

HOMEBUILDING: FLOORING

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Musculoskeletal disorders (MSDs), such as chronic back pain or shoulder problems, often take time to develop. Forceful exertion, awkward positions, hand-arm and whole-body vibration, contact stress, and repetitive tasks can add up over time to produce an MSD.

This profile can help you identify and control MSD hazards in your job. We recommend that you add the best practices outlined here to your company's health and safety program. The hazards in a particular job, however, may be different than the ones on this profile, so evaluate the risks of your particular activities.

In general, when implementing controls, consider the following ergonomic principles:

- 1. Use handling equipment when possible.** The most effective intervention to control the risk of developing an MSD is to eliminate or reduce the frequency of lifting, carrying, pushing, and pulling. Use material-handling equipment such as carts, dollies, pallet jacks, or manual forklifts.
- 2. Don't lift a load from the floor.** Lifting from the floor or below standing knuckle height can expose your back to significant stresses and reduce your lifting capacity. Avoid this procedure by storing objects above standing knuckle height and below standing shoulder height.
- 3. Avoid working on the floor.** Constantly working on the floor can result in injuries to your back, hips, and knees because it usually requires kneeling and bending your back forward. When possible, raise the work height by using a workbench.
- 4. Minimize work above your shoulder.** High lifting or constant reaching above the shoulder level is harmful for three reasons.
 1. Your muscle strength is reduced because most of the muscle work is performed by your shoulders and arms instead of by the bigger muscles in your back and legs.
 2. Your shoulder and arm muscles fatigue more quickly than your back and leg muscles because of reduced blood flow.
 3. Lifting or removing an object from a high shelf can be dangerous because you could drop the object.
- 5. Move smaller weights often or get help.** Smaller weights put less stress on your back than larger weights, even if the frequency of lifting is increased.
- 6. Exercise programs.** Consider exercise programs. They help to prevent MSDs and promote general good health.

Tile

Tasks	Description	What can happen (Hazards/Risks)	Potential Controls
Removes existing finish <ul style="list-style-type: none"> ▶ Removes floor coverings, wall coverings, and incompatible materials ▶ Cleans surfaces 	<ul style="list-style-type: none"> ▶ Repetitive lifting from floor level ▶ Bending at the waist to remove floor coverings ▶ Forceful hand exertion while using hand tools 	<ul style="list-style-type: none"> ▶ Overexertion injuries due to lifting ▶ Sprains, strains of the upper arms ▶ Back injury 	<ul style="list-style-type: none"> ▶ Whenever possible, use mechanical equipment to remove floor coverings. ▶ To avoid bending over, consider using hand tools with long extension handles. ▶ Use low-vibration hand tools for removing tile coverings. ▶ Use shovels to lift small items into a wheelbarrow or cart. ▶ Rotate workers to different tasks if possible. ▶ Use powered wheelbarrows or carts to move materials if possible.
Prepares the installation surface <ul style="list-style-type: none"> ▶ Determines drainage requirements ▶ Ensures that the surface is level and plumb ▶ Installs membranes and reinforcement mesh ▶ Installs mortar beds, underlayments, sound attenuation products, or infloor heating 	<ul style="list-style-type: none"> ▶ Repetitive lifting from floor level ▶ Bending at the waist for low work ▶ Forceful hand exertion while using hand tools 	<ul style="list-style-type: none"> ▶ Overexertion injuries from lifting ▶ Sprains and strains of the upper arms ▶ Back injuries ▶ Knee injuries 	<ul style="list-style-type: none"> ▶ Use long-handled fastening and spreading tools if possible. ▶ Train workers to change body positions (e.g., kneel, sit, stoop). ▶ Rotate workers to other tasks if possible. ▶ Use high-quality kneepads. (Kneepads distribute force over a larger area of the knee's surface, but don't reduce the forces on the knee joint itself.)
Layout <ul style="list-style-type: none"> ▶ Squares the area ▶ Determines tile layout for best visual effect ▶ Establishes pattern locations ▶ Installs divider strips 	<ul style="list-style-type: none"> ▶ Awkward positioning of the back and lower extremities for prolonged periods 	<ul style="list-style-type: none"> ▶ Back injuries ▶ Knee injuries 	<ul style="list-style-type: none"> ▶ Use a kneeling creeper (such as Master Rac) to support your upper body and to move around easily when doing work at floor level. ▶ Use high-quality kneepads. Use kneepads with rollers to move around easily and to reduce friction between the kneepads and the floor. (Kneepads distribute force over a larger area of the knee's surface, but don't reduce the forces on the knee joint itself.) ▶ Rotate workers to other tasks if possible.

Tile *cont'd*

Tasks	Description	What can happen (Hazards/Risks)	Potential Controls
Stocks tile materials ▶ Moves heavy boxes of tile and bags of concrete	▶ Lifting more than 23 kg (50 lb) from floor level • 1 box of tiles: 23 kg (50 lb)	▶ Overexertion injuries from lifting ▶ Sprains, strains ▶ Back injuries	▶ Use a forklift to distribute pallet loads. ▶ Use a hand truck to distribute boxes. ▶ Store pallets, boxes, and bags off the floor (e.g., on top of empty pallets). Store materials at a height that's above your knees but below your shoulders. ▶ If you must carry the materials, carry only a single box or bag at a time.
Stocks thinset, and mixing setting materials ▶ Mixes setting materials (epoxies, thinset mortars, mortar beds, grouting materials)	▶ Lifting more than 23 kg or 50 lb (from floor level) ▶ Lifting more than 23 kg or 50 lb (from between knee and waist level) • bags: 23-25 kg (50-55 lb) • bucketfulls: 5 gal thinset may be more than 25 kg (55 lb) • 5 gal water = 19 kg (42 lb)	▶ Overexertion injuries from lifting ▶ Sprains, strains ▶ Back injuries	▶ Use small bags and buckets of material (23 kg or 50 lb maximum). ▶ Use hand trucks, carts, or hand dollies or carry single bags. ▶ Store pallets, boxes, and bags up off the floor (e.g., on top of empty pallets). Store materials at a height that's between knee height and shoulder height. ▶ Distribute mixed thinset in partially filled 5-gal buckets or fully-filled smaller buckets. Even better, use a hand truck or cart.
Installs floor tile	▶ Contact stress on knees from prolonged kneeling	▶ Sprains, strains ▶ Knee injuries ▶ Back injuries	▶ Set up your tile saw on a workbench to avoid stooping and squatting. ▶ Workers should rotate to activities where they're not working on the floor (e.g., tiling walls or ceilings, other activities), if possible. ▶ Whenever possible, stand up to take a break from kneeling. ▶ Use high-quality kneepads. Use kneepads with rollers to move around easily and to reduce friction between the kneepads and the floor. (Kneepads distribute force over a larger area of the knee's surface, but don't reduce the forces on the knee joint itself.) ▶ Use a mortar spreading machine if possible. ▶ Use a suction handle to lift heavy tiles.

Tile *cont'd*

Tasks	Description	What can happen (Hazards/Risks)	Potential Controls
			<ul style="list-style-type: none"> ▶ Use a kneeling creeper (such as Master Rac) to support your upper body and to move around easily when doing work at floor level, if possible. ▶ During breaks, give your muscles a rest. (e.g., Sit on a comfortable chair with a backrest.)
Installs tile ceilings	<ul style="list-style-type: none"> ▶ Hands above the shoulder 	<ul style="list-style-type: none"> ▶ Sprains, strains ▶ Back injuries 	<ul style="list-style-type: none"> ▶ Rotate workers periodically to other tasks.
Installs wall tile	<ul style="list-style-type: none"> ▶ Hands above the head, or elbows above the shoulder ▶ Back bent more than 30 degrees ▶ Kneeling ▶ Repeated impact (using your hand as a hammer) 	<ul style="list-style-type: none"> ▶ Sprains, strains ▶ Back injuries ▶ Knee injuries ▶ Carpal tunnel syndrome 	<ul style="list-style-type: none"> ▶ When doing low wall work, sit on bucket or stool, or on a short rolling cart. ▶ Switch periodically between kneeling, squatting, and sitting. ▶ Don't use your hand as a hammer. Press the tiles with your hands. Don't hit them. If necessary, use a hammer and a wooden board, or a rubber mallet. ▶ Stand on a stable, non-slip work platform when you need to reach high parts of the wall.
Grouts <ul style="list-style-type: none"> ▶ Floats grout ▶ Polishes tiles ▶ Caulks joints ▶ Seals grout 	<ul style="list-style-type: none"> ▶ Highly repetitive, forceful motion of trowel hands ▶ Contact stress on the knees from prolonged kneeling when grouting floors ▶ Prolonged awkward back posture 	<ul style="list-style-type: none"> ▶ Sprains, strains ▶ Wrist injuries ▶ Knee injuries 	<ul style="list-style-type: none"> ▶ Rotate workers periodically to other activities (e.g., scraping during floor/wall prep, wiping, stocking, etc.) if possible. ▶ Rotate tasks with the tile setter. ▶ Use high-quality trowels with easy-to-grip handles ▶ When wiping, use adequate amounts of clean water and sponges. Reduce hand force by frequently cleaning sponges. ▶ Use tools (especially sponges) with your other hand part of the time. ▶ Consider using a mechanical grout-spreading machine.

Wood Flooring and Carpeting

Tasks	Description	What can happen (Hazards/Risks)	Potential Controls
Wood floor	<ul style="list-style-type: none"> ▶ Installing hardwood, laminate, and vinyl flooring 	<ul style="list-style-type: none"> ▶ Back injuries from lifting heavy loads and awkward postures when working on the floor (bending, squatting, and kneeling) 	<ul style="list-style-type: none"> ▶ Use dollies and carts to move heavy materials. ▶ Cut all materials on a work bench and avoid working below your waist level. ▶ When working on the floor, reduce contact stress on the knees by wearing thick pads to distribute your body weight over a wider area. Pads also reduce the risk of puncture wounds from kneeling on sharp objects. ▶ Use kneepads with castor wheels to make it easier to move when working on the floor. ▶ Use a kneeling creeper (such as Master Rac) to support your upper body and to move around easily when doing work at floor level. ▶ Take a five-minute break during each hour of work. Stretch your back, legs, arms, and neck. ▶ During breaks, give your muscles a rest. (e.g., Sit on a comfortable chair with a backrest).
Carpeting	<ul style="list-style-type: none"> ▶ Installing carpets 	<ul style="list-style-type: none"> ▶ Back injuries from lifting heavy loads and awkward postures when working on the floor (bending, squatting, and kneeling) ▶ Knee injuries from repetitive use of a knee kicker 	<ul style="list-style-type: none"> ▶ Use dollies or specialized equipment to move heavy, awkward carpet rolls from trucks or storage areas. ▶ Get help when lifting heavy objects. ▶ When working on the floor, reduce contact stress on the knees by wearing thick pads to distribute your body weight over a wider area. ▶ Don't use knee-kickers if strong kicks are required, such as to stretch wall-to-wall carpet. ▶ Use power stretchers to stretch wall-to-wall carpet. Employers should provide an adequate number of power stretchers for each crew. ▶ Use knee-kickers to engage carpet edges on tack strips or to install carpet in small areas (closets) where strong kicks are not required. ▶ Take a five-minute break during each hour of work. Stretch your back, legs, arms, and neck. ▶ During breaks, give your muscles a rest. (e.g., Sit on a comfortable chair with a backrest.)

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1-800-263-5024 | info@ihsa.ca | www.ihsa.ca