Practicing Safety in the Field

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Introduction

This presentation focuses on basic safety principles that can be applied to any field conservation laboratory.

The emphasis is on planning: anticipating potential hazards, designing safe tasks, preparing for emergencies, and providing the appropriate response in time of need. Lists of resources will also be provided where more specific guidelines and information can be obtained.

Why the concern?

- Archaeology sites can be part mining, part industrial zones.
- Conservation uses dangerous materials, and dangerous procedures.
- Combining the two produces a situation that is regulated by both industrial and laboratory standards.
- But the combined hazards are often overlooked by the archaeologists, the conservators, and the regulators.

Planning for Safety

- U.S. regulations covering laboratory safety are applicable to conservation in the field:
  - 29CFR1910.1200 Hazard Communication
  - 29CFR1910.1450 Occupational Exposure to Chemicals in the Laboratory
  - 29CFR1910 General Industry Standard (just about everything non-chemical)
- They are available through: www.osha.gov

Planning for Safety II

- These regulations call for a “Hazard Communication Plan” and a “Chemical Hygiene Plan” that cover:
  - Identifying potential hazards.
  - Operating procedures for handling hazardous materials, and training employees.
  - Monitoring hazards and employee exposure.
  - Documenting employee training & exposure.
  - Provisions for responding to a hazardous event.

Hazard Communication

- No matter where you are, safety begins with this plan:
  - Inventory of the hazardous chemicals in your workplace.
  - A library of Material Safety Data Sheets (or local equivalent) for all hazardous chemicals.
  - A system of container labels with appropriate warnings.
  - Employee training on all of the above, plus associated hazards, and proper chemical handling.

Chemical Inventory

- A chemical inventory is smart because:
  - It raises awareness of all the potential hazards.
  - It creates a record of chemical use for budgeting & purchase.
  - It identifies old or out-dated chemicals for disposal.
  - It can be used for planning for emergency response.

Material Safety Data Sheets

- MSDS are manufacturer- supplied with all the crucial information about a chemical. They are:
  - Good for increased hazard awareness.
  - Good for training in proper handling, disposal, and emergency response.
  - Must be readily available to all employees for their safety and education.
- They are widely available on the WWW at manufacturer's sites, and other safety-related sites.

Labeling Systems

- Containers should be labeled with a consistent, understandable system of identification and warnings to provide clarity and continuity.
  - All containers should be labeled in the same system for clarity.
  - Use a common language, such as English, together with the local language (if it is not English).
  - Supplement text warnings with international danger symbols (such as NFPA labeling system).

NFPA Labeling System

National Fire Protection Association

Employee Training

- Any plan is useless if the employees don't know it.
  - Train all employees at least annually, and new employees as soon as they begin.
  - Train any person who must work with an unfamiliar material.
  - Document all training so that management knows that their staff can work safely.

Chemical Hygiene Plan

- CHP begins where HazComm ends.
  - Standard Operating Procedures
    - general discussion of lab operations, chem handling & storage, protective equipment, labeling, spill recovery, waste disposal, record keeping
  - Monitoring of employee health and exposure
  - Use and maintenance of safety equipment
  - Employee training

CHP II

- Start with your HazComm forms.
- Identify the tasks that involve hazardous materials or conditions, including nature of the hazard, who is exposed, and the necessary limits of exposure.
- Create hazard or task-specific procedures to minimize exposure.
- Train your staff to the procedures.
- Provide the necessary safety equipment.

Controlling Exposure

- Field conservation labs rarely use the highly hazardous materials found in other labs, so consider the three ways to control exposure:
  - **Administrative**: training, SOP, task design, or other non-physical ways of limiting exposure
  - **Engineering**: permanent equipment that reduce the hazard, e.g., fume extraction hoods, tool guards
  - **Personal Protective Equipment (PPE):** equipment worn, such as gloves, respirators, eye & ear protection
- Always apply these three in that order. PPE should be your last response.

Example: A conservator must consolidate a fragile ceramic vessel

- Identify the hazard: The consolidant resin is applied in a solution of organic solvent, which is a respiratory and fire hazard.
- Reduce the risk: Can you use a less hazardous resin/solvent system?
- Reduce the exposure: The work must be carried out in a well-ventilated space. If there is no fume-hood, the conservator must wear a respirator.
- Training: the conservator must know the hazards and exposure limits of the resin/solvent system, how to use the fume extraction or respirator properly, and how to dispose of any hazardous wastes.

Cleaning it all up

- Disposal of hazardous wastes are often overlooked, especially where environmental law enforcement is lacking.
- Consider partnerships with companies or universities with waste disposal facilities.
- Proper disposal is good for the staff, local communities and the environment.

Cleaning it all up (cont.)

- If you must dispose of small quantities locally:
  - Prevent access to wastes by children, animals.
  - Neutralize acids and bases before disposing with copious water.
  - Label waste containers prominently in multiple languages, and use international danger symbols.
  - Make empty containers and bags unusable.

References

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"Field Conservation at Kaman-Kalehoyuk: an holistic approach" in *Archaeological Conservation and its Consequences, Preprints of the Contributions to the Copenhagen Congress, 26-30 August 1996.* International Institute for Conservation.

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"Set up for a Safe Space: A Chemical Hygiene Plan" in *AIC News Special Insert June 2000 3/1.* American Institute for Conservation. Also at http://aic.stanford.edu/health/guides/guide3_1.html

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"From Cradle to Grave: Waste Management for Conservators" in *AIC News Special Insert November 2001 3/1.* American Institute for Conservation. Also at http://aic.stanford.edu/health/guides/guide4_1.html

Resources

Government
US Occupational Health and Safety Administration, www.osha.gov
Canadian Workplace Hazardous Materials Information System, www.hc-sc.gc.ca/hecs-sesc/whmis

Conservation Organizations
Conservation Online Health & Safety, palimpsest.stanford.edu\bytopic\health\
American Institute for Conservation of Historic and Artistic Works Health & Safety Committee, aic.stanford.edu/health/

Industrial Groups
National Fire Protection Association, www.nfpa.org
Vermont Safety Information Resources, Inc, hazard.com
International Labor Organization Safety and Health Information Center, www.ilo.org/public/english/protection/safework/cis/index.htm

Equipment Suppliers
Lab Safety Supply, Inc, www.labsafety.com
Fisher Scientific, Inc. www.fishersci.com
Seton, Inc, www.seton.com