

Risk factors and control measures (Safe systems of work).

Risk Factor	Remarks	Control measures
Task		
Static duties	Static duties are high risk for cold injury.	<ul style="list-style-type: none"> ▪ Plan exercise to intersperse static duties, for example following a static guard duty, program a movement activity. ▪ Rotate personnel out of static positions. Duty times should consider how quickly personnel are becoming cold. ▪ If possible, avoid static training in locations that are particularly damp or wet. ▪ In fighting positions, sentry points and observations points reduce risk of cold injury by placing pads, sleeping bags, tree branches, leaves etc inside these positions to allow occupants to insulate themselves from the ground or snow.
Immersion	Cold water presents its own additional risks and cooling is much more rapid in water than air.	<ul style="list-style-type: none"> ▪ Avoid immersion in cold water unless it is an approved requirement and absolutely necessary for example; ▪ If it must go ahead plan for wet-dry drills and re-warming exercise immediately afterwards. ▪ Personnel working in cold water should be watched closely while they enter the water, as sudden plunging into cold water can disrupt breathing and heart rhythm (cold shock). • Recognise that some personnel will cool faster than others, for example those who are lean.
Prolonged exposure	Assess how long personnel will be exposed for.	<ul style="list-style-type: none"> ▪ Brief rewarming periods in a heated shelter or even time spent wearing mittens may maintain manual dexterity. ▪ Plan work to avoid extended periods of inactivity e.g. awaiting transportation while personnel are outside in the cold. <p>ALWAYS be aware that safe exposure times vary for different soldiers. Whilst you may not be feeling cold others may be developing a cold injury. Allow personnel to choose their own clothing combinations based on their individual responses to cold.</p>

Cramped posture	Note increased risk of cold injury, particularly lower limb.	<ul style="list-style-type: none"> ▪ Rotate personnel, aiming to avoid periods of longer than an hour at a time in cramped posture.
Travel in open vehicles	Be aware of heightened wind chill risk.	<ul style="list-style-type: none"> ▪ Limit travel times considering the wind chill index as well as the rate at which personnel are cooling. ▪ Ensure adequate clothing and other PPE. ▪ Consider hand and foot inspections after prolonged journeys or if personnel appear to be suffering the effects of cold.
Access to shelter	Check if personnel will be able to seek shelter to avoid rain/wind/snow	<ul style="list-style-type: none"> ▪ Plan routine access to shelter where possible, and emergency shelter in all situations. ▪ Where possible plan heating/rewarming facilities. ▪ Ensure tents and other shelters have adequate ventilation to prevent the inside becoming moist/wet.
Contact with metals and liquid fuels	Check if contact with fuels or petroleum, oil, or lubricants (POL) is anticipated.	<ul style="list-style-type: none"> ▪ Always wear contact gloves as a barrier between hand and metal, and recommended gloves when handling fuels and POL products to avoid splashing on exposed skin. ▪ Remind personnel that rifle butts and sights can cause cold injury (FCI) to face and nose when sighting and firing weapons. Tape on areas of contact will reduce the risk of contact cold injury (FCI).
Camouflage cream	If ambient temperature below 0°C	<ul style="list-style-type: none"> ▪ Consider not using skin camouflage if cold injury (FCI) is a risk because skin camouflage obscures detection of cold injuries.
Safe People		
Inexperience	Take particular note of new entrants.	<ul style="list-style-type: none"> ▪ Plan classroom training followed by closely supervised training in cold weather conditions. ▪ Gradually increase exposure and training time in the cold to give new entrants confidence and ability to recognise potential areas of risk early enough to employ countermeasures. ▪ Establish buddy system.
Race	Take note of personnel under your command who are of African or Caribbean race.	<ul style="list-style-type: none"> ▪ Check status more frequently (this can be verbal check that they are keeping warm). ▪ Adhere to hand and foot inspection routines.

Sex	Take note of female personnel under your command.	<ul style="list-style-type: none"> ▪ Check status more frequently as for race. ▪ Adhere to hand and foot inspection routines.
Medical conditions and medications.	Involve the unit medical personnel such as the Unit Medical Officer (UMO) in risk assessment and management at an early stage.	<ul style="list-style-type: none"> ▪ Exclude any acutely unwell personnel from the activity. ▪ Identify unit personnel at heightened risk of cold injury due to individual risk factors and make personal risk reduction plans. ▪ Identify unit personnel who have previously experienced cold injury (FCI/NFCI). These personnel should receive intensive retraining in cold injury prevention, ▪ Identify unit personnel who are recovering from a cold injury (FCI/NFCI). These personnel should be checked regularly (verbal check-ins and hand and foot inspection routines) and always have access to rewarming within an hour of developing adverse symptoms. ▪ Adhere to JMES restrictions and medical limitations. ▪ There should be strict adherence to hand and foot inspection routines.
Alcohol		<ul style="list-style-type: none"> ▪ Direct that no alcohol is consumed for 24 hours prior to cold deployment.
Safe Equipment:		
Keep it	Clean	- dirty clothing tends to be packed down which compromises insulation.
Avoid	Overheating	- adjust layers to avoid overheating and sweating.
Wear it	Loose	- loose, layered clothing traps air and provides good insulation.
Keep it	Dry	- wet clothing leads to rapid heat loss.
Boots		<ul style="list-style-type: none"> ▪ Check boots are not too tight, loosen after a short period of exercise to allow for foot swelling. Boots should feel snug, but without pressure points and with room to wiggle the toes. ▪ Do not allow personnel to sleep in boots. ▪ At rest, place boots inside shelter to dry; do not place in sleeping bag as they will accumulate additional moisture. ▪ Dry insoles or boot liners separately. ▪ Do not allow boots to freeze.

		<ul style="list-style-type: none"> ▪ Be aware that vapour barrier boots such as Goretex™ boots may cause feet to sweat more and lead to earlier cooling. ▪ Encourage/mandate use of gaiters. They improve protection from cold by adding another layer, and by preventing socks and boots from getting wet, helping to keep feet warmer and drier.
Socks		<ul style="list-style-type: none"> ▪ Change socks as soon as possible if they become wet. • Waterproof socks are effective in preventing feet from becoming wet in wet boots and maintain warmer feet by reducing evaporative heat loss. However, if worn continuously, feet tend to sweat thus raising the risk of cold injury as well as blisters and infection.
Gloves		<ul style="list-style-type: none"> ▪ Exposed skin, tight or wet gloves all result in hands cooling more quickly. ▪ Mittens provide greater protection from cold, however this protection must be weighed against the significant decline in manual dexterity that occurs with mitten use. ▪ Advise personnel not to blow warm breath into mittens or gloves; the moisture in breath can dampen skin and gloves and cause hands to cool more rapidly. • Ensure personnel have adequate spare gloves/mittens.
Equipment		<ul style="list-style-type: none"> ▪ Glasses, goggles, and eyepieces fog over easily when warm moist breath passes over them or when the wearer comes in from cold to warmed areas. If this condensation freezes, it is difficult to remove and may cause cold damage to skin. ▪ In bright conditions, particularly when there is glare from snow or ice, emphasise the importance of sunglasses (category 3 or 4 lenses for adequate protection).
Sleeping systems		<ul style="list-style-type: none"> ▪ Use bivy cover as protection from wind and rain. ▪ Use branches or similar to improve insulation from the ground. ▪ Regularly air sleeping bags to avoid moisture collecting. ▪ Shake out the sleeping bag before use to add air and improve insulation.

		<ul style="list-style-type: none"> ▪ Advise personnel not to put their head inside the sleeping bag, since moisture from breath will accumulate in the bag, reducing insulation. ▪ Place clothing under the sleeping bag (between the bag and sleeping mat) to dry where it can add insulation without further moisture accumulation that would occur were it placed in the bag.
Safe Processes	Behavioural / Psychological	
<p>Commanders must understand any residual risk and decide whether the objectives of the activity justify that risk. If the residual risk cannot be justified or is unacceptably high the activity is not to proceed.</p>		
Leadership	Develop leadership skills.	<ul style="list-style-type: none"> ▪ A Commander must be nominated to command or supervise any activity where the risk of cold injury exists. ▪ Commanders should be alert to the effects of cold on attitude and morale. ▪ The appointed Commander must be visible and known to all taking part. ▪ Be alert to any signs of cold injury ▪ Ensure a medical support plan is in place, including a means of rewarming and monitoring patients. In the field this may be a heated tent or vehicle, but there should be the wherewithal to evacuate personnel if this proves insufficient. • Ensure personnel are comfortable about reporting any potential problem and that there will be no negative consequences from reporting.
Adequate planning is key to ensuring a successful activity.		<p>Planning:</p> <ul style="list-style-type: none"> ▪ Plan appropriate scaling of kit. ▪ Check all personnel have been issued with correct clothing, footwear and sleeping systems. ▪ Plan periods for wet-dry drills. ▪ Train on the proper use of cold weather clothing, remembering the acronym: C-O-L-D (Safe Equipment)
Inadequate clothing or inappropriately worn clothing.	Clothing, footwear and sleeping systems are critical in cold air deployments.	<p>General principles:</p> <ul style="list-style-type: none"> • LAYERING. Multiple clothing layers allows air to be trapped and serve as insulation, whilst also allowing the individual to adjust clothing layers according to environmental conditions and activity level, thereby reducing sweating and moisture build up within clothing.

	<p>Specialist waterproof immersion suits, additional undergarment insulation and lifejackets may be necessary for cold water-based activities.</p>	<ul style="list-style-type: none"> ▪ Any skin left uncovered cools more quickly. ▪ Remind personnel to put on hat, gloves, layers before they cool, and to remove them before they overheat and sweat. Hats are particularly important in preventing cooling, as they can substantially reduce heat loss and are an easy layer to add or remove. ▪ WATER-PROOFING. Wet clothing offers less insulation as air is displaced within and between layers, as well as heat being drawn away from the body more quickly. ▪ WIND-PROOFING. If wind is able to penetrate clothing layers heat is lost more rapidly. ▪ CONSTRICTIVE CLOTHING. Clothing insulation is diminished by anything that reduces the volume of trapped air, thus tight clothing results in lower insulation value. ▪ COLD WATER. Wear suitable PPE, enter the water slowly to avoid cold shock (loss of control of breathing – lasts about 1 minute), remember that physical performance can be compromised within 10 minutes of entering cold water. ▪ MAINTENANCE OF CLOTHING. Make sure kit is cared for in accordance with manufacturer’s instructions and replaced if function has deteriorated.
<p>Inadequate training</p>	<p>Train before the event.</p>	<ul style="list-style-type: none"> ▪ All personnel must have completed relevant annual training on cold weather injury. ▪ All commanders must be conversant with use of the NFCI Field Assessment Tool (NFAT). • All personnel must have been issued with commander’s and Individual’s guides to cold injury. ▪ A pre-deployment brief must take place summarising cold weather risks and controls. ▪ Establish buddy systems.
<p>Calories</p>	<p>Plan logistics of food supply.</p>	<ul style="list-style-type: none"> ▪ The MOD Nutrition Policy Statement (detailed in JSP 456 - Defence Catering Manual) commits all catering staff to provide a catering service based on sound nutritional principles reflecting current UK government advice and to support the rigorous physical fitness requirements of an expeditionary Armed Forces Policy. <ul style="list-style-type: none"> ▪ With the requirements and advice of JSP 456 being satisfactorily met, there is nothing identifiable over and above this, as a control measure.

		<ul style="list-style-type: none"> ▪ Encourage regular meals and snacking and plan breaks to allow this.
Safe Place	Environmental	
Ambient air and water temperature and conditions	Obtain regular real-time, local weather data and forecasts.	<ul style="list-style-type: none"> ▪ Consider cancelling or postponing the activity if weather is extreme. ▪ Consider training in warmer or more sheltered conditions if there is a high risk of personnel becoming so cold, they cannot keep warm. ▪ Be aware that weather may vary greatly according to local topography. ▪ Know the water temperature and consequences of any bodies of water that must be entered. • Recognise changes in weather and dynamically assess risk, modifying controls as necessary to reduce cold exposure and susceptibility to cold injury throughout an activity.
Wind chill	<p>Consider predicted wind chill.</p> <p>Determine local wind chill temperature using index table (see below)</p> <p>Remember other causes of wind chill: running, skiing, propellers, open vehicle travel (e.g., snowmobile, dog sled) etc.</p>	<ul style="list-style-type: none"> ▪ Provide guidance to personnel on adjusting physical training and clothing according to the wind chill category and work intensity. ▪ Check shelter availability. ▪ Plan for increased cooling of personnel on open ground or ridge lines and reduced effect in tree line.
Wetness	Be aware of any rain/snow expected	<ul style="list-style-type: none"> ▪ Wear waterproof layer in anticipation of precipitation, do not wait until personnel are wet. ▪ Beware overheating when wearing waterproof layers, sweating will increase heat loss.
Altitude	Be aware of differences in weather effects at altitude	<ul style="list-style-type: none"> ▪ Check weather measurements are obtained for altitude and not low elevations. ▪ If a low elevation reading adjust temperature, windchill to determine risk.