

Field Research Safety - Ergonomics

Simon Fraser University's field research activities vary widely and supervisors are required to adequately plan their activities and assess and mitigate risks. Some field research activities may expose researchers to multiple ergonomics risk factors. Ergonomics risk factors should be mitigated to prevent development of a musculoskeletal injury (MSI).

MSIs are caused by overuse of structures of the musculoskeletal systems such as bones, muscles, joints, tendons, ligaments and nerves. They can develop through either a single forceful exertion or repeated use of the same joint. MSIs are most prevalent in the back, shoulders, neck, elbows, wrists, hands and fingers. MSI signs can be seen (swelling/redness) and symptoms can be felt (pain/tingling/numbness).

Common Ergonomics Risk Factors

Risk Factor	Description	Examples within Field Research
Force	<p>Muscular exertion on an object as part of a task.</p> <p>If the force exerted is high, the muscle around the joints must contract forcefully and are likely to fatigue. The high forces, over time, can injure nerves or other tissues.</p>	<ul style="list-style-type: none"> • Lifting or lowering equipment • Carrying equipment for extended periods of time • Pushing or pulling carts over uneven ground • Gripping tools
Posture	<p>The position of the body and it's joints.</p> <p>Awkward posture: when the joint is outside of a comfortable range of motion and is weaker or more likely to fatigue or become injured.</p>	<ul style="list-style-type: none"> • Twisting or bending the trunk • Excessive arm reaching to the front, side, across the body or overhead, • Wrist twisting and bending • Neck bending • Laptop use or taking notes without a proper desk (i.e. sitting in a car, folding chair)
	<p>Sustained posture: holding the same position for prolonged periods of time (e.g. sitting, standing, kneeling)</p>	<ul style="list-style-type: none"> • Prolonged standing or sitting kneeling or squatting over a site • Prolonged use of a microscope
Repetition	<p>Utilization of the same muscles over and over with little chance for rest or recovery. A task that is completed more than once per minute is considered a highly repetitive task.</p>	<ul style="list-style-type: none"> • Shovelling • Pipetting • Intensive typing/mousing
Duration	<p>The longer the exposure to risk factors, the higher likelihood of developing an injury.</p>	<ul style="list-style-type: none"> • Tasks requiring multiple hours to complete
Vibration	<p>Hand Arm Vibration: at the hands, caused by a vibrating hand tool like a drill.</p>	<ul style="list-style-type: none"> • Use of power tools • Operating heavy machinery • Driving over uneven terrain or potholes
	<p>Whole Body Vibration: through the feet if standing or buttocks if sitting.</p>	
Contact Stress	<p>A hard or sharp object coming in contact with the skin.</p> <p>These contact stresses can, over time, injure the skin or cause blisters or injure the muscle, ligament or bone underneath the skin</p>	<ul style="list-style-type: none"> • Using the hand or palm as a hammer • Resting wrists or forearms on sharp edges of tables • Repetitive use of tools with non-cushioned handles
Temperature Stress	<p>The physiological impact on the body of working in extreme heat or cold conditions</p>	<ul style="list-style-type: none"> • Collecting samples during extreme weather conditions

Examples of Common Ergonomics Controls

- **Elimination/Substitution**
 - Assessing all equipment needed and determining if any is unneeded
 - Selecting lighter or more portable equipment or tools
- **Engineering**
 - Redesigns of workstations/work areas/storage areas
 - Having equipment dropped off via helicopter
 - Using mechanical aids to assist with lifting
- **Administrative**
 - Training in Safe Lifting Practices
 - Breaking up the load to reduce amount of force required
 - Setting requirements for two-person lifts based on an object's weight
 - Work planning
 - Adequate rest breaks for recovery
 - Changes to task rotation, pace, and schedules
 - Layout or location of areas where equipment is being stored
 - Requiring all objects to be labelled with their weight
- **Personal Protective Equipment**
 - Anti-vibration gloves or other materials (cushions) to dampen vibration exposure
 - Knee pads for kneeling tasks
 - Shoulder pads to cushion loads carried on the shoulder

Safe Lifting Technique & Tips

Objects can be safely lifted in a variety of manners. Below are steps for how to perform a floor to waist height lift by bending the knees (squatting) to reach the object on the ground:



Approach the box and keep a stance for balance – your feet should be shoulder width apart with one foot slightly in front of the other



Squat down by bending the hips and knees only



Secure your grip and keep the box as close and centred to the body as possible



Keep your back straight, with your chest out and look forward



In a smooth motion, lift by straightening your knees and hips and pushing into the ground

Risk Factors that Affect Lifting

- How far from the body the object is held
- How high the object is lifted
- How far the object vertically travels
- How frequently the lift is performed
- If the upper body is twisted while completing the lift
- How awkward it is to grip the object