

The Delivery Hub health, safety and environment
Raising the bar 14
Slip; trip; fall

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Objective

The objective of this document is to prevent accident, injury damage or loss as a consequence of a slip, trip or fall whilst working on infrastructure managed by Highways England

Background

For highway industry employees, injuries resulting from a slip, trip and fall are the most common. Slip, trip and fall related injuries often result in major injury and potentially have the greatest overall impact on workplace efficiency.

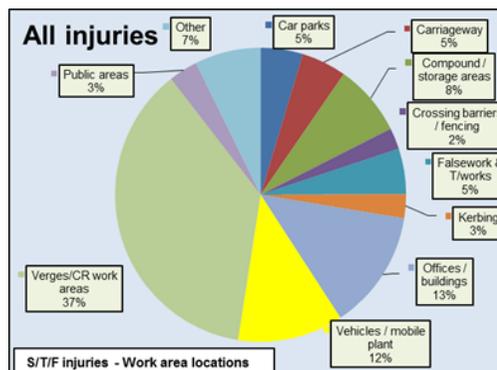
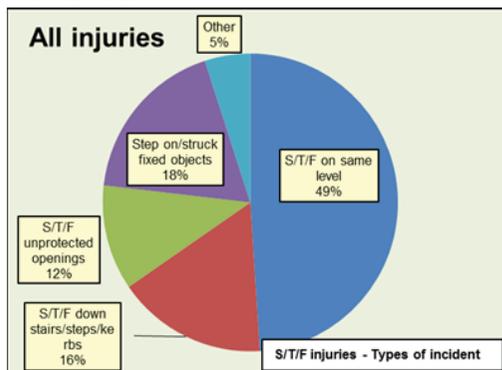
Slip trip fall injuries

To understand the magnitude of the problem a review of injury incidents reported to AIRSweb between April 2012 to January 2015 was undertaken. The analysis discovered that there wasn't a single causal factor but a selection of common risk factors as identified below. In most cases if the projects simply applied the statutory requirements or if the individual concerned applied greater awareness to the potential hazards then these injuries would not have occurred.

Many slip, trip and fall injuries occur due to dangerous conditions being created on site. Everyone has a duty of reasonable care to identify the existence of dangerous or unsafe conditions therefore there must be a collective responsibility to remove the hazard and report for preventative action.

Inadequate housekeeping, maintenance and site inspection procedures are also major contributing factors to most slip, trip and fall injuries.

Summary details of slip, trip and fall (S/T/F) injuries, by incident type and work area location are shown in chart format (see right). This chart information was compiled using AIRSweb entries for 341 injuries, 121 on Major Project (MP) and 220 on Network Delivery and Development (NDD) schemes during the period referred to above.



Common risk factors

There are many causes and contributing factors in slip, trip and fall accidents on a construction site. Understanding these causes and challenges will help develop effective mitigation strategies to address losses. These risk factors include:

Hazards	Solutions
Spillage of wet and dry substances	Clean spills up immediately. If a liquid is greasy ensure a suitable cleaning agent is used. Remember to put out a sign.
Trailing cables	Position equipment to avoid cables crossing pedestrian routes, use cable covers to securely fix to surfaces, restrict access to prevent contact.
Poor housekeeping / loose debris	Keep areas clean and tidy, remove waste, debris and litter as you go
Rugs/mats	Ensure mats are securely fixed and do not have curling edges.
Slippery surfaces, including ice and snow	Assess the cause and treat accordingly, for example appropriate cleaning method etc.
Change from wet to dry floor surface	Suitable footwear; warn of risks by using signs; locate doormats where these changes are likely.
Poor or no lighting	Improve lighting, add apparent tread nosing's, and provide portable stairs / ramps
Changes of level	Improve lighting, add apparent tread nosings, provide portable stairs ramps.
Slopes	Improve visibility, provide hand rails, use floor markings.
Unsuitable footwear	Ensure workers choose suitable footwear, particularly with the correct type of sole.
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Minimum

The minimum requirement to achieve current best practice is to implement a process to systematically reduce the risks associated with slip, trip and fall incidents. A good example of this is to follow the plan, organise, control and monitor model ([Appendix 1](#)):

Plan

- Plan works to design out the hazards and identify key areas of risk and set goals for improvement.

Organise

- Organise the work area to eliminate hazards that currently exist.

Control

- Where slip trip and falls cannot be avoided control measures must be introduced to reduce the hazard to a low level.

Monitor and review

- Re-examine your approach in the light of experience. Look at accident investigation and inspection reports to show improvement.

To assist site teams, the following are ideas to consider for prevention and mitigation of slip, trip and fall losses on a worksite. This is not a comprehensive list of ideas but just a starting point to help you develop mitigation controls for your own worksite. Since each project is different and site conditions change daily, consider and anticipate a variety of exposures during the life of a project. However the expectation is that all the guidance contained within should be considered as minimum requirements.

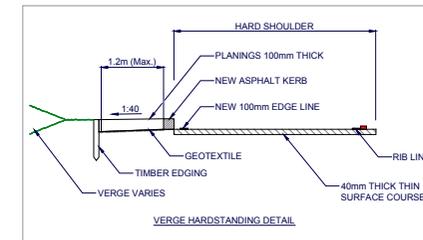
Plan

Planning of works

By designing out the risks to a reasonable level in the early stages of any project significantly reduces the hazards associated with slip, trip and falls. The first and foremost consideration must be given to walkways and all access and egress routes to and from, in and around the sites. The work area flooring itself must, where reasonably practicable, be of a condition that minimises the risk of slip, trip and falls whilst the worker is carrying out their duty. A memorable assessment of whether the walkway is to a good standard is if you can ask yourself the question 'could a pram

be pushed along it'. It is accepted that, given the scope of our work, to achieve this we will inevitably have to work in hazardous conditions but through effective planning at design stage we can mitigate this.

A good example of this is where one of our maintenance contracts is trialling the provision of verge hard standing areas using recycled planings from carriageway renewal schemes. This initiative not only provides a safe walkway for highway workers and traffic officers but also safe refuge areas for members of the public who have broken down and need to walk along the verge to an emergency telephone.



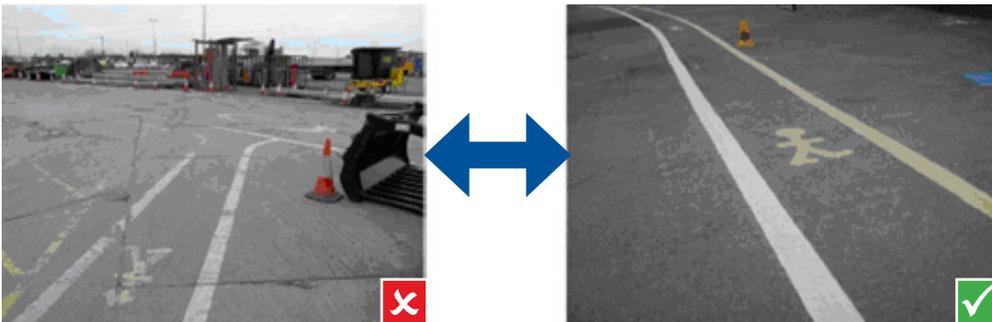
Further suggestions to consider at planning stage

- On new sites, before laying paths / walkways, think about how pedestrians are likely to move around the site.
- Putting the path in the right place from the start may save money in the long term.
- Reduce the exposure to slip, trip and fall hazards by minimising the distance between the welfare and the work area
- An appropriate cleaning regime
- It is important a process is in place to ensure all areas are assessed for the appropriate winter maintenance provision before the workforce arrive.
- Include subcontractor housekeeping requirements in the contract and enforce
- Designate waste collection / material storage points clear of walkways and work areas
- Require frequent waste / scrap removal
- Consider that traffic officers may need to work near to the site boundaries when dealing with incidents on the highway.

Organising the workplace

A really good and effective system to plan and organise the work area is to apply lean techniques and in particular the '5S' principles of sort, simplify (set), sweep, standardise and sustain. Using the '5S' approach will not only bring an order to a cluttered or badly laid out office or depot but will also allow you to save money and become more efficient.

Examples of the 5S approach in practice



- Discourage people from taking shortcuts over grass or unmade ground which are likely to become slippery when wet. Consider converting existing shortcuts into proper paths.
- Many slip accidents happen at building entrances as people entering the building walk in rainwater. Fitting canopies of a good size over building entrances and in the right position can help to prevent this.
- If a canopy is not a possibility, consider installing large, absorbent mats or even changing the entrance flooring to one which is non-slip.
- Fix leaking machines
- Change the system of work
- Strategically placed grit bins
- Clearly demarcated walkways

Control

Controls

Highway industry, slip, trip and fall exposures are among the easiest to spot yet most difficult to control. However, this awareness is only part of the equation, because it seems both the management and the workforce has accepted those exposures as trivial and part of the job for many years. Eliminating slip, trip, fall exposures requires a paradigm shift within the industry that no longer accepts these exposures as part of the job. A more systematic strategy can help prevent and control these types of incidents.

Since slip, trip and fall accidents affect all employees on a site; raising awareness of the impact of incidents and involving employees in worksite assessment is considered an effective strategy. To raise the awareness the focus on slip, trip and falls should form part of every risk assessment, daily briefing and employee consultation process.

People or human factors / behaviour

How people act and behave in their work environments can affect slips and trips.

Individual behaviour

- A positive attitude toward health and safety, a 'don't walk by' mentality can reduce the risk of slip and trips accidents e.g. dealing with a spillage, instead of waiting for someone else to deal with it.
- Reinforce this message by the use of company posters, toolbox talks, e-learning
- What footwear is worn and how it is worn can also make a difference eg wearing worn soled boots at work will make you more vulnerable to a slip or not lacing your boots up all the way to the top to give you maximum ankle support.
- Things that prevent you from seeing or thinking about where you are going, can also increase the risk of an accident such as rushing about; carrying large objects; becoming distracted whilst walking for example using a mobile phone.
- A collective responsibility needs to be enforced eg excavator drivers should be expected to not just dig a hole in the ground. The surrounding work area should be flat and level where ever possible and the excavator driver must ensure that any spoil excavated from the ground does not create a walking hazard.

For further advice on improving behaviours please see [behavioural based safety raising the bar guidance document](#)

Physical attributes

If individuals have a physical problem that stop them from seeing, hearing, or walking in a regular manner it can increase the likelihood of an accident eg vision, balance, weight, age, disability and any pre-existing conditions should be managed in accordance with the [occupational health raising the bar guidance document](#)

Slippery surface controls

Most floors only become slippery once they become contaminated. Prevent

contamination and you reduce or even eliminate the slip risk. Contamination can be classed as anything that ends up on a floor such as rainwater, oil, grease, cardboard, product wrapping, dust etc the list is endless. It can be a by-product of a work process or be due to adverse weather conditions. Firstly try to eliminate any contamination problems eg fix the leaking tap, provide drainage to stop rain water pooling and ice forming etc. If you can't eliminate the problem, then can the contamination be controlled for example provide drip trays for leaks, have good sized mats at building entrances, ensure bunding is inspected and maintained. If you can't stop contamination from getting onto a floor you will need to ensure that it is cleaned effectively and quickly, fence effected areas where possible or assign work in alternate areas until the water / liquid can be removed. Be prepared for spill remediation by placing spill kits, mops etc close by.



This photo shows a storage area with a pool of rain water being allowed to develop. Not only is it a hazard in its own right, think about freezing temperatures!

Change in level controls

In every form of construction there has to be an element of deconstruction or temporary works. In most cases this creates a change in level to the working environment. Large changes in level such as deep excavations are usually planned and assessed at design stage but smaller works have usually less forethought and as a result do not consider the risks associated in change of level. By providing the gangs with portable steps or gangplanks will ensure gangs will have suitable means of negotiating all changes in level.



This photo shows the use of a portable ramp system used in a change of level

Housekeeping controls

A high percentage of all trip injuries are caused by poor housekeeping. Carry out visual inspections and complete a point of work risk assessment before starting work and after every break or change of duty. Good housekeeping doesn't cost money; it just takes a little personal effort. All staff; workers; managers; supervisors; directors and operatives should not ignore and have a see it, sort it attitude regardless of who created the obstacle.



Example of poor housekeeping on site

Another effective proactive solution is to divide up the work area such that every square metre is accounted for, including the compound area and offices and assign each defined space to an individual to monitor and manage. Look to include non operational staff as space owners since this will provide new perspectives. Similarly section managers could be allocated spaces out with their section. Consider rotating ownership; as work progresses things will have to be re-allocated anyway and this provides an opportunity to get a fresh pair of eyes. The nominated person

shall regularly visit the allocated area and implement solutions to improve housekeeping and eliminate causes for trips and slips as well as being a contact point for anyone who identifies a housekeeping issue at that area.



Where it is known that objects or work equipment have the potential to cause a trip hazard to either the workforce or members of the public then measures are to be taken to highlight the problem at source. One good initiative is to spray the TM equipment,



Example of highlighting sign frames

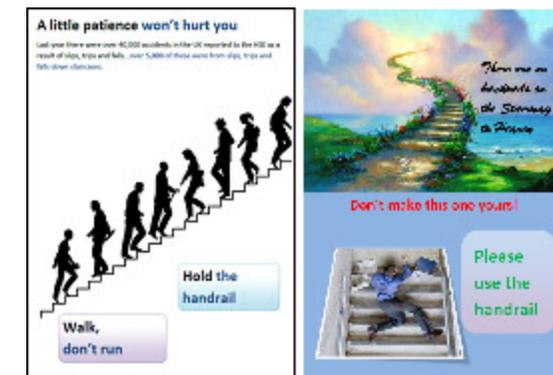
Use of stairs

The use of stairs is a major cause of falling incidents. Stairs should have accompanying handrails, steps of equal height and width and high visibility, non slip, square nosings on the step edges. A good example of an anti slip tread is available on the [Highways England health and safety toolkit](#).

A reminder should also be given where possible to users to hold the handrail as they walk up and down the staircase. Handrails are a safety provision and promoting their use reinforces safe behaviour.



Example of a sign displayed under the steps or on landings to remind users of the requirement of holding the handrail



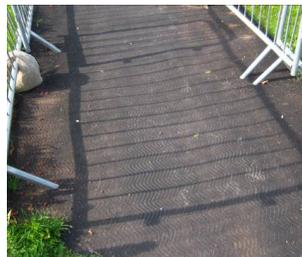
Ground conditions / surroundings / embankments

Many work areas are transient eg maintenance operations. This may often require us to work on embankments or un-kept verges where the controls for suitable flooring are not always reasonably practicable. When working with in this environment workers are to maintain a heightened sense of awareness and ensure a point of work risk assessment is recorded and applied.



A good solution to working on embankments is to use bespoke or own made stair systems

The use of portable walkways or rubber mats that can be laid straight onto soft ground is a quick alternative to using stone or other hardcore in costly groundwork preparation. Due to the combination of materials the product allows water to seep through to the ground below whilst maintaining an unyielding, non slip surface. Once the need for the walkway has finished the matting / track way can be removed and reused. Depending on how long it is in place, there will be no lasting damage to the verge other than sun fade of the grass.



Example of the varying types of portable walkways available to even out ground conditions

Lighting

There should always be enough lighting around a workplace for workers to be able to see and avoid hazards. This may be in the form of natural or artificial lighting. It is important to check lighting conditions both inside and outside of the workplace at different times of the day throughout the project, as the effect of light changes during the day and as the project progresses. If hazards on the ground can not be seen then the lighting will need to be improved. A good maintenance system is also essential, as spent lights should be changed as soon as possible. Provide workforce with personal lighting such as helmet lamp or torch, but this should not be in lieu of task lighting. Encourage workers to stop work immediately when lighting is defective / inadequate

Weather / changing seasons

Slip and trip accidents increase during the autumn and winter season for a number of reasons: there is less daylight, leaves fall onto paths and become wet and slippery and could clog up drainage systems which in cold weather spells cause ice and snow to build up on paths or hide any hazard that may already be on the path. There are effective actions that you can take to reduce the risk of a slip or trip. For example put in place a procedure for removing leaves at regular intervals or consider removing the offending vegetation altogether. Regardless of the size of your site, always ensure that regularly used walkways are promptly tackled.



Snow covering the hard shoulder



Leaves on a walkway

Rain water, ice, frost and snow controls

To reduce the risk of slips on ice, frost or snow, you need to assess the risk and put in a system to manage it.

- Identify the outdoor areas used by pedestrians most likely to be affected by ice.
- Monitor temperature in the winter months, as prevention remains the key. Keep up to date by visiting a weather forecast / service site or install monitoring signs.



A sign showing the outside air temperature



A sign that indicates when the weather is below 5°C

- Salt can stop ice forming and cause existing ice or snow to melt, but salt doesn't work instantly; so consider the use of a sprayable de-icer solution applied using conventional spray techniques. This method will also allow the treatment of steps into excavations or from plant etc or where the use of grit is not practicable.
- The best times to apply treatment to surfaces are early in evening before the frost settles and/or early in the morning before employees arrive.
- Consider covering walkways e.g. by an arbour high enough for people to walk through, or use an insulating material on smaller areas overnight.
- Divert pedestrians to less slippery walkways and barrier off existing ones. If warning cones are used, ensure there is an accompanying sign or text identifying the hazard on the sleeve of the cone to distinguish it from the ones we regularly use everyday and remember to remove them once the hazard has passed or they will eventually be ignored and lose their purpose

- PPE should always be the last resort but where an individual is required to enter an area where ice and frost may be present. For example a winter maintenance operative, then consider the use of crampon style grippers.



An example of use of a sprayable de-icer solution in action



Consider providing visitors and staff with provisions, such as de-icer, washer fluid

Suitable footwear controls

Footwear can play an important part in preventing slips and trips. Choosing slip-resistant footwear from the wide range of products on the market can be difficult. Sole descriptions are varied, from 'improving the grip performance' to 'excellent multi-directional slip-resistance' but usually do not describe the work environments for which footwear are, or are not, suitable.

Slip-resistant industrial footwear will normally have been tested for slip-resistance according to BS EN 13287:2004. Do not select footwear on the basis of brochure descriptions or laboratory test results alone. Footwear, which claims 'slip-resistance', may not perform well in your work environment. Footwear selection has to take account of a number of factors in addition to slip resistance, such as comfort, durability, fit for purpose and any other safety features required, such as toe protection, mid sole etc.

When choosing footwear, work closely with your PPE providers to allow you to understand the problems and involve the workforce in selection so they 'buy in' to decision.

But as a general rule always consider the following:

- Soles should be cleaned regularly. Provide boot cleaning stations at access points where cleats are likely to become clogged.



A good example of boot cleaning station

- Slip resistance properties can change with wear; for example, some soles can deteriorate with wear, especially when the cleats become worn down.
- Implement a system for checking and replacing footwear before it becomes worn and dangerous. One good initiative is to implement a boot amnesty and allow wearers to hand in their tired old boots in favour of discounted new boots. [See example in health and safety toolkit.](#)
- The boots should be lightweight and comfortable to allow the wearer to lift their feet comfortably over obstacles.
- Unless specified by a Risk Assessment the boot must have adequate ankle support in the form of laced up boots

- Further information regarding the new GRIP slip resistance rating scheme from Health and Safety Laboratory (HSL), an agency of the Health and Safety Executive (HSE), can be found by following the link http://www.hsl.gov.uk/news/news_items/taking-steps-against-workplace-slips-and-trips

Crampons

- Keeping a firm footing beneath you is essential, particularly when personnel have to walk (traverse) across grass and earth embankments or cuttings, especially during the winter months, albeit that the primary use for crampons is on ice or snow.
- Crampons may be considered for use by walkers and climbers, with a pair of crampon frames, each with metal spikes, strapped to boots. If used, please ensure that you have the correct crampons for your activity, and that they are well maintained.
- Please note: Pairing up the right crampon and boot combination is important. Marry a rigid crampon with a flexible boot and you stand a good chance of breaking a crampon frame through metal fatigue. Likewise, poorly fitting crampons or incompatible binding systems will inevitably result in a crampons coming off at the worst possible time.
- Anti-balling plates are extremely important unless you are lucky enough to find a roadside icefall. They help prevent the build-up of wet snow underneath the crampon, and are a lifesaver in thawing or wet snow conditions.

Alighting from and stepping off vehicles / mobile plant / trailers

- Park vehicles and items of mobile plant in areas that are lit and where ground conditions are good, i.e. flat and level.
- Use steps and handrails provided in accordance with manufacturer's instructions
- Ensure that steps, handrails and other means of access / egress are;
 - Suitable for purpose and subject to visual inspection prior to and after use
 - Subject to regular maintenance and that routes trafficked by pedestrians remain clear of obstructions, including debris

Hidden and un-protected openings, including holes and recesses in ground surfaces, and uneven surfaces

- It is essential that routes to be trafficked by people are walked prior to starting tasks to identify and remove/control hazards, i.e. clearing brush and grass etc from verge work areas, defining safe routes
- Personnel must not step on ground / surfaces that cannot be seen
- In addition, everyone should be reminded and encouraged to look before they step, to use defined routes, not to take short cuts and be prepared to stop and seek advice before proceeding on foot if safe access is not provided

Monitor and review

Construction sites are ever-changing and dynamic so any plan put into place must be reviewed and monitored regularly to ensure it is still effective. A daily inspection and point of work risk assessment along with hazard reporting submissions from the site team are essential to identify and correct site hazards, maintenance, housekeeping and exposures to employees, subcontractors, traffic officers and the public. This will allow the site to understand where the high risk activities are by analysing the data submitted, work activities, site layout, incidents (injuries, HiPo, hazards and near misses) and address continually.

When the site is closed down remember to check that the area has been left free of slip trip and fall hazards for those that may access the area in future such as members of the public who have broken down, recovery crews and traffic officers. Examples include removing site signage and "A frames" which are no longer required and making sure drain covers have been replaced if they were removed during the works.

Historically near miss reporting for slip trip fall hazards has been low in proportion to the number of slip trip fall injuries. Sites need to raise awareness to encourage

reporting through toolbox talks, poster campaigns, training stand downs. An example of good initiatives used can be found on the [Thames Water Health and Safety Hub](#) website.

Legislation

Construction (Design and Management) Regulations 2007

Workplace (Health, Safety and Welfare) Regulations 1992

The above can be downloaded from <http://www.hse.gov.uk/pubns/books/l24.htm>

Additional information

Further information can be found by following the link

<http://www.hse.gov.uk/slips/index.htm>

- Raising the bar 1 "Plant and equipment"
- Raising the bar 10 "Communication of risk"
- Raising the bar 15 "Task lighting"
- Raising the bar 16 "Working at height"
- Raising the bar 20 "Transport & logistics management"
- Raising the bar 23 "Site inductions"
- Raising the bar 25 "Loading and unloading vehicles"

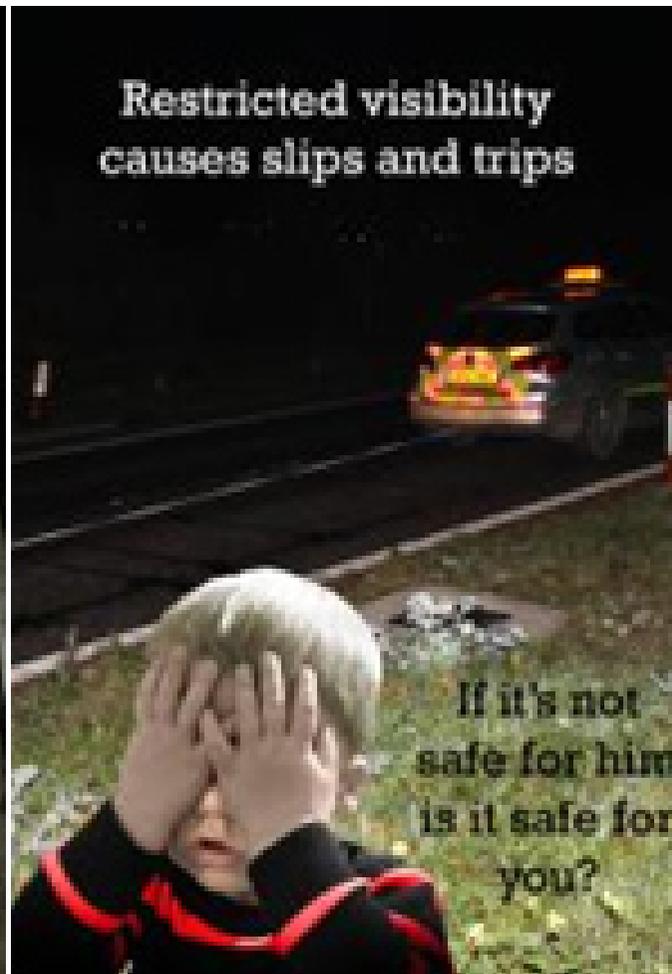
Appendix 1

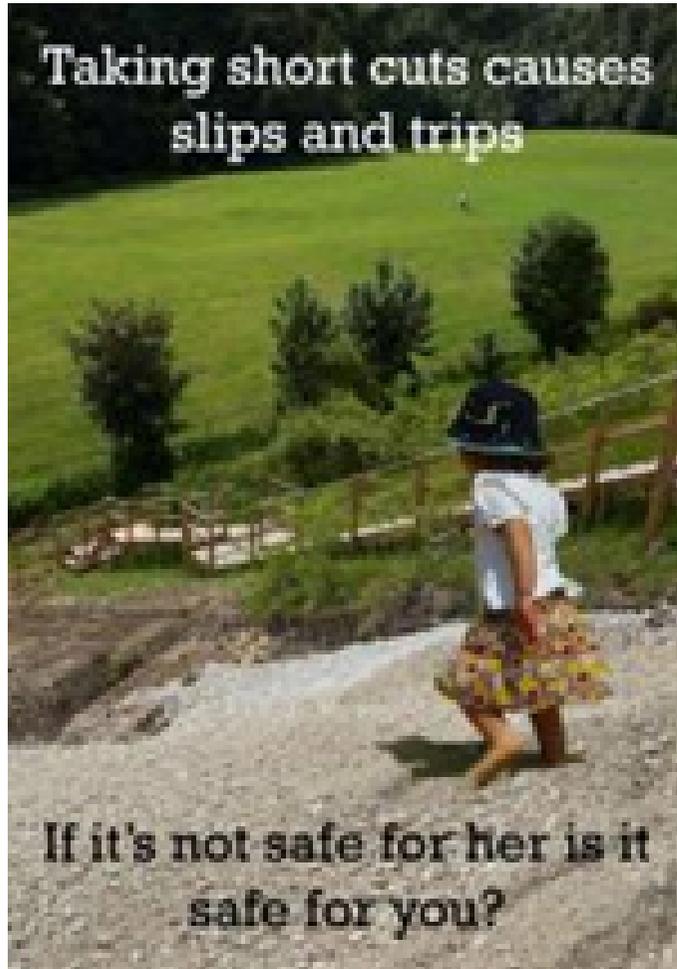
Managing slip,; trip and fall risk



Appendix 2

Slip, trip and fall poster campaign (example photos)





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