



MANUAL OF ACCIDENT PREVENTION FOR CONSTRUCTION

The Associated General Contractors of America's (AGC's) Manual of Accident Prevention for Construction was developed by AGC's Safety and Health Committee. The manual is intended to aid general contractors, specialty contractors, and subcontractors in the development of a safety and health program. Additional assistance is available from various sources, including insurance carriers, equipment manufacturers, suppliers, local AGC chapters, qualified safety consultants, the Occupational Safety and Health Administration (OSHA), and National AGC.

AGC's Manual of Accident Prevention for Construction is not intended to be an exhaustive treatment of the various subjects included. It also should not be interpreted as precluding or disapproving of procedures that would enhance safe construction operations. AGC's Manual of Accident Prevention for Construction is not intended, nor should it be construed, as an undertaking to perform services on behalf of any party either for that party's protection or for the protection of third parties.

This manual is also not intended to be a statement of the work practices and other precautions required by standards and regulations promulgated by OSHA, the Department of Transportation, other federal agencies, or comparable state and local enforcement agencies. Of course, in formulating an accident prevention program, each contractor must ensure that it is in compliance with applicable OSHA and other regulatory requirements. Contractors should be mindful, however, that this is not an OSHA compliance manual, and that the program elements suggested in this manual may need to be made mandatory or be supplemented to ensure compliance.

AGC's Manual of Accident Prevention for Construction is also not intended, nor should it be construed, as legal advice. Construction contractors should determine whether to seek legal counsel on all matters in which legal advice may be appropriate. The Associated General Contractors of America assumes no liability for reliance on the contents of this publication.

To the extent the manual addresses first aid and other care of injured persons, the manual is not intended, nor should it be construed, as medical advice. Health care professionals should be consulted where appropriate.

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Manual of Accident Prevention for Construction

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Occupational Diseases

Chapter 6

6-1 GENERAL

Most occupational diseases do not develop from occasional exposure; they result from long and continuous exposure to a specific health hazard. Workers engaged in occupations where health hazards may exist should be examined by appropriate medical personnel when necessary and as regulatory requirements prescribe.

In many states, certain occupational diseases are compensable under state compensation laws. Technical and research bureaus, as well as federal and state agencies, are giving increased attention to the study and determination of the various types and classes of occupational diseases.

Exposure to an occupational disease should be regarded as seriously as other job hazards. Every effort should be made to control disease-producing hazards. Close attention should also be given to OSHA requirements governing worker exposure to toxic substances, especially where OSHA has issued a standard addressing a specific substance.

EXPOSURE

SOME TYPES OF WORK THAT COULD CAUSE EXPOSURE

Silica Dust	Tunneling, sandblasting, grinding, sand and gravel pit operations, and brick and stone cutting.
Compressed Air	Tunnel and caisson work.
Carbon Monoxide	Garage and tunnel work, and work on heating and internal combustion processes.
Metal (Toxic)	Painting; plumbing; glazing; working around lead, cadmium, zinc, copper chromates, and nickel.
Chemicals (Dermatitis)	Working around cutting oils, creosote, emulsions, lime, acids, cement, concrete, paints, and solvents.
Chemical Fumes	Working around hot tar, asphalt pitch, TDI (polyurethane foam), and paints.
Asbestos Materials	Demolition, remodeling, and asbestos removal.

6-2 SILICA DUST

Silica dust may be produced by the following operations:

Tunneling, Pitwork, and Quarry Operations

- Drilling
- Blasting
- Mucking
- Shoveling and screening dry sand and gravel
- Rock crushing

Miscellaneous Operations

- Sandblasting
- Grinding
- Cleaning
- Refractory brick cutting
- Stone cutting
- Concrete repairs

Preventive Measures:

Drilling

- Keep drills sharp. A dull drill tends to pulverize the rock and create more dust.
- Use wet drilling wherever practicable.
- In dry drilling, install a dust collection system that will trap the dust around the drill shank at the surface of the rock.
- Provide appropriate NIOSH-approved respirators and filters and require drill operators to wear them when exposed to silica dust.

Blasting

- Perform blasting operations outside of regular working shifts whenever possible. Clear the work area of dust before workers return.
- Before blasting, wet down tunnel walls, tunnel floors, and ground surfaces in the immediate area of the blast to reduce the amount of dust produced by the blast.

Mucking, Loading Cars or Trucks From Chutes, and Rock Crushing

- Wherever practical, moisten material to be handled and keep it moist during operations in order to minimize dust.

Sandblasting and Grinding

- Sandblasters should wear an appropriate NIOSH-approved respirator.
- In grinding operations, equip wheels with an exhaust hood and/or wetting capability. Operators should wear an appropriate NIOSH-approved respirator.

Cleaning

- When cleaning the interior of shops, sheds, or other structures, do not blow dust into the air.
- Use a vacuum cleaner whenever possible.
- When sweeping, moisten floors or use a sweeping compound.

Ventilating Systems

- In tunneling operations, provide a continuous supply of clean, fresh air for workers at the working face. The system should also be used to capture and remove contaminants.

6-3 DECOMPRESSION ILLNESS

See Chapter 34 of this manual, "Compressed Air Atmospheres."

6-4 CARBON MONOXIDE ASPHYXIATION

Workers in the construction industry may be exposed to harmful concentrations of carbon monoxide gas. Some common sources of carbon monoxide include internal combustion engines, exhaust gases, and fires. The severity of poisoning depends upon the amount of carbon monoxide in the air, the length of time exposed, and the degree of exertion. Carbon monoxide is not easily detected because it is a gas that is odorless, colorless, tasteless, and non-irritating. It may give no warning sign of its presence. Those most likely to be exposed to the hazards of carbon monoxide are:

- Garage mechanics
- Workers in tunnels and caissons
- Sewer workers
- Workers in buildings heated by temporary heaters

Preventive Measures:

- Keep all working areas well supplied with fresh air. Wherever possible, provide exhaust ventilation to remove carbon monoxide at the point of origin.
- Provide NIOSH-approved respiratory protection for emergency use and where positive exhaust methods are not practical. Periodically test for the presence of carbon monoxide with an appropriate testing device.
- Do not allow persons with anemia or any chronic diseases to work in hazardous environments without approval from qualified medical personnel.
- Do not allow a person who has been ill due to acute poisoning to return to work without written approval from qualified medical personnel.

6-5 LEAD POISONING

In construction operations, the hazards of lead poisoning may be found in plumbing, soldering, painting, glazing, sheet lead burning, sandpapering of paint, welding of painted steel, and removal of old paint. The poison is taken into the body by inhaling lead fumes or dust, by swallowing tiny particles of lead, or by absorbing the lead through the skin. The performance of this work must meet the applicable federal, state, and local environmental safety regulations.

6-6 SPRAY PAINTING

Although painters are principally affected by spray painting, others in the vicinity of painting operations may be exposed to the same hazards. The preventive measures that should be applied for paint or lacquer exposure are the same as those for lead exposure. Respirators used should be appropriate and NIOSH approved.

6-7 CHEMICALS (DERMATITIS)**Cutting Oils and Emulsions**

- Machinists and other workers exposed to cutting oils and emulsions may suffer from skin disease.
- Pimples and boils caused by clogging of the skin may appear.

Preventive Measures:

- Wear protective clothing.
- Use a mineral oil content free from irritants in the cutting medium.
- Keep the cutting fluid clean by filtration and sterilization.

- Encourage workers to scrub their hands and forearms regularly with soap and warm water.

If the skin becomes chapped and dry, rub lanolin ointment on the skin after washing. The use of petroleum jelly or cosmoline should be discouraged.

Lime and Cement

Wet lime and cement principally affect the skin. Some persons are more susceptible than others to a skin reaction from these materials. The effect of lime or cement "burns" is drying and subsequent cracking of the skin, which could lead to infection. Burns from lime or cement may require the attention of a physician.

Preventive Measures:

- Provide tools, equipment, and personal protective clothing that will minimize worker contact with these materials. Require their use to the fullest extent.
- Keep exposed parts of the body away from direct contact with lime and cement.
- Wash and dry hands regularly.
- Wash hands thoroughly with soap and warm water when work is finished.
- Rub in lanolin ointment.
- Provide surface finishers with knee pads on cement work.

6-8 TAR AND PITCH

Contact with tar may lead to serious skin problems. Hot fumes from tar are harmful to breathe and can irritate the eyes. The total effect depends upon the length of exposure and the concentration of the fumes. Typical symptoms of overexposure to tar include loss of appetite, nausea, diarrhea, headache, numbness, vertigo, bronchitis, and conjunctivitis.

Preventive Measures:

- Tar melting should be done outdoors so that fumes can disseminate into the air.
- Workers should stay upwind of the kettle.
- Keep doors and windows open when applying these materials indoors.
- Force fresh air into the room when applying hot tar, if necessary.
- If kettles are used indoors, they should be hooded. It is preferable to keep kettles outdoors.

- Wear eye protection to prevent bubbling or splashing hot tar from causing eye burns. In cases of eye burns, flush eyes immediately with fresh water and consult a physician immediately.
- Wear clothing and gloves to prevent hot tar from penetrating to the skin.

6-9 CHEMICAL HAZARDS AND CONTROLS

Rapid technological advances in construction methods have resulted in an ever-increasing use of chemical substances. Many chemical substances produce potential health hazards. Refer to AGC's Hazard Communication Compliance Guide for Construction.

6-10 EPOXY RESINS

Because of their unusual bonding strength, epoxies are used regularly in the construction industry, especially in bonding new concrete to old concrete. They are also used in splicing concrete pile sections and in many other applications.

The use of epoxy materials often involves uncured compounds, many of which are toxic. The curing agents (amines) and solvents are the principal health hazards associated with epoxies, but resins are also toxic to a degree. Unless workers take proper precautions, they can develop skin rashes, severe itching, eye irritation, and respiratory ailments. Tolerance to contact varies with the individual worker. However, each additional exposure will increase a worker's sensitivity.

The personal protection needed by workers handling toxic epoxy compounds varies with the epoxy and the application. Troweling with epoxy mortar may require the use of appropriate gloves. A worker spraying epoxy should use an appropriate NIOSH-approved respirator designed for protection against organic vapors and should wear appropriate protective clothing to prevent skin contact with epoxies.

Epoxies, and particularly those containing solvents, should never be used without adequate ventilation. Confined fumes and solvent vapors can irritate eyes, lungs, and the respiratory tract.

Epoxies coming into contact with the skin should be washed off immediately with soap and warm water, not with solvents. Many epoxy solvents are irritants and will not remove the epoxy. Instead, they will spread the epoxy to cover a greater area of skin.

Care should also be taken to see that other persons working adjacent to epoxy mixing and application processes are provided with adequate personal protection. The operation should be isolated to minimize exposure to other workers.

6-11 ASBESTOS

Construction activities involving asbestos disturbance or removal require a licensed contractor bonded and insured to perform such activity. The performance of this work must meet federal, state, and local environmental and safety regulations.