SAFETY & HEALTH IN ARCHAEOLOGY

A SITE SAFETY PRIMER

Cover photos:
Top
San Juan Island National Historic Park. British Camp 45-SJ-24, Washington
Julie Stein

Bottom
Fossil Bay Site, 45-SJ-105, Washington
Anonymous

This booklet suggests a strategy for an archaeological site safety and health plan. We hope this information will promote health and safety planning before projects begin and risk prevention on site.

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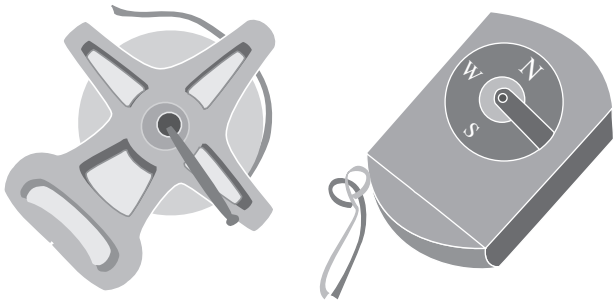
ARCHAEOLOGY

SITE SAFETY & HEALTH

Archaeology is an exciting, varied, and rewarding profession, but it is not without risks. Conditions affecting safety and health at archaeological sites are often unpredictable. Project sites may be remote, require deep trenching, or involve caves or underground tunnels. Archaeologists working in confined spaces may be at risk from dangerously low levels of oxygen or dangerously high levels of carbon monoxide or other gases. Some project sites may once have been repositories of hazardous chemicals. Archaeological workers in the field may risk exposure to biological hazards–insects, snakes, plants, soil, or waterborne organisms. Considering the health and safety impacts of these and other conditions is important in evaluating any archaeological site.

Employers and field managers are responsible for preventing hazards to themselves and their field workers and volunteers. A custom written Site Safety & Health Plan, developed before work begins, can provide a framework for identifying and anticipating potential safety and health risks and outline procedures for controlling hazards and unsafe conditions. This advanced preparation can help protect the health of all site personnel and also save time and money.



SAFETY & HEALTH PLAN

All archaeological site safety and health plans should include the six general elements listed below, as well as procedures for handling site-specific hazards.

I. SAFETY POLICY STATEMENT

Top management or the person responsible for the project should develop an overall policy statement stating management's commitment to and accountability for health and safety.

Example: *Our employees and volunteers are our most valuable asset. The protection of their health and safety will be given top priority at all times.*

II. SAFETY POLICY STANDARDS

Standards are the rules developed by site or project management to ensure safe working conditions.

Example: *Eye protection is required during chipping or grinding activities; safety eyewear will be provided by the organization, free of charge.*

III. EMPLOYEE ORIENTATION, EDUCATION, AND TRAINING

All employees and volunteers should receive safety training during their first day on the site. The orientation program should introduce site safety policies, present the written Site Safety & Health Plan, give information on how to recognize and control hazardous conditions. The law requires worker training on the proper use of any hazardous chemicals on site. Periodic education and training may be needed to increase safety awareness and review new hazards and processes.

IV. ACCIDENT INVESTIGATION

Site management is responsibility for identifying hazardous conditions, materials, and operations. The common hazards found on archaeological sites are reviewed in this booklet. All accidents and near misses, no matter how minor, should be reported to the person responsible for the site. The Site Safety & Health Plan should include methods for evaluating all accidents to find their causes and should stipulate corrective actions to prevent recurrences.

V. SAFETY COMMITTEE

Safety Committees include employees and management and can help identify hazards and investigate accidents. Safety committees are recommended for all sites. They are required in Washington State for organizations with 11 or more employees. A Site Safety & Health Plan should outline the safety committee's specific activities and responsibilities, which may include conducting safety inspections, assisting in accident investigations, and monitoring the effectiveness of the safety program. Safety committees cannot be effective without top management support.

VI. RECORD KEEPING

Appropriate health and safety records should be maintained for each site. Records include a log of injuries and illnesses (OSHA 200 Log), accident investigation findings and results, minutes of Safety Committee meetings, list of hazardous materials kept on site, and a written copy of the Site Safety & Health Plan.

ADDITIONAL SITE-SPECIFIC ELEMENTS

Each archeological site has unique attributes, including potential hazards. In addition to the six core items outlined on pages 2–3, a Site Safety & Health Plan should discuss these site-specific elements.

The following pages cover major archaeological health and safety considerations. Other issues you may need to think about and include in your site-specific Safety & Health Plan are providing site access (transportation to and from the site, signs, barricades, media interactions, nonessential personnel); specialized equipment (power equipment, electrical safety, use of specialized personal protective equipment); providing for general public health (potable water, sanitation, housekeeping); and addressing other hazards (presence of wildlife which may require training in and use of sidearms, lifting heavy or awkward weights, noise exposures, waterborne organisms).

Archaeological field work frequently involves excavations,

San Juan Island National Historic Park. British Camp 45-SJ-24, Washington
Julie Stein

EXCAVA-SAFETY

On the average, soil weighs about 100 pounds per cubic foot (2).

On March 12, 1993, a 62-year-old construction worker died in Tucson, Arizona. A 40-foot-long section of a dirt embankment collapsed, burying the man in three feet of dirt (1).

which are similar to those in the general construction industry. The Occupational Safety and Health Act (OSHA) defines an excavation as "any manmade cut, cavity, trench, or depression in an earth surface, formed by earth removal" and requires that:

- Excavations deeper than 4 feet must be shored, sloped, stepped, or shielded.
- Excavations deeper than 4 feet must have an entrance or exit within 25 feet of workers.
- Sites must have a "competent person" documenting the conditions and safety of the excavation.
- Excavations must be reinspected by the competent person upon any change in weather conditions.

Since 1970 OSHA has encouraged employers and employees to work together to maintain a safe working environment. Shoring can prevent injuries and death due to excavation collapses and cave-ins. At archaeological sites where workers are trying to observe stratigraphic profiles, however, shoring trench walls can interfere with archaeological examinations. Excavation engineers can help to develop combinations of stepping and shoring systems that would meet both the needs of archaeologists and OSHA compliance.

If trenches are close to underground utility lines, utility shutdowns should be arranged if necessary. It is wise to have a utility locator service identify underground utilities before digging begins. Heavy equipment and debris should be kept back from the edge of the trench.

The National Institute for Occupational Safety and

CONFINED SPACES

Health (NIOSH) defines a confined space as one that has limited openings for entry and exit, is not designed for continuous employee occupancy, and has unfavorable ventilation that could produce a hazardous environment. In the field, archaeological workers frequently need to work in confined spaces–deep narrow trenches, underground tunnels, and caves.

One of the primary hazards of confined or enclosed spaces is an oxygen-deficient atmosphere. In excavations near garbage dumps, landfills, or swamps, bacterial processes like fermentation can displace oxygen. Rust formation can also consume oxygen, reducing it to unhealthy levels. Further, such conditions may also pose an explosion hazard; methane gas may build up near a dump or other area where organic material is decomposing. All confined spaces should be checked for safe oxygen concentration prior to entry.

Contaminants are usually denser than ordinary air and may settle in the bottom and undisturbed areas of a confined space. Gas-powered motorized screens may work efficiently and yet still generate carbon monoxide. When they are used in a confined area, concentrations of carbon monoxide may increase to dangerously high levels, threatening the crew with asphyxiation.

In addition to reduced air quality, workers in a confined space may be exposed to several physical hazards: falling objects, wet or slick surfaces, amplified noises, and limited communication with others working in the area.

In all confined-space work situations, it is essential to limit access and to institute a buddy system in which a spotter outside the work site is prepared for emergency

situations and rescues.

The Site Safety & Health Plan should incorporate provisions to comply with the Washington State confined- space standards.

During the time between the archaeologically significant and the present, sites have been used for a variety of purposes. Agriculture can leave pesticide residue; residential areas may

Top
Carlston Annis Shell Mound 15-BT-5, Kentucky.
Julie Stein

Bottom
Kimmswick Site, Missouri.
Julie Stein

HAZARDOUS
MATERIALS & ACTIVITIES

At a Superfund cleanup site along the Hudson River in New York State, workers found one end of a chain that had been stretched across the river during the Revolutionary War. With further research, they discovered an entire camp at the contaminated site. Cleanup was discontinued until archaeological investigation could be completed.

have buried heating oil tanks or abandoned septic systems. In urban areas, soil contamination from oil and fuel runoff may be found. All of these conditions require protection for workers.

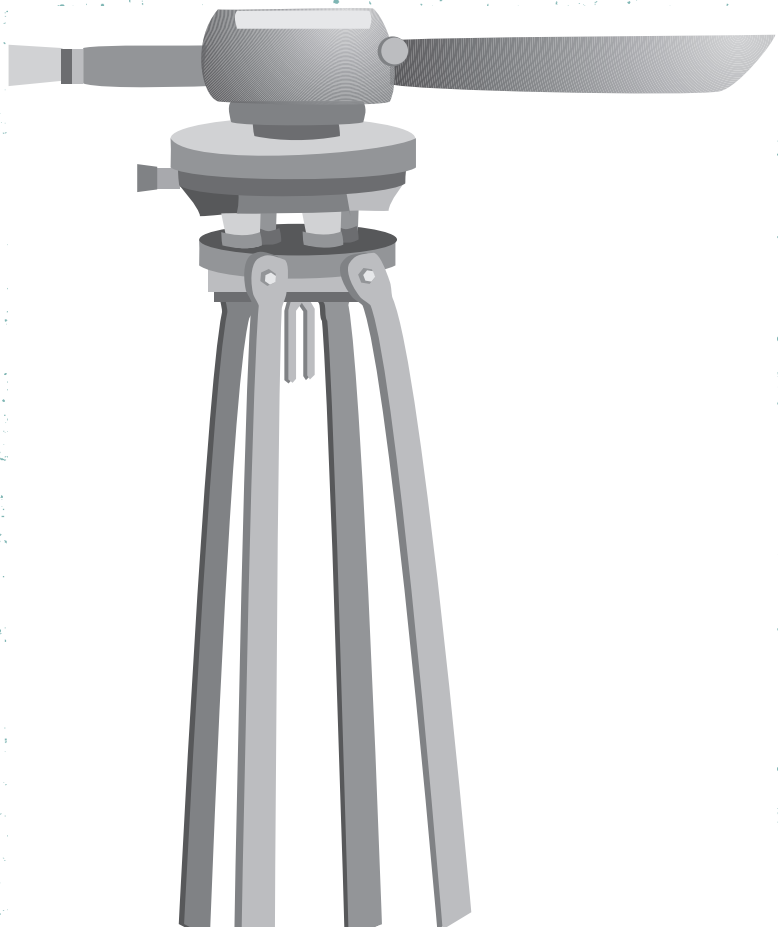
Previous land-use information can be obtained from state and local agencies and can be useful in preparing site safety and health plans. Interviews with nearby residents may also help. Water, sewer, and utility company records can provide good information about previous use of land parcels.

Site personnel may need specialized hazardous waste equipment as well as personal protective equipment (e.g., filters or full-mask respirators, gloves, boots, occlusive garments, or even HazMat suits). Employees at the site should be trained to work with hazardous substances and waste contamination. Some sites may be contaminated to the extent that the law requires workers to receive HAZWOPER training and instruction on proper use of personal protective equipment and safety devices. Check with local solid and hazardous waste authorities for guidelines.

Workers preparing and storing specimens also need to be aware of possible exposure to hazardous materials. Lab analysis may involve dangerous compounds, requiring gloves and safety glasses and well-ventilated areas. To reduce the risks to workers and to avoid hazardous waste disposal requirements, it may be necessary to substitute less hazardous compounds or reduce the amount of hazardous material.

Field work in the Pacific Northwest fortunately does not provide as many opportunities for contracting infectious diseases as in other parts of the world. Still, archaeologists may work in areas near poisonous plants, bees, or poisonous snakes or where hantavirus and Lyme disease are indigenous.

Burton Acres Shell Midden 45-KI-437 Vashon Island, Washington
Julie Stein



BIOLOGICAL HAZARDS

Hantavirus has claimed the life of 70 people in the past three years, and 5% to 15% of the deer mice in the Northwest carry the virus. (6)

Worldwide, an estimated 25,000 people die each year from rabies. (5)

Hantavirus causes respiratory distress syndrome, a life-threatening illness with flulike symptoms. People contract the virus by inhaling dust rising from disturbed rodent feces. Archaeologists are often exposed to rodents, their nests and feces, and large amounts of soil and dust that may contain the virus. The best approach to protecting site personnel is to carefully assess the level of rodent activity at the site. Gloves should be worn at all times and areas should be wiped repeatedly with disinfectant such as a weak bleach solution. To minimize airborne dust, workers should avoid sweeping and keep the area damp while cleaning or moving material. Respiratory protection should be worn (a high-efficiency particulate air filter, or HEPA, mask) if the work area is very dusty.

Lyme disease is rarely fatal, although it does affect the joints, nerves, and heart and can cause partial paralysis. Lyme disease is a tick-borne illness, and people spending time outdoors in tall grass or vegetation, such as archaeological surveyors, are particularly at risk of exposure. Field crews should wear long sleeves and tuck their pants legs into their socks. Ticks are easier to spot on light colored clothing. Insect repellent can be applied to exposed areas. Workers should be advised to check all areas of the body immediately after returning from the field and to completely remove any ticks.

Infected blisters, cuts, abrasions, broken bones, allergic reactions, and dehydration may occur on archeological sites. Field crews should be equipped with all necessary supplies and know how to respond to and cope with general first aid as well as emergencies.

Several people at the site, including the principle

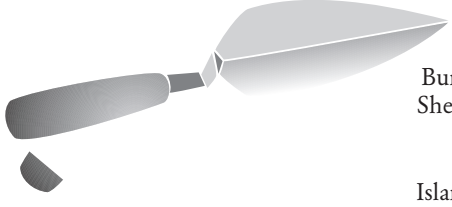
FIRST AID

investigator or others responsible for site management, should be trained in first aid and cardiopulmonary resuscitation (CPR). First aid and CPR training is available through local chapters of the American Red Cross.

A disaster plan and emergency procedures should be included in the Site Safety & Health Plan. Preparations might include supplies to sustain the crew for several days in case of a natural disaster (e.g., earthquake). The plan should also include evacuation plans to nearby emergency medical facilities, particularly if the dig is in a remote location. Other elements of a disaster plan include directions on how to handle:

- Severe weather (floods, electrical storms, etc.).
- Vandalism, theft, or other security concerns.
- Fire.

Archaeological field work is interesting to many people besides trained specialists. Students, teachers, community members, and volunteers are joining archaeologists in the field, bringing added responsibility to protect those individuals with good safety strategies, training, and proper equipment. Even the most careful planning may not avert all injuries or health problems. A Site Safety &



Burton Acres Shell Midden 45-KI-437 Vashon Island, Washington
Ray Pfortner

INSURANCE AND LIABILITY

Health Plan should clearly discuss liability for everyone on a project.

In Washington State, most regular employees are covered by the State's Workers' Compensation Insurance Program. Some employers can opt to cover employees under a private insurance plan. More information regarding the workers' compensation system can be obtained from the Department of Labor and Industries' Industrial Insurance Services Division.

Volunteers and consultants contracted for specific projects may or may not be covered by the state workers' compensation plan. Field work is seasonal, and crews may move from project to project; people may not be consistently insured. Students and teachers may or may not be covered by their school. Volunteers, contract workers, teachers, and students should verify their health and safety insurance coverage status before beginning work.

If the site is on private property, it might be useful to review liability and insurance issues with the landowner before starting a project. Some insurance companies may offer reduced premiums if safety precautions and procedures are documented and used.

(1) National Institute for Occupational Safety and Health (NIOSH). 1993. NIOSH warns of trench cave-ins. *NIOSH Update,* 20 May, DHHS (NIOSH) No. 93-110. Publications Dissemination, DSDTT, Cincinnati, OH.

(2) Suprenant, B. A., and K. D. Basham. 1993. *Excavation Safety: Understanding and Complying with OSHA Standards.* American Society of Civil Engineers, New York.

RESOURCES AND REFERENCES

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(4) National Institute for Occupational Safety and Health (NIOSH). 1994. *Worker Deaths in Confined Spaces.* DHHS (NIOSH) No. 94-103. Publications Dissemination, DSDTT, Cincinnati, OH.

(5) Fink, T. M. 1994. Health issues for Arizona archaeologists: Rabies and animal bites. *Petroglyph* 30(10): 6–8. Arizona Archaeological Society, Phoenix.

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(9) Washington Department of Labor and Industries. 1996. *Worker's Compensation Insurance Manual.* Chapter 296-17 WAC, 1 July. Washington State Department of Labor and Industries, Olympia.

This document was prepared by Tiffany Potter-Chiles and the Field Research & Consultation Group, Department of Environmental Health, University of Washington. For more than 25 years the Field Group has provided industrial hygiene and occupational health consultations, information, and research support to Washington workplaces. For more information, contact the Field

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Group at 4225 Roosevelt Way NE, #100, Seattle, WA, 98105-6099; (206) 543-9711. Or call the National Institute for Occupational Safety and Health at 1-800-35-NIOSH for general health and safety information.

The Office of Archaeology and Historic Preservation (OAHP) serves as the historic preservation office for Washington State. Receiving both state and federal support, OAHP's mission is to identify, evaluate, and protect sites that significantly represent Washington's cultural heritage. Washington State OAHP is located at 111 21st Ave. SW, P. O. Box 48343, Olympia, WA 98504-8343; (360) 753-5010.

A workshop, "Archaeology and Safety: Principle to Practice," presented at the 1996 Society for American Archaeology (SAA) meeting inspired this document. For information on future workshops, contact the SAA offices at 900 Second St. NE #12, Washington, DC, 20002-3557; (202) 789-8200.

Examples of a generic Accident Prevention Program can be obtained from your local office of the Washington State Department of Labor and Industries. You may obtain assistance in developing your Site-Specific Safety & Health Plan by working with an industrial hygienist or occupational safety and health specialist.

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