review and a copy of the standard and its appendices.

The appendices to the standards vary in scope and content. Two standards, asbestos and the 14 carcinogens, have no appendices. Appendices to the other health standards are somewhat different in format, but generally cover substance identification; health hazard data; emergency procedures; respirators and protective clothing; precautions for safe use, handling and storage; access to information, physical and chemical data; fire, explosion and reactivity data; monitoring and measuring methods; house-keeping and hygiene facilities; miscellaneous precautions; common operations in which exposure is likely to occur; and medical surveillance guidelines.

An overused expression or cliché in the occupational health field is that the basic solution to all health hazards on the job is to educate and train the affected workers. The committee agrees that appropriately designed education and training programs are a key factor in minimizing hazards; however, to be effective they must be job-related and fully supported by management and labor.

Traditionally, many health hazards were not recognized as a major problem in the construction industry and most

employers and employees neglected to consider the possibility that construction activity could cause serious health problems. The result has been that insufficient sources of information on prevention of these problems have been available in this industry.

The health standards promulgated by OSHA recognize the importance of education and training and include very specific requirements as mentioned earlier. While these requirements are both detailed and comprehensive, they appear to have been developed with a factory setting in mind. Thus, to an extent, they are not completely relevant to construction. Their design does not take into account rapid employee turnover, a constantly changing work environment, and the concept of a workforce made up of craftsmen who are expected to bring specialized skills to the jobsite with them.

To be effective in the construction industry, education and training programs should satisfy the practical needs of the worker. The objective should be to make the worker as knowledgeable of the safety and health skills and techniques as they are of the skills and techniques of the construction process. To be practical, the pro-

grams should be designed and organized to teach only that material which is necessary to allow the employees to work safely in an environment as healthful as the state of the art dictates. This organization requirement automatically influences the employer to develop specific course outlines and lesson plans relating to the hazard and the activities necessary to control the hazard.

Records should be maintained in order for the employees and OSHA to determine whether the employer is conducting a training program. These records should show the dates of training, participating employees, topics, and evaluation results.

A practical method for guaranteeing that all affected employees receive training is for the training to be conducted during regular work hours. Since the health hazard is a function of, and generated by the work process, the employer should consider the cost of employer health hazard training as a necessary direct job expense when estimating job costs.

When OSHA includes training and education language in a construction health standard, the employer should be required to include the following items in the curriculum:

1. The exact identification of the material or process that is hazardous.

2. The procedure for notifying affected employees that a hazardous material or process will be used at the work site.

3. The hazardous properties and health effects of the material or process.

4. Information on the required labels and location and availability of chemical identification lists and substance data sheets.

5. A description of the employer's self-inspection and exposure monitoring activities.

6. The identification of regulated areas, including posting of signs, barricading, entry and exit procedures and restrictions on unauthorized personnel.

7. An explanation of emergency procedures including an opportunity for employees to practice procedures under simulated conditions.

8. An explanation of the employer's rationale for requiring employees to use personal protective equipment instead of implementing engineering or administrative controls.

9. Detailed instruction on selection, fit, use, and care of all personal protective equipment. Employees should be given the opportunity to practice putting on and fitting the personal protective equipment.

10. A general description of any OSHA standard covering the particular material or process. This portion of the training should also include an outline of the employees' rights regarding access to pertinent records and the protection from discriminatory acts by the employer.

11. A review of the employer's medical surveillance program and its procedures for guaranteeing employees access to medical records and assuring the confidentiality of medical records.

12. An explanation of any agreed upon administrative actions that may be triggered by failure of the employee to follow health procedures. "Agreed upon" means both employers and employee representatives have discussed and reached consensus on the rules and subsequent administrative actions.

Some construction employers, through negotiated bargaining agreements with employee organizations, participate in joint apprenticeship and other training programs. These programs generally are designed to train new employees in the skills of the trade, both mechanical and academic.

In summary, most of these training programs teach general job safety and health procedures. OSHA should consider accepting these training programs as meeting the requirements of the training and education sections of the health standards. Before OSHA approval is given, the employer should have to demonstrate that the specific requirements of the applicable standard have been satisfied. Records of those persons participating in the training must be maintained. Those employees who did not participate in the apprentice training program, and more specifically in the health standard training, should be required to receive separate training before working with or around a controlled substance.

Signs and Labels

All of the health standards contain requirements for signs and labels. The committee supports this concept and feels that posting and labeling is a necessary part of preventing overexposure to toxic materials or harmful physical agents on the job.

At issue, however, is the fact that construction employers are not primary manufacturers, but purchasers of these materials. As such, construction employers may not always be aware of the hazard associated with a particular product or device if the items are not accompanied upon purchase by appropriate labels and data sheets.

A solution would be to modify and extend the existing OSHA standard for material safety data sheets which now applies only to ship repairing, shipbuilding, and ship breaking (29 CFR 1915, 1916 and 1917). The modified standard would require manufacturers or formulators of harmful materials or agents to supply material safety data sheets along with their products in such a fashion that they reach construction employers. OSHA should coordinate this action, through the IRLG or otherwise, with other Federal agencies which regulate other aspects of the handling, distribution and use of toxic substances. Under the standard, these

data sheets would then be available at the construction worksite for use by employers and employees in the preparation of signs and labels, training programs, first aid programs, and safe work practices.

In summary, it was felt that the construction employer was not in a position to easily acquire information on the hazard associated with the many products and materials used in this industry, but that such information was fundamental to the preparation of warning signs, labels, training programs, and other important job safety and health activities. Extension of OSHA's current material safety data sheet standard in slightly modified form to the construction industry would be helpful.

Methods of Compliance

All of the health standards except the 14 carcinogens include a section on methods of compliance. Except for minor differences in language, all of these standards call for employers to reduce employee exposures to or below the permissible exposure limits by means of engineering and work practice controls when these are feasible. These standards permit the use of respiratory protective devices only when the employer has established that engineering and work practice controls are not feasible.

Engineering controls include substitution for the toxic material or process, redesign of processes or equipment, isolation or enclosure of the process or equipment, and exhaust ventilation. This class of controls is most desirable, because once implemented, engineering controls provide permanent employee protection unless conditions change or maintenance is neglected. In construction, the frequent change in physical arrangements due to the installation of permanent systems often causes interruption of these controls.

Work practice controls accomplish the same results as engineering controls, but rely upon employers and

employees to perform certain activities in a carefully prescribed manner so that harmful exposures are controlled.

OSHA's policy of mandating engineering controls or work practice controls, instead of respiratory protective equipment, is correct. Except for the air-supplied types, respiratory protective devices are uncomfortable, unreliable and difficult to maintain. Unfortunately, the application of OSHA's policy in this regard is far easier in a fixed location, such as a factory, than a temporary work site such as a construction project.

It was the committee's judgment that both time and the dedication of scientific resources would be required before the construction industry could match the knowledge possessed by the industrial sector of this country in the application of engineering and work practice controls. Almost exclusively, the textbooks, private research, and government studies have been devoted to understanding and controlling the factory environment.

This is not to say that no progress has occurred in construction. Machinery, for example, is being engineered to more strict noise standards. Substitution is reducing

the use of toxic materials, and portable ventilation systems have been developed. Unfortunately, information on the application of engineering controls and work practices to the construction industry is neither voluminous nor widely dispersed.

New standards for construction should recognize this technological problem and include control system research as an early part of the standards development process. Additionally, these new standards should include appendices in the form of technical manuals which describe feasible engineering controls and work practices that may be applied to particular construction work situations.

Construction standards should also continue use of 29 CFR 1910.134 as the criteria for respirator selection in lieu of engineering and work practice controls when the job is not amenable to engineering controls for valid reasons.

In summary, the committee felt that OSHA's policy of mandating engineering or work practice controls whenever feasible was appropriate. However, because these control systems are poorly developed or not available at all for

many construction settings, the deliberate development of low cost, practicable control methods should be a part of the total standards development process for construction.

Hygiene Facilities

An industrial facility, in most instances, is permanently placed and configured. Employee activity is usually constant and predictable. A construction site is of a more complex nature, usually starting in the open with development of a foundation, then erection of a structure or building as the finished product. When work is completed, an employee leaves the job, travels to another location and may undertake a different set of tasks; many times with a new employer. The employee's exposure progresses with each new endeavor. He will be working outside as much or more than he will inside, with a corresponding exposure change. The only consistent aspect of the construction employee's exposure is its variability.

Industrial construction, where most of the toxic exposures are found, are in remote areas. Water in large amounts is not always available. The disposition of large volumes of waste water containing toxic residues would be most difficult.

During the winter months in northern parts of the country, employees work both outside and inside and must

dress accordingly. The requirement of employee showers is questionable as to feasibility in such an environment. Taking showers during cold months probably would be more injurious to their health than not taking one. The requirement to wash face and hands and remove contaminated work clothes would often provide adequate protection for the employee and his family.

The committee agreed that lunchroom facilities appropriate to the work place should be provided. If there are no clean eating areas available, then the employer should provide such a facility.

It was also agreed that a suitable space to change from contaminated work clothes should be provided. The employer shall insure that such clothing is decontaminated, clean and dry before reuse.



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July 18, 1979

APPENDIX A

SUBGROUP ON HEALTH STANDARDS IN THE CONSTRUCTION INDUSTRY

Workers in the construction industry are often exposed to a number of serious health hazards. The health standards developed by OSHA to protect workers have been focused primarily on general industry. Because of the mobile and transient nature of their industry, construction employers and employees have had difficulty in complying with these standards.

The Advisory Committee on Construction Safety and Health has studied these difficulties and has expressed concern about the problems of health standards in the construction industry. I appreciate the Committee's views.

In recognition of these difficult problems, I request that a Subgroup on Health Standards be formed within the Advisory Committee on Construction Safety and Health. The Subgroup should thoroughly review the problems mentioned above and submit a written report containing their findings and including recommendations that would provide the necessary protection to employees. The report should be in a form that OSHA can utilize to provide guidance for the development and application of future health standards to construction.

To assist the Subgroup in its work, I request that a number of experts from business, labor and the occupational medical profession be consulted and asked to participate in the Subgroup meetings. I have asked John Martonik to work closely with the Subgroup and to provide technical assistance from the Agency.

Because of the importance and high priority of this issue, I would like the Subgroup to meet as often as necessary to complete its report as soon as possible, hopefully within six months. OSHA will provide all necessary staff and clerical support

Eula Bingham
Assistant Secretary
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APPENDIX B

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The Committee wishes to express its appreciation
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tributed to the writing of this report.

ROSTER

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March 20, 1980

U.S. Department of Labor

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