LEIA Safety Information Sheet
Winter Working

Prepared by the LEIA Safety and Environment Committee

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WINTER WORKING

Preamble

This Information Sheet is one of a series produced by LEIA Safety and Environment Committee on topics relevant to the Lift and Escalator Industry. Whilst every effort has been taken in the production of these sheets, it must be acknowledged that they should be read in conjunction with the relevant legislation, codes of practice etc. They should not be taken as an authoritative interpretation of the law but guidance to it.

Introduction

Winter working in the lift and escalator industry encompasses many facets of the duty of care due to employees by their employer. The HSE does not have specific guidance for working in temperatures below 13°C, so much of the physiological advice here is taken from US and Canadian sources.

Uncomfortably cold working conditions can lead to lower work efficiency and higher accident rates. Cold impairs the performance of complex mental tasks. Manual tasks are also impaired because the sensitivity and dexterity of fingers are reduced in the cold. At even lower temperatures, the cold affects the deeper muscles resulting in reduced muscular strength and stiffened joints. Mental alertness is reduced due to cold-related discomfort. For all these reasons accidents are more likely to occur in very cold working conditions.

Cold causes skin to stick to metal especially with wet hands; it causes cold burns and cold exacerbates musculo-skeletal disorders, hand-arm vibration syndrome and vibration white finger.

Cold causes atmospheric effects including problems with radio transmission. Cold makes plastic brittle and difficult to work with.

Conditions are more slippery underfoot as trees lose leaves and icy patches appear on roads and footways and other walking routes.

Consider employees working in the shaft indoors: ventilation may mean they will be colder than if working in any other part of the building, and night work will be colder still.

Cold can have a deleterious effect on certain populations:

- Ageing employees are less agile and more susceptible to the effects of low sun in the morning and evening. Males make up 20% of the population with osteoporosis causing bone loss and bone breakages. Cold will exacerbate the need for toilet breaks with a consequent need to keep fluid intake up.
- Employees with an hormonal imbalance (eg menopause or hypo/ hyperthyroidism) can be adversely affected.

Driving conditions can be variable over the course of one day or night.

COLD EFFECTS

The Law

Temperatures in the indoor workplace are covered by the Workplace (Health, Safety and Welfare) Regulations 1992 (W(HS&W)R). Construction sites are covered under the Construction (Design and Management) Regulations 2015 (CDM). Both sets of regulations require employers to ensure a reasonable temperature in the workplace (see Appendix A).

Case law also applies, with a precedent set in 1967, that the employer must provide necessary equipment to protect employees from cold (see Appendix B).

Workplaces

The requirements of the W(HS&W)R apply to all workplaces except construction sites and offshore facilities. This does not state a minimum or maximum temperature, but requires that the temperature in all workplaces shall be reasonable. It doesn't say what reasonable is, nor is it given in the ACoP.

HSE document L24, ACoP and guidance to the W(HS&W)R does say that temperature in workrooms should normally be at least:

- 16°C or
- 13°C if much of the work involves rigorous physical effort

Outdoor working

Outdoor workstations (ie any outdoor working place which is not a construction site) must be protected from adverse weather, but there is no temperature limit applied, except as defined in Paragraph 3(2) of W(HS&W)R for temporary work sites:

'In their application to temporary work sites, any requirement to ensure a workplace complies with any of regulations 20 to 25 shall have effect as a requirement to so ensure so far as is reasonably practicable.'

This applies to:

Sanitary conveniences	Accommodation for clothing
Washing facilities	Facilities for changing clothing
Drinking water	Facilities for rest and to eat meals

When working outdoors the effects of the weather in the UK environment can potentially have a serious impact on an employee's health if the risks have not been considered or properly managed. This impact may be immediate or it may occur over a long time period. Management using just engineering controls (ie local heating) is not easily achieved. In these circumstances some of the most effective ways of managing these environments are to introduce some simple administrative controls for example:

- Ensure the PPE issued is appropriate and efficient: coat, gloves, hat, hoods, thermal underwear, socks, boots waterproofs
- Provide mobile facilities for warming up, and encourage the drinking of warm fluids such as soup or hot drinks. Identify cafes/ refuges for breaks
- Introduce more frequent rest breaks
- Check weather forecasts or subscribe to a more detailed forecasting service to determine an appropriate working period. Consider delaying the work – can it be undertaken at warmer times of the year without compromising on safety?
- Educate workers about recognising the early symptoms of cold stress
- Health assessment to ensure no underlying health problems
- Offer 'flu jabs, vitamin D supplements, but beware insisting upon them.

Cold Environments - General

Working in cold environments can be not only hazardous to health but also life threatening. It is critical that the body is able to preserve its core temperature at around 37°C to preserve normal body functioning and provide energy for activity.

Body heat losses:

Radiation

Radiation is the loss of heat to the environment due to the difference in temperature of the air and the temperature of the body. Loss is affected by the amount of body surface area exposed to the air.

Conduction

Conduction is the loss of heat through direct contact with a cooler object. Heat loss is greatest if the body is in direct contact with cold objects. The body can lose 25 to 30 times more heat when in contact with cold wet objects than in dry conditions or with dry clothing. Generally, conductive heat loss accounts for only about 2% of overall loss. However, with wet clothes the loss is increased 5-fold.

Convection

Convection is the loss of heat from the body to the surrounding air as the air moves across the surface of the body. The rate of heat loss from the skin by contact with cold air depends on the air speed and the temperature difference between the skin and the surrounding air. Heat loss increases with wind speeds up to about 50mph; beyond that, losses do not increase.

Evaporation

Evaporation is the loss of heat due to the conversion of water from a liquid to a gas. In terms of human physiology.

- Perspiration/ Sweating - evaporation of water to remove excess heat.
- 'Insensible' Perspiration – the body sweats to maintain a humidity level of 70% next to the skin. In a cold, dry environment, you can lose a great deal of moisture this way and not notice that you have been sweating.
- Respiration - air is heated as it enters the lungs and is exhaled with an extremely high moisture content.

It is important to recognize the strong connection between fluid levels, fluid loss, and heat loss. As body moisture is lost through the various processes, the overall circulating volume is reduced which can lead to dehydration. This decrease in fluid level makes the body more susceptible to hypothermia and other cold injuries.

Cold & Hypothermia Effects

Cooling of body parts may result in various cold injuries – non-freezing injuries and freezing injuries. Non-freezing injuries include chilblains, immersion foot and Trench foot. Frostnip and frostbite are freezing injuries and hypothermia, being the most serious.

Non-freezing Injuries

Chilblains are a mild cold injury caused by prolonged and repeated exposure for several hours to air temperatures from freezing to as high as 16°C. In the affected skin area there will be redness, swelling, tingling, and pain. Immersion foot and Trench foot require prolonged exposure to damp or wet conditions over several days and are thus rare.

Freezing Injuries

Frostnip is the mildest form of a freezing injury. It occurs when ear lobes, noses, cheeks, fingers, or toes are exposed to the cold and the top layers of a skin freeze. The skin of the affected area turns white and it may feel numb. The top layer of skin feels hard but the deeper tissue still feels normal. Frostbite is an injury caused by exposure to extreme cold or by contact with extremely cold objects (especially those made of metal). It may also occur in normal temperatures from contact with cooled or compressed gases. Frostbite occurs when tissue temperature falls below freezing, or when blood flow is obstructed. Blood vessels may be severely and permanently damaged, and blood circulation may stop in the affected tissue. In mild cases, the symptoms include inflammation of the skin in

patches accompanied by slight pain. In severe cases, there could be tissue damage without pain, or there could be burning or prickling sensations resulting in blisters. Frostbitten skin is highly susceptible to infection, and gangrene (local death of soft tissues due to loss of blood supply) may develop.

Toes, fingers, ears and nose are at greatest risk because these areas do not have major muscles to produce heat. In addition, the body will preserve heat by favouring the internal organs and thus reducing the flow of blood to the extremities under cold conditions. Hands and feet tend to get cold more quickly than the torso because they lose heat more rapidly since they have a higher surface area-to-volume ratio, and they are more likely to be in contact with colder surfaces than other parts of the body.

Hypothermia is the most severe cold injury occurring from excessive loss of body heat and the consequent lowering of the inner core temperature. Hypothermia can be fatal.

How to Produce and Retain Heat within the Body

Factors important for heat production include:

- Food intake.
- Fluid balance.
- Physical activity.
- Shivering is a reflex reaction, which increases the body's heat production when necessary.

Heat retention and tolerance to cold also depends on the body's structure, certain reflex and behavioural mechanisms that retain heat within the body as well as what is worn:

- Size and shape of the body (surface to volume ratio).
- Layer of fat under the skin (Subcutaneous adipose tissue).
- Decrease of the blood flow through the skin and outer parts of the body.
- Insulation (layering and type of clothing).

Individual Response to Cold

Response in Men and Women

Studies have shown that response to cold in women can differ from that of men. While the core body temperature cools more slowly in women, women are not usually able to create as much metabolic heat through exercise or shivering. In addition, the rate of cooling of the extremities (feet, hands) is faster among women. As a result, women are generally at a greater risk of cold injury.

Predisposing Conditions

In general, people in good physical health are less susceptible to cold injury. While anyone working in a cold environment may be at risk, those with the following conditions may make the risk of cold injury greater:

- Age (older adults are more susceptible).
- Diseases of the blood circulation system.
- Injuries resulting in blood loss or altered blood flow.
- Previous non-freezing or freezing injury.
- Raynaud's Disease
- Fatigue.
- Consumption of alcohol or smoking.
- Use of certain drugs or medication.

A health assessment may indicate these conditions.

Cold Stress

HSE advise reference to the British Standards listed below.

You will likely be complying with the law if you work in accordance with British/European Standards but you can demonstrate compliance by alternative means.

The standards listed are not an exhaustive list but provide a framework around which you can develop your risk assessment and start managing the problem. You may need to refer to other standards listed elsewhere, dependant on your operational circumstances.

British standards for assessing cold stress in the workplace

- BS EN 511: Protective gloves against cold
- BS EN ISO 13732-3: Ergonomics of the thermal environment. Methods for the assessment of human responses to contact with surfaces
- BS 7915: Ergonomics of the thermal environment. Guide to design and evaluation of working practices in cold indoor environments
- DD ENV SO 11079: Evaluation of cold environments. Determination of required clothing insulation (IREQ)
- BS EN SO 15743: Ergonomics of the thermal environment. Cold workplaces. Risk assessment and management

WINTER DRIVING

Winter Driving - Vehicle Preparation

Start to plan for the really bad weather and arrange to prepare your vehicles:

Set up a pre-winter check list for the car battery, bulbs, wiper blades and electrics. Get them tested or replaced as a precaution.

Check tyres. 1.6mm may be the legal limit but anything under 3mm will see a reduction in grip and braking performance. If your vehicles are regularly used in extreme adverse weather, consider a set of winter tyres. Don't follow the urban myth of reducing the tyre pressure to get more grip: it doesn't work.

Try to get windscreen scratches, abrasions and chips fixed as colder temperatures can worsen the damage. Top up the windscreen washer with a more concentrated screen wash mix to ensure it doesn't freeze.

Check forecasts and plan for really bad weather. A survival kit in the boot can make a difference. Spare clothes, a torch, a mobile phone charger, emergency rations such as water and chocolate and a tow rope and shovel to help yourself and others.

Advise drivers to dress appropriately for the weather. Too many drivers dress based on the assumption they will always have a working car heater. If it breaks or they are stranded they can easily be caught out.

The freezing point of petrol is around -60C, but oil is around -40C, and other lubricants can thicken at less than that. Diesel normally clogs at much warmer temperatures – around -10C – unless it has special additives to enable it to remain viscous in cold temperatures.

Winter Driving – Driving Action

Consider giving drivers training in winter driving skills. In rain, snow and ice, drivers should adjust their driving to cope with the different environments. Journeys should be made only if it's absolutely necessary. Staff should not be afraid of reprisals if they are obliged to turn back or cut short a drive.

Ice is one of the most hazardous of all driving conditions. Black ice is particularly treacherous because it is transparent and harder to spot compared to snow, frozen slush or thicker white ice.

For winter driving tips see Appendix C.

REFERENCES AND FURTHER INFORMATION:

L24, Workplace health, safety and welfare; Workplace (Health, Safety and Welfare) Regulations 1992. Approved Code of Practice and guidance 2013
http://www.hse.gov.uk/pubns/books/l24.htm

L153 Managing health and safety in construction; Construction (Design and Management) Regulations 2015. Guidance on Regulations 2015
http://www.hse.gov.uk/pubns/books/l153.htm

US Occupational Safety & Health Administration - coldcard
https://www.osha.gov/Publications/OSHA3156.pdf

Canadian Centre for Occupational Health and Safety – Temperature Conditions: Cold
http://www.ccohs.ca/oshanswers/phys_agents/hot_cold.html

RoSPA Road Safety Factsheet – Winter Driving Tips
https://www.rospa.com/rospaweb/docs/advice-services/road-safety/drivers/winter-driving-tips.pdf

APPENDIX A Legislation Extracts

The Construction (Design and Management) Regulations 2015:

PART 4
General requirements for all construction sites
Temperature and weather protection

34. (1) Suitable and sufficient steps must be taken to ensure, so far as is reasonably practicable, that during working hours the temperature at a construction site that is indoors is reasonable having regard to the purpose for which that place is used.
(2) Where necessary to ensure the health or safety of persons at work on a construction site that is outdoors, the construction site must, so far as is reasonably practicable, be arranged to provide protection from adverse weather, having regard to—
(a) the purpose for which the site is used; and
(b) any protective clothing or work equipment provided for the use of any person at work there.

SCHEDULE 2
Facilities for rest

5. (1) Suitable and sufficient rest rooms or rest areas must be provided or made available at readily accessible places.
(2) Rest rooms and rest areas must—
(e) be maintained at an appropriate temperature.

The Workplace (Health, Safety and Welfare) Regulations 1992

Application of these Regulations
3. (1) These Regulations apply to every workplace but shall not apply to—
(2) In their application to temporary work sites, any requirement to ensure a workplace complies with any of regulations 20 to 25 shall have effect as a requirement to so ensure so far as is reasonably practicable.

Temperature in indoor workplaces
7. (1) During working hours, the temperature in all workplaces inside buildings shall be reasonable.
(2) A method of heating or cooling shall not be used which results in the escape into a workplace of fumes, gas or vapour of such character and to such extent that they are likely to be injurious or offensive to any person.
(3) A sufficient number of thermometers shall be provided to enable persons at work to determine the temperature in any workplace inside a building.

Workstations and seating
11. (1) Every workstation shall be so arranged that it is suitable both for any person at work in the workplace who is likely to work at that workstation and for any work of the undertaking which is likely to be done there.
(2) Without prejudice to the generality of paragraph (1), every workstation outdoors shall be so arranged that—
(a) so far as is reasonably practicable, it provides protection from adverse weather;

APPENDIX B Case Law – Bradford v Robinson Rentals Ltd (1967)

This civil law case related to the employer's duty to provide equipment adequate for the degree of risk posed by a particular work activity.

Mr Bradford was a radio service engineer who worked for Robinson Rentals. He was sent out to exchange an old van for a new vehicle; this required a 720km round trip. But on the day in question, traffic reports on the radio highlighted bad weather and motoring organisations were advising drivers only to make journeys that were absolutely necessary.

As neither of the vans had a heater, Bradford asked his employers to postpone the journey until weather conditions improved. They refused and he was told to make the trip. Due to the severe cold, he suffered frostbite and subsequently claimed damages against the company.

Though frostbite is extremely rare in the UK, the court decided that some injury was foreseeable due to the extreme cold of the 1966 winter. The employer had been informed of the adverse weather conditions and was aware that the vans had no heaters.

The court held that the employer was in breach of its duty to provide necessary equipment - van heaters or cold weather protective equipment - and should have either ensured its employee was protected against the cold or should not have sent him out into an adverse working environment. Bradford was successful in his claim and was awarded damages.

APPENDIX C - SAFE DRIVING TIPS

Some tips for driving in rain, snow and ice:

Take it slow – with stopping distances 10 times greater, gentle manoeuvres are the key to safe winter driving.

Pull away in second gear, easing your foot off the clutch gently to avoid wheel-spin.

When driving uphill, leave plenty of room or wait until it's clear so you don't have to stop part way up. Keep a constant speed and try to avoid having to change gear on the hill.

When driving downhill, slow down before the hill, use a low gear and try to avoid braking. Leave as much room as you can to the car in front.

If you have to use your brakes, apply them gently.

If you drive an automatic, check the handbook – some have a winter mode or recommend selecting '2' in slippery conditions.

If you do get stuck, straighten the steering and clear the snow from the wheels. Put a sack or old rug in front of the driving wheels to give the tyres some grip.

For more details see the RoSPA Road Safety Factsheet – Winter Driving Tips

https://www.rospa.com/rospaweb/docs/advice-services/road-safety/drivers/winter-driving-tips.pdf