Section 6

Hazardous or Toxic Agents and Environments
References

- EM 385-1-1, section 6
- 29 CFR 1926.50
- 29 CFR 1910.94
Close Encounters with Chemicals

- We encounter chemicals almost every day
  - Filling your vehicle with gasoline
  - Cleaning the bathroom
  - Applying pesticides or insecticides
  - Using solvents or acids at work
- Many chemicals can cause injury or illness if not handled properly
Right to Know

- OSHA created the Hazard Communication Standard to help ensure your safety when working with hazardous chemicals
- You have a RIGHT TO KNOW about the hazardous chemicals you use on the job and how to work safely with those chemicals
Exposure Standards

Exposure, through inhalation, ingestion, skin absorption, or physical contact, to any chemical, biological, or physical agent in excess of the acceptable limits specified in the most recently published ACGIH guidelines or OSHA, whichever is more stringent, shall be prohibited.
Conflicts

In case of conflicts between ACGIH and other standards or regulations referenced in this manual, the more stringent shall apply.
AHA and/or PHA shall be used for the evaluation. The analyses shall identify all substances, agents, and environments that present a hazard and recommend hazard control measures.

First use Engineering controls

- If not feasible, then use Administrative controls
  - If engineering and admin. controls not feasible, then use PPE.
Testing & Monitoring

- NI OSH or OSHA sampling and analytical methods or other approved sampling and analytical methods shall be used.
Chemical Exposure

- Dosage
- Acute effects
- Chronic effects
Control of Exposure

Hierarchy of Control:

- **Substitution:** if the substitute process or product is determined to provide the same outcome and to be less of a hazard.

- **Engineering Controls:** such as local/ general ventilation to limit exposure within acceptable limits.

- **Work Practice Controls:** when engineering controls are not feasible.

- **Appropriate PPE:** such as respirators, gloves, etc. and associated programs instituted if all of the above controls are not feasible.
PPE

- Dust masks and respirators
- Glasses, goggles, and face shields
- Hearing protection
- Gloves
- Foot protection
- Head protection
- Aprons or full-body suits
Hazardous or Toxic Agents

A written hazard communication program shall be developed when the use of hazardous or toxic agents (any chemical which is a physical/health hazard) are procured, stored or used at a project site.
Hazard Communication Standard

- Chemical manufacturers must:
  - Determine a chemical’s hazards
  - Provide labels and MSDSs

- Employers must:
  - Provide a hazard communication program
  - Maintain MSDSs
  - Train on the use of hazardous materials
Hazard Communication Standard (cont.)

- Employees must:
  - Read labels and MSDSs
  - Follow employer instructions and warnings
  - Identify hazards before starting a job
  - Participate in training
Hazardous Materials First Aid

When eyes or body of any person may be exposed to hazardous or toxic agents, suitable facilities for quick drenching or flushing of the eyes and body shall be provided in the work area for immediate emergency use and shall be no more than ten (10) seconds from the hazardous material.

06.B.02.b
Personal Eye Wash

- Personal eyewash equipment may be used to supplement emergency washing facilities. They must not be used as a substitute. *Personal eyewash fluids shall be visually inspected monthly to ensure they remain sanitary and with no visible sediments.*
Storage

- Storage prior to transportation of hazardous chemicals, materials, substances and wastes shall be under the supervision of a qualified person.

06.B.03
Lead and Asbestos Hazard Control Activities

- All projects will be evaluated for the potential to contact asbestos-containing material (ACM) and lead based paint (LBP).
  - If the evaluation shows the potential for activities to generate unacceptable occupational exposure to LBP, a written lead compliance plan shall be written.
  - If the evaluation shows potential for activities to disturb ACM, an asbestos abatement plan shall be developed.
Hot Substances

Heating devices and melting kettles shall be placed on firm, level, non-combustible foundations and shall be protected against traffic, accidental tipping, or similar hazards and whenever possible, shall be placed downwind from employees or occupied buildings.
Handling of Hot Substances

At a minimum, roofers handling roofing materials shall be fully clothed including long sleeved shirts, shoes secured and at least 6 inches (15 cm) in height, and gloves up to wrist.

06.C.05.d
Harmful Animals & Insects

Protection against hazards from insects and/or animals harboring fleas, or disease-carrying insects shall include, as applicable, the following:

- PPE such as netted hoods, leather work gloves, and high-top work boots worn in conjunction with trousers and long-sleeved shirts;
- Clothing treated at the factory with DEET or Permethrin are recommended in areas of high insect population;
- Drainage or spraying of breeding areas;
- Destroying or flagging of nests;
- Smudge pots and aerosols for protecting workers and small areas;
- Elimination of actions or conditions that propagate insects or vermin;
- Extermination measures by a certified pesticide applicator or for over the counter items, following the instructions on the label;
- Approved first-aid procedures for employees;
- Inoculation against diseases known to be a local hazard; and
- Instruction in recognition of the animals and insects and their common nesting habits, aggressiveness, etc.
Harmful Plants

When burning poisonous plants, controls shall be instituted to prevent contact with or inhalation of toxic elements contained in the smoke.
Anyone who procures, uses, possesses, transports, transfers, or disposes of radioactive materials or radiation generating devices shall notify, in writing, the GDA of the nature of the material or device, a description of intended use, the location of use and storage, and all transportation and disposal requirements.
Radiation Safety Officer

- The RSO is responsible for performing or ensuring the performance of an annual review of the program. Documentation of the review shall be retained for two (2) years.

06.E.03.a.(2)
Nonionizing Radiation

- Only qualified and trained employees may be assigned to install, adjust, and operate laser equipment. Proof of qualification of the laser equipment operator shall be in the operator’s possession during operation. A qualified employee shall design or review for adequacy all radiation safety SOP.
Warning Signs

Areas in which lasers are used shall be posted with standard laser signs.
Setting of Lasers

- The laser beam shall not be directed at employees: whenever possible, laser units in operation shall be set above the heads of employees.
Ventilation & Exhaust Systems

All portable and temporary ventilation systems shall remove dusts, fumes, mists, vapors and gases away from the worker and the work environment or provide air to prevent an oxygen deficient atmosphere.
Approval for Use and Location

Any portable or temporary ventilation system and the locations the systems are to be used shall be approved by the GDA before use.
Local Exhaust Ventilation Systems

Local exhaust ventilation systems shall be periodically evaluated to ensure that proper contaminant capture, movement through the system and filtration or exhaust to the outside.
Abrasive Blasting

- Silica sand shall NOT be used as an abrasive blasting media.

- Alternate blasting materials are:
  - Aluminum oxide – hard metals, etched glass
  - Baking soda – general paint, aircraft skins
  - Coal slag – paint, rust, paint on wood
  - Copper slag – paint, rust, scale form steel
  - Corn cob granules – deburring, paint, rust
  - Dry ice – aircraft part, exotic metals
  - Garnet – paint, rust
Alternates

Alternate blasting materials (con’t):
- Glass beads – cleaning, polishing, deburring
- Nickel slag – paint, rust, scale from steel
- Nut shells – cleaning soft materials, i.e., aluminum, plastics
- Olivine – light mill scales, rust
Engineering Controls

Engineering controls for noise and dust shall be considered even if they cannot reduce the exposures to the lowest Occupational Exposure Limit (OEL) but will significantly reduce noise and exposure to employees.
Blast Cleaning Enclosures

- All air inlets and access openings shall be well baffled to prevent the escape of abrasive and the recommended continuous inward air velocity at the air inlets is a minimum of 250 fpm (4.6 kph).
Abrasive Blasting PPE

Minimum recommended protective equipment of an abrasive blaster working inside a blasting room, in the open, in enclosed space, or outdoors is: safety boots or toe guards; durable coveralls; closeable wrists, ankles, and other openings to prevent entry of abrasive dust and rubbing of such; respiratory, eye, and hearing protection; and gauntlet gloves.
Inclement Weather & Heat/Cold Stress Management

In areas with frequent inclement weather, the employer’s APP or project safety plan shall include a discussion of:

a. Severe weather triggers to alert the SHO to monitor weather conditions;

b. Training on severe weather precautions, and actions;

c. Identified area of retreat, preferably a substantial building.
In hot environments, the following guidelines will be followed to prevent heat related injury:

- Drinking water shall be made available to employees and encouraged to frequently drink small amounts, i.e., 1 cup every 15-20 min.; water shall be kept reasonably cool;
- Tool box training in hot environments;
- When possible, schedule work during cooler periods;
- Individuals encouraged to take breaks in cooler places;
- SSHO shall monitor individuals with previous heat related injuries;
- Individuals who are not acclimatized shall be allowed additional breaks, number determined by SSHO and provided to supervisor and employee for implementation.
Working in Cold Environments

- Employees working in air temperatures of -15°F (-26°C) or less shall use the work/warm-up regimen specified in the ACGI H “Threshold Limit Values and Biological Exposure Indices”.

06.1.06
Environmental Monitoring

- At air temperatures below 45°F (7°C) the temperature shall be monitored a minimum of every 8 hours or as warranted.
- At temperatures below 45°F (7°C) and above 30°F (-1°C) the temperature and wind speed shall be monitored every 4 hours or as warranted.
- At air temperatures below 30°F (-1°C) the temperature and wind speed shall be monitored every 4 hours or more frequently if it begins to lower.
Cumulative Trauma Prevention

When work activities that stress the body’s capabilities are identified, the employer shall incorporate it in the AHA and identify it as a hazard in the SSHP/APP.
Indoor Air Quality (IAQ) Management

- An industrial hygienist or other qualified and competent person will initiate an IAQ investigation using appropriate guidelines published by AGCIH; AIHA; ANSI; ASHRAE; USEPA; OSHA; NIOSH; or other Federal, DOD, State, Local, and host nation requirements.
Air Handling Systems

IH shall evaluate the condition of the air-handling system for proper operation, make-up air supply, blocked dampers or diffusers, cleanliness of ducts and filters, and standing water or wet areas.
Environmental Tobacco Smoke (ETS)

- Employees shall be protected from involuntary exposure to ETS in working and public living environments.

- Smoking shall be prohibited inside all DOD vehicles, aircraft, vessels, and work buildings.
Mold Evaluation

Because mold can contribute to health problems ranging from minor irritation to serious debilitation if found in high quantities or improper locations, a mold assessment shall be performed when need is indicated.
Mold Pictures

Mold growth in A/C filter

Mold growth behind wall paper
Remediation

Mold remediation should not be performed by the same entity that performed the evaluation.

06.K.04.b
Control of Chromium (VI) Exposure

- All activities which could generate chromium fumes, mists, or dusts shall be evaluated by an IH to determine potential personnel exposure over the OSHA chromium standards.

- Typical operations with high exposures:
  - Portland cement greater than 20ppm chromium
  - Cutting and breaking up cement surfaces
  - Painting or paint removal operations
  - Heating or welding on stainless steel
  - Cutting or breaking up wood treated with preservatives
  - Handling or applying anti-corrosive substances or coatings

The evaluation shall be added as an appendix to the APP and AHA.
Crystalline Silica

- Employee airborne exposure to crystalline silica shall not exceed the 8-hour TWA limit as specified by the ACGIH in their “TLV and BEI” or by OSHA, whichever is more stringent.
**Mandatory Requirements:**

- Employee exposure shall be eliminated through the implementation of feasible engineering controls.
- After all such controls are implemented and they do not control to the OEL, each employer must rotate its employees to the extent possible in order to reduce exposure.
- When all engineering and administrative controls have been implemented, and the level of respirable silica still exceeds OEL, an employer rely on a respirator program.
Medical Surveillance

Each employer shall institute a medical surveillance program for all employees who are exposed to airborne concentrations of silica above the OEL.

06.M.03
QUESTIONS