# Quiz: PPE Legs/Feet

**QUESTION**

What are some problems of standing in the job?

A. Accelerates tiredness/fatigue, reduces productivity, flooring issues.
B. Reduced blood supply to lower extremities, distracts from job responsibilities, inadequate footwear.
C. Increases risk of foot and leg problems, reduced blood supply to lower extremities, accelerates tiredness and fatigue.
D. Reduced blood supply to lower extremities, inadequate footwear, and poor personal life style habits.

**ANSWER**

C. Increases risk of foot and leg problems, reduced blood supply to lower extremities, accelerates tiredness and fatigue.

**WHY IS IT RIGHT**

**The importance of foot comfort**

There are two major categories of work-related foot injuries. The first category includes foot injuries from punctures, crushing, sprains, and lacerations. The second group of injuries includes those resulting from slips, trips and falls. Slips and falls do not always result in a foot injury but lack of attention to foot safety plays an important role in their occurrence.

These two categories of foot injuries, however, do not exhaust the whole range of foot problems at work. There are also other conditions such as calluses, ingrown toenails or simply tired feet that are common among workers. Although these may not be considered as occupational injuries in the strictest sense, they can have serious consequences for health and safety at the workplace. They cause discomfort, pain and fatigue. Fatigue sets up the worker for further injuries affecting the muscles and joints. Also, a worker who is tired and suffering pain is less alert and more likely to act unsafely. An accident or incident of any kind may result.

**Working position contributes to the foot problems**

Common foot problems occur both on and off the job. Still, there is no doubt that some work-related factors can lead to foot problems, especially jobs that require long periods of standing. Since the human foot is designed for mobility, maintaining an upright stance is extremely tiring. Standing for hours, day after day, not only tires the worker’s feet but can also cause permanent damage. Continuous standing can cause the joints of bones of the feet to become misaligned (e.g., cause flat feet)

and can cause inflammation that can lead later to rheumatism and arthritis.

**Flooring contributes to the foot problems**

The type of flooring used in the workplace has an important influence on comfort, especially on tender feet. Hard, unyielding floors like concrete are the least comfortable surfaces to work on. Working on a hard floor has the impact of a hammer, pounding the heel at every step. Slippery floors are hazardous for slips and falls that can result in sprained ankles or broken foot bones.

**Foot-wear contributes to the foot problems**

Footwear that fits poorly or is in need of repair also contributes heavily to foot discomfort. Pointed toes and high heels are particularly inappropriate for working footwear.

**Examples of workplace foot injuries**

| Injuries | Common Causes |
|---|---|
| Crushed or broken feet, amputations of toes or feet | Feet trapped between objects or caught in a crack, falls of heavy objects, moving vehicles (lift trucks, bulldozers, etc.), conveyor belts (feet drawn between belt and roller) |
| Punctures of the sole of the foot | Loose nails, sharp metal or glass objects |
| Cuts or severed feet or toes, lacerations | Chain saws, rotary mowers, unguarded machinery |
| Burns | Molten metal splashes, chemical splashes, contact with fire, flammable or explosive atmospheres |
| Electric shocks | Static electricity, contact with sources of electricity |
| Sprained or twisted ankles, fractured or broken bones because of slips, trips or falls | Slippery floors, littered walkways, incorrect footwear, poor lighting. |

**Foot and leg protection is an important personal protection equipment (PPE)**

It involves protecting your employee’s feet and legs from injuries they are at risk of during their normal business operations. If your employees might be in risk of something crushing their feet or legs, or puncturing them, you should consider what type of protection they need.

**Foot and Leg PPE Protects Employees**

Foot and leg protection can protect your workers from damage or injury to their feet that might occur when equipment rolls or pinches their feet or heavy objects falls on their feet. It also protects them from sharp objects like broken glass or nails, molten metal splashing, electrical or chemical hazards, fire explosions, hot and wet surfaces, and slippery surfaces from oil or grease.

**Employees Need to Wear Foot and Leg Protection**

In general, your workers should always wear foot and leg protection if they are at risk for an injury of their limbs. Specifically, here are some situations where you want to make sure they are protected:

- They are working around electrical or fire hazards.
- Employees working on slippery, oily, hot, or wet surfaces.
- They will be exposed to molten metal that is at risk of splashing their legs and feet.

- There are sharp objects nearby that might harm them, such as spikes or nails that would go through regular shoes.
- Large and heavy tools or equipment could potentially roll over their feet.

**The best way to involve workers in programs to protect their feet is to provide:**

- Training and information on the health hazards of wearing improper shoes.
- Principles for selecting proper footwear.
- Simple rules of general foot care.
- The inner side of the shoe must be straight from the heel to the end of the big toe.
- The shoe must grip the heel firmly.
- The forepart must allow freedom of movement for the toes.
- The shoe must have a fastening across the instep to prevent the foot from slipping when walking.
- The shoe must have a low, wide-based heel; flat shoes are recommended.

**People buying footwear for work should take the following advice:**

- Do not expect that footwear that is too tight will stretch with wear.
- Have both feet measured when buying shoes. Feet normally differ in size.
- Buy shoes to fit the bigger foot.
- Buy shoes late in the afternoon when feet are likely to be swollen to their maximum size.
- Ask a doctor’s advice if properly fitting shoes are not available.
- Consider purchasing shock-absorbing insoles when a job requires walking or standing on hard floors.

**WHY IS EVERYTHING ELSE WRONG**

Workers who should wear protective footwear are those who are exposed to hot substances, corrosive or poisonous materials, molten metal, splashes, falling or rolling objects such as barrels, tools, penetrating materials, (nails, spikes), hot, wet slippery surfaces, or electric hazards. Non-conductive footwear should be worn in electric hazard situations; conductive footwear is required for those who work where there are static electric conditions.

**Types of protection for legs and feet are:**

- **Leggings** – Protection for lower legs and feet against heat hazards; safety snaps allow leggings to be quickly removed.
- **Metatarsal Guards** – May be strapped to outside of shoes to protect instep area from compression and impact. Usually made of aluminum, steel fiber or plastic.
- **Toe Guards** – Fit over toes of regular shoes, also made of aluminum, steel or plastic.
- **Safety Shoes** – Have heat resistant soles and impact resistant toes. Some have metal insoles for protection from puncture wounds.
- **Foot and Shin Guards** – May be used in addition to toe guards when more protection is needed.

Special Purpose Shoes are Electrically Conductive Shoes, which protect against buildup of static electricity in the body, and produce a spark. This type of shoe is required for those who work in occupations such as explosives manufacturers or grain elevators. Non-Conductive Electric Hazard safety-toe shoes prevent wearers’ feet from completing electric circuit to the ground, while working in jobs that may present electric hazards. Foundry Shoes are made of snug- fitting leather, leather-substitute, and have leather or rubber soles, rubber heels. All foundry shoes must have built in safety toes.

Employees working around rolling or falling materials are exposed to food or leg injuries. They have to use appropriate footwear and leg protection in order to avoid

severe injuries. Some working enviroments involve hot, poisonous or corrosive substances. When workers deal with those dangerous substances, they have to utilize protective gear. Safety garments strike the mind when it comes to working in hazardous environment. They do provide protection against some hazards and to some extent.

If a worker{s feet are exposed to electric shocks, it becomes inevitable to wear non-conductive footwear. The nature of hazards can vary from place to place. Some of the common hazards that can injure legs include sparks, moving objects, chemicals, dirt, hot liquids, etc.

**Situations where a worker must use foot or leg protection include:**

- Heavy materials or machines that can roll onto or fall on a worker’s foot.
- Sharp-edged objects such as unguarded machines, nails, tools, etc.
- Molten metals that can splash on legs or feet.
- Slippery or wet surfaces.
- Electric hazards.

**SAFETY PLAN**

Employers should develop a **Safety Plan** that thoroughly identifies all the present hazards and propose safety measures. Protective garments and equipment should be designed and provided according to the nature of potential risk. For example, safety footwear must meet minimum compression and performance standards. We can find a variety of footwear.

Safety wear such as coveralls and bib pants are suitable for workers who have to protect themselves against dirt, chemicals, and hot substances. A flame-resistant coverall is a good choice if hazards are limited to sparks and heat.

It can protect most of the body from arms to legs. Workplace hazards that may require safety coveralls include high temperature, harsh weather, metal splash, spray, impact or penetration, dirt, etc. People who have to perform their duties in laboratories should wear leg and foot protection to avoid chemical splashes.

Protective equipment can be a compromise between safety and comfort. Overprotection can limit free movement and make the work uncomfortable. However, custom clothing designed specifically for your size and needs can provide you with both comfort and protection. Safety work wear, of course, provides a limited level of protection.

It is not wise to rely solely on garments when your workplace involves the risk of being splashed with hydrochloric acid. Choose your safety gear carefully and make a good use of it.

Standing on the job not only accelerates tiredness and fatigue, but it also increases the risk of various foot and leg problems because it puts strain on bones, joints, tendons, muscles and ligaments. Standing for long periods of time also causes reduced blood supply to the lower extremities, which promotes soreness. Prolonged standing may also create an accumulation of blood in the foot or around the ankles. Flat feet, plantar fasciitis, bunions, edema (swelling), varicose veins and venous insufficiency are all problems associated with prolonged standing.

**Fortunately, there are many ways to reduce or avoid the risks of foot and leg problems if you must stand a lot at work.**

**Take More Seated Breaks**

1. **Sit down more often while working.**Although many jobs in modern times are sedentary and involve sitting, there are still some jobs that involve lots of standing, such as bank teller, cashier, factory worker, chef, hairdresser and various retail and construction jobs, to name a few. However, there are often

opportunities to sit and rest your feet while still working and being productive, so look for those opportunities and be sure to tell your boss what you're up to. For example, sitting while answering the phone or filling out paperwork might be appropriate at your workplace, especially if there are no customers around.
    - Aged people are more susceptible to foot/leg injuries from excessive standing because their tissues (ligaments, tendons, cartilage, fascia) lose elasticity and shock absorbency.

2. **Sit down during lunch.**When you take your lunch break, make sure to grab a seat and put your feet up while eating and hydrating. You may be in a hurry, but take advantage of the opportunity to take the weight off your feet. If your workplace is short of chairs or doesn't have a lunch room, then either bring your own folding chair or stool, or find a different location to eat where you can safely sit down.
    - Food courts at malls, outdoor picnic tables, water fountains, or even some clean grass under a tree are all good places to take a load off and enjoy your lunch.

3. **Sit down during breaks.**Make sure to take all of your allotted breaks and try to sit the entire time, preferably with your legs up, which promotes better circulation because of the reduced effects of gravity. Taking off your shoes while resting will also allow your feet to cool down by evaporation.
    - While on your break, consider rolling your bare feet over a golf ball. It will feel great, relieve some tension in the soles of your feet and maybe even help prevent plantar fasciitis (pain and inflammation of the connective tissue covering the bottom of your feet).

**Change Your Substrate**

1. **Stand in a different spot.**Many years ago, most workplaces were made with wood floors, which have some cushioning even though they may seem pretty hard to walk on. However, in modern times, most businesses tend to have floors made from concrete, ceramic tile or marble, which have essentially no cushioning, shock absorbency or isolative properties. Consequently, stand in an area that's covered in more springy material such as wood. If that's not possible, then change positions just for the exercise, which will promote blood circulation and may ease the tension in your feet and leg muscles.
    - Concrete and ceramic tile will easily transfer cold to your feet which is not good for blood circulation, so stand in warmer areas without cool drafts.
    - If you work outside, find some grass to stand on while plying your trade or waiting for the next task.

2. **Stand on an anti-fatigue mat.**Anti-fatigue mats are designed to decrease the stress on your feet and legs by providing a cushioned surface to stand on over prolonged periods of time. These mats are typically made of thick rubber, but some are also made of foam, leather, vinyl or even wood. In many cases, your employer will readily supply you with an anti-fatigue mat if you ask because they are proven to reduce the incidence of feet and lower leg problems.
    - Thick anti-fatigue mats can be a minor hazard at the workplace if people trip over them, so always be aware of where your mat and those of your co-workers are located.

3. **Stand carpeting.**Take a look around your workplace and see if there's any carpet you can stand on and still be able to do your job properly. Carpet (even the thin, cheap stuff) provides much more cushion than concrete and will help your feet and legs survive the long shifts at work. If there is no installed carpet at your workplace, ask your boss if you can bring a piece from home.
    - Some businesses that sell carpet will give you a decent sized sample (big enough to stand on) for free.

- Make sure the underneath side of the carpet doesn't slide too readily on the floor, or else you're at high risk to slip and fall.

**Wear appropriate shoes and socks**

1. **Wear shoes that fit properly.**A significant percentage of people wear shoes that don't fit, perhaps because their feet suddenly increased in size, or because the shoes were on sale super cheap, or because they were passed down from a relative or friend. Either way, always wear shoes to work that properly fit your feet while wearing socks. If you absolutely have to choose a pair that aren't your size, then pick a pair that is too big rather than shoes that are too small because cramped shoes often lead to blisters and foot cramps.
2. **Don't wear high heels.** Women are often expected or pressured to wear high heels for many jobs, but heels more than 2 inches (5.1 cm) high can force the body to tilt forward, which creates a variety of imbalances from the feet to the low back. This situation can cause foot strain, Achilles tendonitis, tight calf muscles, knee pain and low back problems, as well as instability while walking.
3. **Don't wear narrow shoes.**High heels are often too narrow at the toe, which compresses the toes together unnaturally and increases the risk of painful bunions and unsightly calluses. Cowboy boots and some swing back sandals are also too pointy in the toe, especially if you plan on doing lots of standing. Instead, choose shoes that grip your heel tightly, provide enough room to wiggle your toes, and has enough interior support to prevent pronation (the rolling inward or collapsing of your ankle).
4. **Wear compression stockings.**Compression stockings provide support to muscles and blood vessels of the lower leg, which reduces edema / swelling and promotes better circulation. They are found online, at medical supply stores and sometimes at pharmacies or physiotherapist offices. Alternatively, wear supportive pantyhose or well-padded socks.

**Try Helpful Therapies**

1. **Take a foot bath.**Soaking your feet and lower legs in a warm Epsom salt bath can significantly reduce pain and swelling. The magnesium in the salt is thought to help the muscles relax. If inflammation and swelling is a problem for you then follow the warm salt bath with an ice bath until your feet feel numb (about 15 minutes or so).
    - Always dry your feet thoroughly before you get up and walk away from your foot bath in order to prevent slipping and falling.
    - Epsom salt baths are thought to be helpful for alleviating restless leg syndromeat night, which negatively impacts sleep cycles.
2. **Get a massage.**Get a massage therapist or sympathetic friend to give you a foot and calf massage. Massage reduces muscle tension and promotes better blood flow. Start rubbing from the toes and work towards the calf so you help the venous blood return to the heart. Using a wooden roller under your feet will give you a decent massage by yourself without straining your hands. Consider applying peppermint lotion to your feet also, as it will tingle and invigorate them. After the massage, perform a few foot and calf stretches on both legs.
    - Stretch the calf muscles by leaning against a wall with one knee bent and the other leg straight out behind you with both feet flat on the floor – hold for 30 seconds and repeat a few times.
    - Stretch the bottom of your foot by wrapping a towel around the end of your toes and then trying to extend your leg – hold for 30 seconds and repeat of few times.
3. **Wear shoe orthotics.**Orthotics are custom-made insoles for your shoes designed to provide arch support, shock absorption and better foot biomechanics, which can translate into less foot/leg/back pain and reduced risk of various foot and leg

conditions. Orthotics are particularly helpful for treating and preventing plantar fasciitis, a very painful condition of the bottom of the foot, and flat feet. Custom orthotics can be expensive without medical coverage, but off-the-shelf insoles may provide benefit also.
    - It's estimated that about 2 million people require treatment for plantar fasciitis in the United States every year.
    - You may have to buy shoes a little bigger than you normally would in order to accommodate the orthotics.
4. **Lose some weight.**In general, people who are overweight or obese suffer more foot problems because of the increased amount of pressure on their feet. Flat feet, fallen arches, severe pronation, and "knock knees" (medically known as genu valgum) are more common among the obese. As such, do your feet a favor by losing some weight. Lose weight by increasing cardiovascular exercise (such as walking) and decreasing your caloric consumption.
    - Most people who are relatively sedentary only require about 2,000 calories per day to maintain their body processes and have enough energy for mild levels of exercise.
    - Reducing your calorie intake by 500 calories daily will result in about 4 pounds of fat tissue loss per month.

**Foot and leg protection choices include the following:**

- Safety-toed shoes or boots protect against falling, crushing or rolling hazards. Safety-toed footwear must meet the minimum compression and impact performance standards in ANSI Z41-1999 or provide equivalent protection.
- Some safety shoes may be designed to be electrically conductive to prevent the buildup of static electricity in areas with the potential for explosive atmospheres or nonconductive to protect workers from workplace electrical hazards.
- Metatarsal guards protect the instep area from impact and compression. Made of aluminum, steel, fiber or plastic, these guards may be strapped to the outside of regular work shoes.
- Toe guards fit over the toes of regular shoes to protect the toes from impact and compression hazards. They may be made of steel, aluminum, or plastic.
- Rubber overshoes are used for concrete work and areas where flooding is a concern.
- Shoes with slip-resistant soles are required for certain departments and should be used in areas where slips and falls on wet floors are most likely.
- Studded treads and overshoes should be used when employees must work on ice or snow-covered walking surfaces.
- Leggings protect the lower legs and feet from heat hazards such as molten metal or welding sparks. Safety snaps allow leggings to be removed quickly.

**Foot Injuries can be prevented**

There is no workplace where a worker is immune to foot injury. However, the hazards differ according to the workplace and the types of tasks the worker does. The first step in developing a strategy to reduce foot problems is to identify the relevant hazards at the workplace. Such hazards should be assessed in each workplace, no matter how safe or how dangerous it may seem. Foot injuries then can be prevented by looking for measures through proper job design and/or workplace design, and identifying proper foot wear.

**Job Design Improve Foot Safety**

Aching, flat or tired feet are common among workers who spend most of their working time standing.

The most important goal of job design is to avoid fixed positions especially fixed standing positions. Good job design includes varied tasks requiring changes in body position and using different muscles. Job rotation, job enlargement and team work are all ways to make work easier on the feet.

- Job rotation moves workers from one job to another. It distributes standing among a group of workers and shortens the time each individual spends standing. However, it must be a rotation where the worker does something completely different such as walking around or sitting at the next job.
- Job enlargement includes more and different tasks in a worker's duties. If it increases the variety of body positions and motions, the worker has less chance of developing foot problems.
- Team work gives the whole team more control and autonomy in planning and allocation of the work. Each team member carries a set of various operations to complete the whole product. Team work allows workers to alternate between tasks which, in turn, reduces the risk of overloading the feet.
- Rest breaks help to alleviate foot problems where redesigning jobs is impractical. Frequent short breaks are preferable to fewer long breaks.

**Foot Safety in Workplace**

Job and workplace designs also have the potential to increase foot safety in workplaces that are specifically hazardous. Here are some examples:

- Separating mobile equipment from pedestrian traffic and installing safety mirrors and warning signs can decrease the number of incidents that might result in cut or crushed feet or toes.
- Proper guarding of machines such as chain saws or rotary mowers can avoid cuts or severed feet or toes.
- Effective housekeeping reduces the number of incidents at workplaces. For example, loose nails, other sharp objects, and littered walkways are hazards for foot injury.
- Using colour contrast and angular lighting to improve depth vision in complicated areas such as stairs, ramps and passageways reduces the hazard of tripping and falling.
- Posting safety signs in conspicuous places where safety foot wear is required when there is a potential hazard from falling objects, sharp objects, etc.

**Floors can improve foot comfort**

Standing or working on a hard, unyielding floor can cause a lot of discomfort. Wood, cork, carpeting, or rubber – anything that provides some flexibility – is gentler on workers' feet. Where resilient floors are not practical, footwear with thick, insulating soles and shock-absorbing insoles can alleviate discomfort. Anti-fatigue matting can also be useful wherever workers have to stand or walk. They provide a cushioning which reduces foot fatigue. However, the use of matting requires caution. When installed improperly, it can lead to tripping and slipping incidents.

Special anti-slip flooring or matting can reduce slipping incidents. If installed properly, these mats are useful, but workers may find that their feet burn and feel sore. The non-slip properties of the flooring mat cause their shoes to grab suddenly on the flooring making their feet slide forward inside the shoes. Friction inside the shoes produces heat that creates soreness and, eventually, calluses. A non-slip

resilient insole can reduce this discomfort.