

Biological Health Hazards in Construction



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OSHAcademy Course 151 Study Guide

Biological Health Hazards in Construction

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Contact OSHAcademy to arrange for use as a training document.

This study guide is designed to be reviewed off-line as a tool for preparation to successfully complete OSHAcademy Course 151.

Read each module, answer the quiz questions, and submit the quiz questions online through the course webpage. You can print the post-quiz response screen which will contain the correct answers to the questions.

The final exam will consist of questions developed from the course content and module quizzes.

We hope you enjoy the course and if you have any questions, feel free to email or call:

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Modules and Learning Objectives

Click on the links below to access the modules. You can also click on the links at the top of the page. By the end of the course, you should be able to accomplish each of the learning objectives listed in each module.

Module 1: Biological Risk Factors

Learning objectives in this module include:

-) Discuss the risk factors of exposure to biological hazards in construction.
-) Describe the ways workers can be exposed to biological hazards in construction.
-) Describe the hazards, controls, and preventive measures related to fungi (mold) hazards.
-) Discuss the risk factors of exposure to poisonous plants while working in construction.

Module 2: Infectious Animals and Insects

Learning objectives in this module include:

-) Discuss the hazards, controls, and preventive measures related to exposure to infectious animals and insects.
-) Describe the various tick-borne diseases and their symptoms.
-) Discuss the hazards of Lyme Disease and West Nile Virus and symptoms of exposure.
-) Describe the hazards, controls, and preventive measures of exposure to venomous snakes and insects.

Course Introduction

Construction workers are exposed to a variety of health hazards every day. These men and women have the potential for becoming sick, ill and disabled for life.

This course discusses the biological health hazards construction workers may find, such as exposure to mold, poisonous plants and infected animals. We'll also take a closer look at ways to protect yourself from these hazards on a construction site.

Biological agents include bacteria, viruses, fungi (mold), other microorganisms and their associated toxins. They can adversely affect human health in a variety of ways, ranging from relatively mild, allergic reactions to serious medical conditions, even death.

These organisms are widespread in the natural environment; they are found in air, water, soil, plants, and animals. Because many microbes reproduce rapidly and require minimal resources for survival, they are a potential danger in a wide variety of occupational settings.

Module 1: History and Mission

Risk Factors in Construction

Construction work is dynamic, diverse, and constantly changing. This leads to a great challenge in protecting the health and safety of construction workers. Workers are at risk of exposure to many different types of hazards that can result in physical injury, illness, disability, or even death.

Here's a list of factors that increase the health and safety risk of workers while working on construction sites:

-) Constantly changing job site environments and conditions affect the health and safety of workers. Constant change is the most common factor causing injuries and illnesses in construction.
-) Multiple contractors and subcontractors may create hazards unknown to others due to poor communication and coordination.
-) High turnover and unskilled laborers result in a lack of awareness of hazards.
-) Lack of education and training on hazards and safe work practices.
-) Diversity of work activities that happen simultaneously quickly create new hazards.
-) Exposures to health hazards, both from their own work as well as from nearby activities.

Quiz Instructions

After each section, there is a quiz question. Make sure to read the material in each section to discover the correct answer to these questions. Circle the correct answer. When you are finished go online to take the final exam. This exam is open book, so you can use this study guide.

1. What is the most common factor causing injuries and illnesses on construction worksites?

- a. Extreme temperatures
- b. Multiple contractors
- c. Constant change
- d. High turnover

Exposure to Biological Hazards

Exposure to biological hazards may occur during demolition, renovation, sewer work, work on air handling systems, or other construction work from contact with contaminated or disease-carrying materials, such as:

-) soil
-) water
-) insects (mosquitoes, ticks)
-) bird or bat droppings
-) animals
-) structures

The most common biological health hazards in the workplace are found:

-) while working in health care facilities
-) where there is an accumulation of animal waste and the presence of rodents, insects and birds
-) during demolition and remodeling of old structures and buildings where there is likely the presence of mold

-) when removing plants, trees and other foliage during landscaping and clearing operations.

2. Which of the following construction activities is most likely a common source of biological hazards?

- a. Working in new residential construction
- b. During work on bridges over water
- c. During demolition of old structures
- d. Working in newly constructed office areas

Fungi (Mold) Hazards

Fungi (mold) are found everywhere - both indoors and outdoors, all year round. The terms fungi and mold are often used interchangeably, but mold is a type of fungi. There are many thousands of species of mold and most, if not all, of the mold found indoors comes from outdoor sources.

Mold seems likely to grow and become a problem only when there is water damage, high humidity, or dampness. Molds are organized into three groups according to human responses:

-) allergenic
-) pathogenic
-) toxigenic

We will take a closer look at each of these types of molds in the next section.

3. In which conditions are molds not likely to grow and become a problem?

- a. In areas of high humidity
- b. In areas of low humidity
- c. In structures with water damage
- d. In damp locations

Allergenic Molds

Allergenic molds do not usually produce life-threatening health effects and are most likely to affect those who are already allergic or asthmatic. The human system responds to allergenic

molds tend to be relatively mild, depending on individual sensitivities, typically producing scratchy throats, eye and nose irritations, and rashes.

Pathogenic Molds

Pathogenic molds usually produce some type of infection. They can cause serious health effects in persons with suppressed immune systems. Healthy people can usually resist infection by these organisms regardless of dose. In some cases, high exposure may cause hypersensitivity pneumonitis (an acute response to exposure to an organism).

Toxigenic Molds

Mycotoxins can cause serious health effects in almost anybody. These agents have toxic effects ranging from short-term irritation to immuno-suppression and possibly cancer. Therefore, when toxigenic molds are found, further evaluation is recommended.

Molds Effect on the Body

Molds produce and release millions of spores small enough to be airborne. They can also produce toxic agents known as mycotoxins. Spores and mycotoxins can have negative effects on human health. The most common route of entry into the body is through inhalation; mold has a characteristic smell - if you smell mold, you could be inhaling mold. Mold is generally visible; however, some of the most toxic mold spores are small enough to be considered respirable [less than 10 micrometers (10 μm) in diameter].

4. Which of the following molds can possibly cause cancer after exposure?

- a. Neurologic molds
- b. Allergenic molds
- c. Pathogenic molds
- d. Toxigenic molds

Ten Things You Should Know About Mold

1. Potential health effects and symptoms associated with mold exposures include allergic reactions, asthma, and other respiratory complaints.
2. There is no practical way to eliminate all molds and mold spores in the indoor environment; the way to control indoor mold growth is to control moisture.

3. If mold is a problem in your workplace, you must clean up the mold and eliminate sources of moisture.
4. Fix the source of the water problem or leak to prevent mold growth.
5. Reduce indoor humidity (to 30-60%) to decrease mold growth.
6. Clean and dry any damp or wet building materials and furnishings to prevent mold growth.
7. Clean mold off hard surfaces with water and detergent, and dry completely.
8. Absorbent materials, such as ceiling tiles, that are moldy may need to be replaced.
9. Prevent condensation on cold surfaces by adding insulation.
10. In areas where there is a perpetual moisture problem, do not install carpeting.

Remember, molds can be found almost anywhere; they can grow on virtually any substance, providing moisture is present.

5. Since there is no way to eliminate all molds indoors, what is the primary control method?

- a. Control temperature
- b. Control moisture
- c. Control ventilation
- d. Control animals

Mold Cleanup

There are several things to be aware of while cleaning up mold on a construction site. Here are a few things to remember.

1. **Non-porous materials** (e.g., metal, glass, hard plastics, etc.) can be dried out, fully cleaned and reused. Clean hard and non-porous materials using a detergent. Surfaces can be rinsed with a disinfectant made of ½ cup liquid household bleach mixed into one gallon of water (Caution: DO NOT mix bleach with cleaning products that contain ammonia).

-)] **Semi-porous materials** (e.g., wood and concrete) can be cleaned if they are structurally sound.
-)] **Porous materials** (e.g., drywall, carpets, insulation, ceiling tile, etc.) are different because mold penetrates into them making it very difficult to fully clean. As a general rule, if a porous material has been wet for over 48 hours it is best to remove and replace.

Source: [OSHA Pub 3713, Mold Hazards during Disaster Cleanup](#).

CAUTION: Do not mix bleach with other cleaning products that contain ammonia. Highly toxic chlorine gas can be produced.

-)] Avoid breathing mold spores. A N-95 respirator is recommended.
-)] Avoid touching mold with your bare hands. Long gloves that extend to the middle of the forearm are recommended. Use ordinary household rubber gloves when cleaning surfaces with water, bleach, and a mild detergent. Gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC are recommended if using a disinfectant, biocide, or strong cleaning solution.
-)] Avoid getting mold spores in your eyes. Goggles without ventilation holes are recommended.

6. What is a recommended way to avoid inhalation to mold spores when cleaning a surface?

- a. Wear an N-95 respirator
- b. Breathe in through the nose and out through the mouth
- c. Wear a dust mask with two straps
- d. Wear a self-contained breathing apparatus (SCBA)

Respiratory Protection

Respirators protect cleanup workers from inhaling airborne mold, contaminated dust, and other particulates released during the remediation process. Either a half mask or full-face piece air-purifying respirator can be used. A full-face piece respirator provides both respiratory and eye protection. More protective respirators may have to be selected and used if toxic contaminants such as asbestos or lead are encountered during remediation.

Respiratory protection is effective only if:

- J the correct respirator is used
- J it's available when you need it
- J you know when and how to put it on and take it off
- J you have stored it and kept it in working order in accordance with the manufacturer's instructions

Respiratory protection for exposure to mold will depend on the size of the particle and its level of toxicity.

- J Whenever you smell or see the presence of mold, it is important to take precautions to limit your exposure to mold and mold spores.
- J To limit your exposure to airborne mold, you need to wear, at a minimum, an N-95 respirator.
- J If oil is present in the air, make sure to use either an R or a P designed filter.

7. What does the need for respiratory protection depend on when exposed to mold?

- a. The shape of the mold spore
- b. The concentration of mold spores in the air
- c. The particle size and level of toxicity of the mold
- d. The particle length and concentration of spores

Poisonous Plants

Many native and exotic plants are poisonous to humans when ingested or if there is skin contact with plant chemicals. However, the most common problems with poisonous plants arise from contact with the sap oil of several plants that cause an allergic skin reaction: poison ivy, poison oak, and poison sumac.

Poison ivy, poison oak, and poison sumac release oil when the leaf or other plant parts are bruised, damaged, or burned. Approximately 85 percent of the general population will develop an allergy if exposed to these plants. The sensitivity to the sap usually develops after several encounters with poison ivy, oak, or sumac. When the oil gets on the skin, an allergic reaction,

referred to as contact dermatitis, occurs in most exposed people as an itchy red rash with bumps or blisters.

Plant Identification

You might have heard the old saying "Leaves of three, let it be!" It is a helpful reminder for identifying poison ivy and oak, but not poison sumac which usually has clusters of 7-13 leaves. Even poison ivy and poison oak may have more than three leaves and their form may vary greatly depending upon the exact species encountered, the local environment, and the season.

Being able to identify local varieties of these poisonous plants throughout the seasons and differentiating them from common non-poisonous look-a-likes are the major keys to avoiding exposure.

8. What causes an allergic reaction when workers are exposed to poison ivy, oak, or sumac?

- a. The solvent given off by the plant is absorbed
- b. The spores given off and inhaled with contact
- c. The tips of the leaves penetrating the skin
- d. The oil of the plant contacting the skin

Poison Ivy

If you are working in a wooded area, you want to be on the lookout for poison ivy. It is everywhere in United States except Hawaii and Alaska. In the East, Midwest, and the South, it grows as a vine. In the Northern and Western United States, it grows as a shrub. Each leaf has three leaflets. Leaves are green in the summer and red in the fall. In the late summer and fall, white berries may grow from the stems.

Here are a few things to remember about poison ivy.

-) Eastern poison ivy is typically a hairy, ropelike vine with three shiny green (or red in the fall) leaves budding from one small stem.
-) Western poison ivy is typically a low shrub with three leaves that do not form a climbing vine. May have yellow or green flowers and white to green-yellow or amber berries.

Poison Oak

Poison oak is usually a shrub with leaves of three, similar to poison ivy. It has oak-like leaves in clusters of three. There are two distinct kinds: Eastern poison oak and Western poison oak.

- Eastern poison oak (New Jersey to Texas) grows as a low shrub.
- Western poison oak (Pacific Coast) grows to six-foot-tall clumps or vines up to 30 feet long. It may have yellow or green flowers and clusters of green-yellow or white berries.

9. Which type of poisonous plant has can grow into six-foot clumps up to 30 feet long?

- a. Western poison oak
- b. Northern poison oak
- c. All types of poison oak
- d. Eastern poison oak

Poison Sumac

In the United States, poison sumac grows in standing water in peat bogs in the Northeast and Midwest and in swampy areas in parts of the Southeast. Each leaf has clusters of seven to 13 smooth-edged leaflets. The plants can grow up to 15 feet tall. The leaves are orange in spring, green in summer, and red, orange, or yellow in fall. There may be clumps of pale yellow or cream-colored berries.

Poisonous Plant Exposure Symptoms and Solutions

Sign and symptoms of poison ivy, oak, and sumac include:

- itching
- redness
- burning sensation
- swelling
- blisters
- rash (may take up to 10 days to heal)

Possible solutions and controls for poison ivy, oak and sumac include:

-) Wear long-sleeved shirts and long pants, tucked into boots. Wear cloth or leather gloves.
-) Apply barrier creams to exposed skin.
-) Educate workers on the identification of poison ivy, oak, and sumac plants.
-) Educate workers on signs and symptoms of contact with poisonous ivy, oak, and sumac.
-) Keep rubbing alcohol accessible. It removes the oily resin up to 30 minutes after exposure.

10. How can you decrease the effects of poison sumac exposure?

- a. Rub the resin off with a clean towel
- b. Use rubbing alcohol to remove the oily resin
- c. Use soap so clean the affected area
- d. Neutralize the resin with sodium ascorbate

Module 2: Infectious Animals and Insects

Many different poisonous and infectious insects and animals are found throughout the United States. Workers should be aware of these health hazards before starting work in a specific location.

Rabies

Rabies is a viral disease caused by infection of the central nervous systems of wild and domestic animals and humans. The initial symptoms of human rabies resemble those of other systemic viral infections, including:

-) fever
-) headache
-) disorders of the upper respiratory and gastrointestinal tracts

Recognizing that a person has been exposed to the virus and prompt treatment are essential for preventing rabies. Once clinical symptoms have begun, there is no treatment for rabies and almost all patients will die from the disease or its complications within a few weeks of onset.

Raccoons, skunks, foxes, and coyotes are the terrestrial animals most often infected with rabies in the United States. All bites by such wildlife must be considered a possible exposure to the rabies virus.

The most sensible way to avoid contact with rodents is to prevent rodents from infesting your work site. You must also follow safety precautions if you do come across a rodent infested area.

1. Which of the following animals is most likely to carry rabies?

- a. Domestic dogs
- b. Wild bores
- c. Raccoons
- d. Ferrets

Safe Disposal of Rodents

Safe disposal of rodents and proper cleaning and disinfection of rodent-inhabited areas are keys to minimizing exposure to the virus.

The Center for Disease Control specifically recommends following these steps for safe disposal and clean-up of dead rodents and/or rodent droppings:

-) Wear rubber gloves.
-) Thoroughly spray dead rodents, traps, droppings, and contaminated areas with a general household disinfectant.
-) Place disinfectant-soaked rodents into a plastic bag and seal it. Then place it into a second plastic bag and seal. If possible, burn or bury the bag or contact your local or state health department about other appropriate disposal methods.
-) Disinfect floors, countertops and other surfaces with a general household disinfectant.
-) Before removing the gloves, wash gloved hands in disinfectant, and then in soap and water. Thoroughly wash hands with soap and water after removing the gloves.
-) Disinfect all used traps, and then set them again or replace them.
-) Eliminate possible rodent nesting sites such as junk cars, old tires and trash piles. Do not leave animal food and water in feeding dishes overnight, and keep all food in rodent-proof containers.
-) Cut grass, brush and dense shrubbery within the immediate area of buildings.

2. After placing disinfectant-soaked rodents into a plastic bag and sealing it, what's the next step?

- a. Place it in a second plastic bag
- b. Carefully place it in a disposal bin
- c. Call the animal control agency for pickup
- d. Dispose of the animal and wash your hands

Tick-Borne Diseases

Tick-borne pathogens can be passed to humans by the bite of infected ticks. Ticks can be infected with bacteria, viruses, or parasites. Lyme disease is the most commonly reported tick-borne diseases in the United State.

How do Ticks Get on a Person?

Ticks do not jump, crawl, or fall onto a person. They are picked up when your clothing or hair brushes a leaf or other object they are on. Ticks are generally found within three feet of the ground. Once picked up, they will crawl until they find a favorable site to feed. Often, they will find a spot at the back of a knee, near the hairline, or behind the ears.

Many tick-borne diseases can have similar signs and symptoms. If you have been bitten by a tick and develop the symptoms below within a few weeks, a health care provider should evaluate symptoms before deciding on a course of treatment:

Some of the most common tick-borne diseases in the United States include:

-) Lyme disease - Most common in the Northeast. Spread by black-legged or deer tick.
-) Rocky Mountain Spotted Fever - Common in the Southeast. Can be fatal if not treated soon.
-) Ehrlichiosis - Common in the Southwest. Spread by the lone star tick.
-) Babesiosis - Common in Northeast and upper Midwest. Spread by deer tick.
-) Human Granulocytic Anaplasmosis - In Midwest, Northeast and Northern California.

The most common symptoms of tick-related illnesses are:

-) Fever/chills: With all tickborne diseases, patients can experience fever at varying degrees and time of onset.
-) Aches and pains: Tickborne disease symptoms include headache, fatigue, and muscle aches. With Lyme disease, you may also experience joint pain. The severity and time of onset of these symptoms can depend on the disease and the patient's personal tolerance level.

-) Rash: Lyme disease, southern tick-associated rash illness (STARI), Rocky Mountain spotted fever (RMSF), ehrlichiosis, and tularemia can result in distinctive rashes.

3. What is the most commonly reported tick-borne disease in the United States?

- a. Rocky Mountain Spotted Fever
- b. Lyme disease
- c. Ehrlichiosis
- d. Babesiosis

Lyme Disease

As we mentioned earlier, Lyme disease is the most commonly reported tick-borne disease in the United States. U.S. workers in the northeastern and north-central States are at the highest risk of exposure to infected ticks. 70-80 percent of Lyme disease is passed to humans by the bite of black-legged ticks (also known as deer ticks in the eastern United States) and western black-legged ticks infected with the bacterium *Borrelia burgdorferi*. The Lyme disease bacterium normally lives in mice, squirrels, and other small mammals.

Victims will develop a "bull's-eye" rash. Other signs and symptoms may be non-specific and similar to flu-like symptoms such as:

-) fever
-) lymph node swelling,
-) neck stiffness
-) generalized fatigue
-) headaches
-) migrating joint aches
-) muscle aches

Most cases can be successfully treated with antibiotics, especially if treatment is started early. However, some workers may have symptoms such as arthritis, muscle and joint pain, or fatigue for an extended period.

4. What is a sign that a co-worker may be infected with Lyme disease?

- a. Tissue necrosis
- b. Two distinctive red marks
- c. White pustules
- d. "Bulls-eye" rash

West Nile Virus (WNV)

West Nile virus is transmitted by the bite of an infected mosquito. CDC reports that in four out of five cases, persons infected with WNV show no symptoms. In almost 20% of the cases, infections result in very mild flu-like symptoms, called West Nile fever.

The typical time from infection to the onset of signs and symptoms is 3 to 14 days. Signs and symptoms of the milder West Nile Fever and more severe infection (West Nile encephalitis or meningitis) include:

-) **Mild West Nile Fever** - Headache, fever, tiredness, aches, nausea/vomiting, swollen lymph nodes, skin rash.
-) **West Nile encephalitis/meningitis** - All the above plus stiffness in neck, stupor, possible coma, tremors, convulsions, muscle weakness, paralysis, loss of vision.

Protect yourself from vector-born tick and mosquito hazards with these precautions:

-) Wear light-colored clothes to see ticks more easily.
-) Wear long sleeves; tuck pant legs into socks or boots.
-) Wear high boots or closed shoes that cover your feet completely.
-) Wear a hat.
-) Shower after work. Wash and dry your work clothes at high temperature.
-) Examine your body for ticks after work. Remove any attached ticks promptly and carefully with fine-tipped tweezers by gripping the tick. Do not use petroleum jelly, a hot match, or nail polish to remove the tick.
-) Apply Picaridin or insect repellent with DEET to exposed skin.

- J Spray clothing with repellents containing DEET or permethrin. (Note: Do not spray permethrin directly onto exposed skin.)
- J Be extra vigilant at dusk and dawn when mosquitoes are most active.
- J Get rid of sources of standing water (used tires, buckets) to reduce or eliminate mosquito breeding areas.

5. How is West Nile virus transmitted?

- a. The bite of an infected mosquito
- b. The bite of an infected tick
- c. Contact with surfaces infected with the virus
- d. Inhalation of contaminated airborne virus

Venomous Snakes

Venomous snakes found in the United States include rattlesnakes, copperheads, cottonmouths/water moccasins, and coral snakes. Although rare, some workers with a severe allergy to snake venom may be at risk of death if bitten. It has been estimated that 7,000–8,000 people per year receive venomous bites in the United States, and about 5 of those people die.

It is important for employers to train their workers about their risk of exposure to venomous snakes, how they can prevent and protect themselves from snake bites, and what they should do if they are bitten.

- J Watch where you place your hands and feet when removing debris. If possible, don't place your fingers under debris you are moving. Wear heavy gloves.
- J If you see a snake, step back and allow it to proceed.
- J Wear boots at least 10 inches high.
- J Watch for snakes sunning on fallen trees, limbs or other debris.
- J A snake's striking distance is about 1/2 the total length of the snake.
- J If bitten, note the color and shape of the snake's head to help with treatment.

-) Keep bite victims still and calm to slow the spread of venom in case the snake is poisonous. Seek medical attention as soon as possible.
-) Do not cut the wound or attempt to suck out the venom. Apply first aid: lay the person down so that the bite is below the level of the heart, and cover the bite with a clean, dry dressing.

6. How high should your work boots be to decrease the chance of being bitten by a venomous snake?

- a. At least 6 inches
- b. At least 7 inches
- c. At least 8 inches
- d. At least 10 inches

Venomous Spiders

Venomous spiders found in the United States include the black widow and the brown recluse. These spiders can be dangerous to construction workers. These spiders occasionally find their way inside structures or buildings and can also present a risk to indoor workers.

-) **Black Widow:** Black widow spiders are found throughout North America, but are most common in the southern and western areas of the United States. They are identified by a red-colored hourglass mark on the underside (females) or on top (males). Only females are poisonous, injecting a potent neurotoxic venom that is 15 times more potent than that of the rattlesnake. Though venomous, the quantity of poison is so minute that death is rare, though the bite is painful.
-) **Brown Recluse:** The brown recluse spider, also known as the violin spider, is most commonly found in the Midwestern and Southern states. It is brown in color with a characteristic dark violin-shaped (or fiddle-shaped) marking on its head and has six equal-sized eyes (most spiders have eight eyes). Sometimes a bite from a brown recluse spider can go unnoticed, or maybe feel as slight as a pinprick. Usually, after 2–8 hours, there is ensuing severe pain, erythema, and localized tissue necrosis (death) due to the venom's proteolytic enzymes.

Workers can take the following steps to prevent being bitten by venomous spiders:

-) Inspect or shake out any clothing, shoes, towels, or equipment before use.

-) Wear protective clothing such as a long-sleeved shirt and long pants, hat, gloves, and boots when handling stacked or undisturbed piles of materials.
-) Minimize the empty spaces between stacked materials.
-) Remove and reduce debris and rubble from around the outdoor work areas.
-) Trim or eliminate tall grasses from around outdoor work areas.
-) Store apparel and outdoor equipment in tightly closed plastic bags.
-) Keep your tetanus boosters up-to-date (every 10 years). Spider bites can become infected with tetanus spores.

7. Which spider bite may cause severe pain and localized tissue necrosis (death)?

- a. Black widow
- b. Brown recluse
- c. Brown widow
- d. Wolfe spider

Stinging Insects

Stinging or biting insects or scorpions can be hazardous to outdoor workers. Stinging or biting insects include bees, wasps, hornets, and fire ants.

The health effects of stinging or biting insects or scorpions range from mild discomfort or pain to a lethal reaction for those workers allergic to the insect's venom. Anaphylactic shock is the body's severe allergic reaction to a bite or sting and requires immediate emergency care.

Bees and Wasps

Bees and wasps (including paper wasps, yellowjackets and hornets) are most abundant in the warmer months. Wasps can be generally distinguished from bees by their lack of body hair and thinner, elongated bodies. Nests and hives may be found in trees, under roof eaves, or on equipment such as ladders.

Workers should take the following steps to prevent insect stings:

-) Wear light-colored, smooth-finished clothing.

-) Avoid perfumed soaps, shampoos, and deodorants and don't wear cologne or perfume.
-) Avoid bananas and banana-scented toiletries.
-) Wear clean clothing and bathe daily. (Sweat may anger bees.)
-) Wear clothing to cover as much of the body as possible.
-) Avoid flowering plants when possible.
-) Keep work areas clean. Social wasps thrive in places where humans discard food.
-) Remain calm and still if a single stinging insect is flying around. (Swatting at an insect may cause it to sting.)
-) If you are attacked by several stinging insects at once, run to get away from them. (Bees release a chemical when they sting, which may attract other bees.)
-) If a bee comes inside your vehicle, stop the car slowly, and open all the windows.
-) Workers with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

8. In a worst-case scenario, what can a wasp bite result in?

- a. Epinephrine response
- b. Anaphylactic shock
- c. Redness at the sting
- d. Soreness and itching

Scorpions

Scorpions usually hide during the day and are active at night. They may be hiding under rocks, wood, or anything else lying on the ground. Some species may also burrow into the ground. Most scorpions live in dry, desert areas. However, some species can be found in grasslands, forests, and inside caves.

Symptoms of a scorpion sting may include:

-) stinging or burning sensation at the injection site (very little swelling or inflammation)
-) positive "tap test" (i.e., extreme pain when the sting site is tapped with a finger)
-) restlessness
-) convulsions
-) unusual eye movement
-) staggering gait
-) thick tongue sensation
-) slurred speech
-) drooling
-) muscle twitches
-) abdominal pain and cramps
-) respiratory depression

Workers should take the following steps to prevent scorpion stings:

-) Wear long sleeves and pants.
-) Wear leather gloves.
-) Shake out clothing or shoes before putting them on.
-) Workers with a history of severe allergic reactions to insect bites or stings should consider carrying an epinephrine auto injector (EpiPen) and should wear a medical identification bracelet or necklace stating their allergy.

9. If a worker, who has a history of allergic reactions, is stung by a scorpion, what should he or she consider carrying with them?

- a. A phone to contact emergency services
- b. A bracelet displaying his or her blood type
- c. An epinephrine (EpiPen) auto injector
- d. A scorpion venom removal kit

Fire Ants

Imported fire ants first came to the United States around 1930. Now there are five times more ants per acre in the United States than in their native South America. The fire ants that came to the United States escaped their natural enemies and thrived in the southern landscape.

Fire ants bite and sting. They are aggressive when stinging and inject venom, which causes a burning sensation. Red bumps form at the sting, and within a day or two they become white fluid-filled pustules.

Workers should take the following steps to prevent fire ant stings and bites:

-) Do not disturb or stand on or near ant mounds.
-) Be careful when lifting items (including animal carcasses) off the ground, as they may be covered in ants.
-) Fire ants may also be found on trees or in water, so always look over the area before starting to work.

10. If you feel a sting on your leg and after a day or two notice white fluid-filled pustules where you were stung, what is the likely cause?

- a. You received a bite from a bee
- b. You were stung by a wasp
- c. You were stung by a scorpion
- d. You were bitten by a fire ant

Additional Resources

1. [Construction Safety and Health, NIOSH](#)
2. [Construction Topics, Health & Safety Executive](#)
3. [Occupational Safety and Health Administration Homepage](#)