

# MASONRY

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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 material-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.
- 7. Minimize vibration exposure.** Vibration can be transmitted from work processes—such as operating hand-held power tools (hammer drills, chipping guns, jackhammers)—into workers' hands and arms. Frequent exposure to moderate- and high-intensity hand-arm vibration can lead to permanent health problems.

## Labourers

Tasks	What can happen (Hazards/Risks)	Potential Controls
<b>Lifting scaffold frames</b> <ul style="list-style-type: none"> <li>▶ 1 frame: ~20 kg / 45 lb</li> </ul>	<ul style="list-style-type: none"> <li>▶ Overexertion due to manual material handling</li> <li>▶ Back injury</li> <li>▶ Shoulder injury</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use forklifts when possible.</li> <li>▶ Limit the weight you lift from the ground to 23 kg (51 lb).</li> <li>▶ Lift or carry only one frame at a time.</li> <li>▶ Use proper lifting techniques. Use your legs—not your back—to lift the load, and keep it close to your body. See the “Back Care” chapter in IHSA’s <i>Construction Health and Safety Manual (M029)</i>.</li> </ul>
<b>Lifting scaffold planks</b> <ul style="list-style-type: none"> <li>▶ 9’= ~16 kg (35 lb)</li> <li>▶ 12’= ~20 kg (45 lb)</li> <li>▶ 16’= ~27 kg (60 lb)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Overexertion due to manual material handling</li> <li>▶ Back injury</li> <li>▶ Shoulder injury</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use forklifts when possible.</li> <li>▶ Lift or carry only one plank at a time.</li> <li>▶ Use proper lifting techniques. Use your legs—not your back—to lift the load, and keep it close to your body. See the “Back Care” chapter in IHSA’s <i>Construction Health and Safety Manual (M029)</i>.</li> <li>▶ Get help from other workers when lifting wet or heavy planks.</li> <li>▶ Keep planks clean (remove mortar, ice, mud, etc.).</li> </ul>
<b>Mixing mortar</b> <ul style="list-style-type: none"> <li>▶ Lifting mortar bags</li> <li>▶ Mortar bags: 32 to 40 kg (70 to 88 lb)</li> <li>▶ Repetitive shovelling (and twisting the lower back when shovelling)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Overexertion due to manual material handling and mixing</li> <li>▶ Back (e.g., lower back) injury</li> <li>▶ Shoulder injury</li> </ul>	<ul style="list-style-type: none"> <li>▶ Consider using silo mix.</li> <li>▶ Use a mechanical mortar mixer.</li> <li>▶ Use lighter bags (maximum 23 kg / 51 lb) when you can.</li> <li>▶ Store bags above ground level so that you’re lifting from between chest and knee height.</li> <li>▶ When lifting, keep the load close to your body.</li> <li>▶ Rotate to other tasks when you can to give these muscles a break.</li> </ul>
<b>Transporting material to the work area</b> (e.g., mortar, masonry products, insulation, masonry systems, etc.)	<ul style="list-style-type: none"> <li>▶ Overexertion due to manual material handling</li> </ul>	<ul style="list-style-type: none"> <li>▶ Practice good housekeeping.</li> <li>▶ Use mechanical assistance such as forklifts, power buggies, and power wheelbarrows.</li> <li>▶ Use tools such as brick tongs and brick carts.</li> </ul>

## Labourers *cont'd*

Tasks	What can happen (Hazards/Risks)	Potential Controls
<b>Stacking masonry materials</b>  (e.g., blocks, bricks, stone, pre-cast, etc.)	<ul style="list-style-type: none"> <li>▶ Overexertion due to manual material handling</li> <li>▶ Back (e.g., lower back) injury</li> <li>▶ Shoulder injury</li> <li>▶ Wrist/arm injury</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use a forklift to place pallets as close to the required location as possible.</li> <li>▶ Position skids of materials below chest level and above knee level (e.g., stack skids on top of other pallets).</li> <li>▶ Spread materials along the length of the scaffold to reduce the distance you need to carry the material.</li> <li>▶ When lifting blocks or bricks, keep them close to your body.</li> <li>▶ Stack blocks so that you can pick them up by the flange.</li> <li>▶ Rotate to other tasks when you can to give these muscles a break.</li> </ul>

## Bricklayers

Tasks	What can happen (Hazards/Risks)	Potential Controls
<b>Cutting masonry materials with saws</b>  (e.g., quick-cut saws, table saws, etc.)	<ul style="list-style-type: none"> <li>▶ Back injuries due to bent and static posture</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use a table saw instead of a quick-cut saw.</li> <li>▶ Adjust table-saw height so that you can work standing upright and don't have to bend over.</li> <li>▶ To reduce vibration, maintain the saw in good condition (replace defective blades, inspect the saw periodically, etc.)</li> <li>▶ Stack the material you're going to cut above ground level so you don't have to bend over. Set up multiple pallets so that you can reach the material at a comfortable height.</li> </ul>
<b>Scooping and spreading mortar</b>	<ul style="list-style-type: none"> <li>▶ Wrist/arm injury</li> <li>▶ Back injury</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use mortarboard stands to reduce forward bending.</li> <li>▶ Read IHSA's study on masonry trowel sizes in the research (ergonomics) section of our website.</li> </ul>

## Bricklayers *cont'd*

Tasks	What can happen (Hazards/Risks)	Potential Controls
<b>Laying masonry</b> (e.g., blocks, bricks, stone, pre-cast, etc.) <ul style="list-style-type: none"> <li>▶ Gripping more than 4.6 kg (10 lb) per hand</li> <li>▶ Twisting your back to get material behind you</li> </ul>	<ul style="list-style-type: none"> <li>▶ Wrist/arm injury</li> <li>▶ Back injury</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use both hands when handling heavy material, or, for certain materials, get the help of another worker.</li> <li>▶ Place material between chest and knee height, and within arm's reach.</li> <li>▶ Use scaffolding with adjustable height. Adjust it to reduce the amount you lift above your shoulders or below your knees.</li> <li>▶ Rotate to other tasks when you can to give these muscles a break.</li> <li>▶ Consider using low-weight, alternative masonry materials.</li> <li>▶ Don't twist your body when you lift. Use proper lifting techniques.</li> </ul>
<b>Finishing the masonry surface</b> (e.g., jointing, cleaning, wiping, or similar repetitive tasks)	<ul style="list-style-type: none"> <li>▶ Wrist/arm injury</li> <li>▶ Shoulder injury</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use a powered sanding machine to clean blocks, if necessary.</li> <li>▶ Avoid work in constricted spaces that force workers into awkward postures.</li> <li>▶ When you can, rotate to other tasks that don't involve repetitive movement of the wrist.</li> </ul>
<b>Grouting or filling walls</b>	<ul style="list-style-type: none"> <li>▶ Wrist/arm injury</li> <li>▶ Back injury</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use a mechanical pump as a delivery system.</li> <li>▶ Use a grout scoop with comfortable handles.</li> </ul>

## Restoration workers

Tasks	What can happen (Hazards/Risks)	Potential Controls
<b>Mixing mortar</b> <ul style="list-style-type: none"> <li>▶ Lifting mortar bags below knee level               <ul style="list-style-type: none"> <li>• bags weigh approx. 32 kg (70 lb)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▶ Overexertion injuries due to manual material handling and mixing</li> <li>▶ Repetitive shoveling</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use smaller-weight bags (23 kg or 51 lb max) where suitable.</li> <li>▶ Store bags up off the ground (e.g., place pallets so that lifting occurs between knee and chest height), and lift bags close to the body.</li> </ul>

## Restoration workers *cont'd*

Tasks	What can happen (Hazards/Risks)	Potential Controls
	<ul style="list-style-type: none"> <li>▶ Twisting of lower back</li> <li>▶ Back and shoulder injuries</li> <li>▶ Chemical exposure to mortar</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use mechanical mortar mixer where suitable.</li> <li>▶ Rotate to other tasks where possible.</li> <li>▶ Wear gloves to avoid getting mortar on hands, which can lead to ingestion and skin irritation.</li> </ul>
<p><b>Grinding joints</b></p> <ul style="list-style-type: none"> <li>▶ Grinding mortar joints between masonry units           <ul style="list-style-type: none"> <li>• weight between 5 and 8 lb</li> <li>• awkward tool positions such as bending forward and reaching above head level to grind joints</li> </ul> </li> </ul> <p><b>Chipping concrete, masonry units, or joints</b></p> <ul style="list-style-type: none"> <li>▶ Removing mortar joints using electric or pneumatic chipping tools           <ul style="list-style-type: none"> <li>• exposure to hand-arm vibration and high noise from hand tools</li> <li>• awkward tool positions such as bending forward and reaching above head level to remove masonry joints</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▶ Potential hand-arm vibration syndrome due to vibration from hand tools</li> <li>▶ Musculoskeletal disorders of the shoulder and back due to static awkward postures</li> <li>▶ Hand, wrist, elbow, and shoulder injuries due to vibration</li> <li>▶ Shoulder and back strain due to reaching above shoulder level</li> <li>▶ Back injuries due to bending or twisting</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use hand tools that have           <ul style="list-style-type: none"> <li>• low vibration and weight</li> <li>• a comfortable handle that provides a good grip, (e.g., rubber or spongy-type grips)</li> <li>• appropriate-sized grips that are designed to be used by either hand</li> <li>• a neutral wrist posture</li> <li>• torque reduction and low kickback, where possible</li> <li>• a comfortable soft pad.</li> </ul> </li> <li>▶ Position work between waist height and shoulder height.</li> <li>▶ Position yourself close to the work area and centre yourself to the work area to reduce overreaching or bending at the waist.</li> <li>▶ Practice good housekeeping. Discard or pick up debris and scrap material to prevent repetitive bending, slips, trips, and falls. Keep pathways clear for carts, wheelbarrows, and dollies.</li> <li>▶ Change work position often. Working overhead or in a cramped space forces your body into an awkward posture. To relieve muscle tension and improve circulation, change body positions, alternate tasks, and take stretch breaks throughout the day.</li> <li>▶ Use elbow pads to protect your elbows from contact stress. They are useful for working in cramped spaces and when you are leaning on your elbows for long periods. Elbow pads should fit snugly, but should not compromise the circulation in your arm.</li> <li>▶ Wear proper PPE at all times (e.g., anti-vibration gloves; hearing, respiratory, and eye protection when drilling masonry materials).</li> </ul>

## Restoration workers *cont'd*

Tasks	What can happen (Hazards/Risks)	Potential Controls
		<ul style="list-style-type: none"> <li>▶ Consider using anti-vibration gloves to reduce the vibration that is transmitted to your hands and arms from tools such as grinders, needle guns, and sanders.</li> <li>▶ Teach/use low strain tool handling techniques.</li> <li>▶ Keep cutting tools sharp to reduce the force required.</li> <li>▶ Inspect tools and blades daily.</li> <li>▶ Ensure that the plug to the grinder can be easily accessed. This way, if grinder jams/kicks back, there is potential to avoid injury.</li> <li>▶ Throughout the work day, rotate tools between the left and right hand.</li> <li>▶ Wear a wide and soft knee pad or use a knee creeper for low level work.</li> <li>▶ Sit on bucket/stool, or short rolling cart for low wall work.</li> <li>▶ Adjust scaffold for reaching lower or higher walls.</li> <li>▶ Where possible, rotate tasks or rotate between different postures such as kneeling, squatting, sitting, and reaching.</li> <li>▶ Take short breaks to perform suitable stretches for wrists, shoulders, and back.</li> </ul>
<p><b>Pointing</b></p> <ul style="list-style-type: none"> <li>▶ Applying grout between stones and bricks (This task involves holding an S-shaped tool or a trowel and applying grout repetitively with light hand-arm force)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Potential knee and back injuries due to kneeling and awkward back posture. These awkward postures are due to working below standing knuckle height.</li> <li>▶ Shoulder strain due to reaching above head to point joints that are higher than shoulder level</li> </ul>	<ul style="list-style-type: none"> <li>▶ Use a hock with good handle to reduce static hand force.</li> <li>▶ If a mud pan is used to hold mortar, use an easy-hold glove under the mud pan (see page 63 in NIOSH manual <i>Simple Solutions: Ergonomics for Construction Workers</i>).</li> <li>▶ Rotate to other tasks where possible (e.g., scraping (floor/wall prep), wiping, stocking).</li> <li>▶ Use high-quality tools, with easy-to-grip handles.</li> <li>▶ When wiping, use adequate amounts of clean water and sponges. (Reduce hand force by cleaning sponges frequently.)</li> <li>▶ Throughout the workday, alternate tools (especially sponges) between between the left and right hand.</li> </ul>

## Stone setters

Tasks	What can happen (Hazards/Risks)	Potential Controls
<p><b>Installing mechanical wall stone</b></p> <ul style="list-style-type: none"> <li>▶ Lifting large pieces of stone into walls and onto stainless steel anchors</li> <li>▶ Reaching overhead to install stones and anchors</li> <li>▶ Drilling anchor and dowel holes</li> <li>▶ Applying caulking materials into dowel hole before setting stone</li> </ul>	<ul style="list-style-type: none"> <li>▶ Overexertion due to heavy manual material handling</li> <li>▶ Sprains and strains</li> <li>▶ Repetitive lifting of heavy stones</li> <li>▶ Hand-arm vibration due to working with hand tools</li> <li>▶ Forceful hand exertion while working with caulking gun, lifting materials and hand tools</li> </ul>	<ul style="list-style-type: none"> <li>▶ Plan ahead to minimize material handling.</li> <li>▶ Use mechanical lifting equipment whenever you can.</li> <li>▶ Limit worker lift capacity to 50 lb per worker.</li> <li>▶ Adjust scaffold height frequently to limit reaching below waist or above shoulders.</li> <li>▶ Where suitable, place materials for installation between knee and chest height and within arm's reach.</li> <li>▶ Get help with heavy or awkward loads.</li> <li>▶ Use proper PPE when working with manual and powered hand tools (e.g., anti-vibration gloves; hearing, respiratory, and eye protection when drilling masonry materials). Consider using anti-vibration gloves to reduce the vibration that is transmitted to your hands and arms from tools such as grinders, drills, and sanders.</li> </ul>
<p><b>Installing stone pavers</b></p> <ul style="list-style-type: none"> <li>▶ Lifting large stones into place</li> <li>• Stones may weigh up to 600 lb</li> <li>• Stones are located near the ground and will require bending forward in order to lift and position the stones into specific locations.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Overexertion due to lifting of heavy and awkward stones</li> </ul>	<ul style="list-style-type: none"> <li>▶ For large stones, get help or use mechanical lifting equipment whenever possible.</li> <li>▶ Use a vacuum or suction lift device to reduce forceful exertion.</li> <li>▶ Whenever possible, try to equally distribute the weight between workers before lifting the object. Try to lift the stones as close to your body as possible to reduce the load on your lower back.</li> <li>▶ When carrying stone, ensure that stone is at equal height and all workers are moving in unison and at the same pace. Use stone hooks or straps to carry materials.</li> <li>▶ Use proper lifting techniques (i.e., lift materials with your legs, do not bend over or lift with your back, keep the load close to your body). See the "Back Care" chapter in IHSA's <i>Construction Health and Safety Manual</i> (M029).</li> </ul>

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1-800-263-5024 | [info@ihsa.ca](mailto:info@ihsa.ca) | [www.ihsa.ca](http://www.ihsa.ca)