

ESTATES OPERATIONS

HEALTH & SAFETY DOCUMENT	-	CODE of PRACTICE
DOCUMENT TITLE	-	SLIPS, TRIPS & FALLS
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Please Note – the guidance provided in this Code of Practice pertains only to the Estates Operations Group and its activities. For Imperial College’s Health & Safety policies and Codes of Practice go to: <https://imperial.ac.uk/safety>.

INTRODUCTION

This Code of Practice (CoP) reflects Estates Operations’ commitment to meeting the requirements of the Management of Health and Safety at Work Regulations 1999 (MHSWR) and the Health and Safety (Workplace Health, Safety and Welfare) Regulations 1992 in so far as to undertake risk assessments and to provide safe access and egress to College properties and buildings.

The principles and practices described in this CoP are aimed at mitigating the risk of injury and damage to health caused by slips, trips and falls as a result of a lack of systematic, planned management and maintenance. The CoP is not intended to provide definitive guidance to the Management of Health and Safety at Work Regulations and where any doubt exists as to the action to be taken or advice or assistance being required, contact should be made with Estates Operations’ Health and Safety Manager or the College’s Safety Department.

The CoP provides the following:

- An introduction to slips, trips and falls and the scope of the Regulations
- The risk control hierarchy
- The methodology for risk assessment in FM, development of generic risk assessments
- Responsibilities of Duty holders and employees
- Maintenance of pedestrian routes
- Training and competence
- Monitoring and inspection.

1. Overview and Introduction to the Management of Health and Safety at Work Regulations 1999 and the Health and Safety (Workplace Health, Safety and Welfare) Regulations 1992.

Section 3 of the Management of Health and Safety at Work Regulations describes the statutory duty of employers to undertake a suitable and sufficient assessment of:

- a) the risks to the health and safety of his employees to which they are exposed whilst they are at work; and
- b) the risks to the health and safety of persons not in his employment arising out of or in connection with the conduct by him of his undertaking,

Essentially, this places a duty on employers to undertake risk assessments for all activities carried out on site and where a workplace has 5 or more employees it is a legal requirement for the assessments to be recorded.

Such assessments must be reviewed on a regular basis or where significant change has occurred – e.g. a change of process.

Section 12 of the Health and Safety (Workplace Health, Safety and Welfare Regulations) places a duty on employers to ensure that the surface of every traffic route in a workplace be suitable for which it is used, have no hole or slope, be uneven or slippery so as to expose persons to a risk to their health and safety.

They go on to state that, so far as is reasonably practicable, every floor in a workplace and the surface of every traffic route be kept free from obstructions and from any article or substance which may cause a person to slip, trip or fall.

Every workplace should have suitable and sufficient lighting.

Suitable and sufficient handrails and, if appropriate, guards shall be provided on all staircases, except where they would cause an obstruction.

In summary the Estates Operations Department will, on behalf of Imperial College:

- Provide, so far as is reasonably practicable, a safe working environment for staff, students and visitors which is free from slip and trip hazards.
- adequately control or reduce the risk of slips and trips, by a combination of a safe environment and safe behaviour.
- ensure that appropriate risk assessments and risk reduction methods are in place.
- encourage all staff and students to take personal action to reduce the risk of slips and trips as far as possible.
- ensure that there is an effective response to changing conditions such as weather and the environment e.g. during construction works or refurbishment.
- ensure that College premises are designed and maintained to minimise the risk of slips and trips.

2. Why is it important to minimise the risk from slips, trips and falls?

Over a third of major accidents at work are caused by slips, trips and falls on the same level which can often have serious consequences such as broken bones or other disabling injuries.

The reduction of slips, trips and falls can only be achieved when managers, staff and students are committed to taking personal responsibility.

Before assessing the risks of slips and trips it is important to understand what causes them:

- Most slips happen when flooring is contaminated
- Trips and falls occur when you catch your foot on an unexpected obstacle

Other contributory factors include:

- Human behavior
- Environmental conditions
- Building design

Appendices 1 & 2 provide guidance on the techniques and factors which can be applied to assist in determining what specification of flooring is required for specific applications. This guidance can be used to scope the requirements for a new floor covering or to assess the performance of an existing covering.

3. Risk Control Hierarchy

A hierarchy of controls is the standard process by which a risk is effectively controlled and for slips, trips and falls the following is adopted:

- Eliminate – prevent flooring contamination

- Control Contamination
- Eliminate adverse environmental conditions
- Improve floor conditions
- Put into place footwear controls

4. Responsibilities of duty holders and employees

The Estates Operations Department is the appointed agent of the College and hold responsible for management and maintenance of the building fabrics, external pathways, roads, lawns etc.

The Director of Estates Operations, although being a principal 'duty holder', delegates day to day responsibility for safety management to operational line managers, his key responsibilities are to ensure: those being the Heads of Departments as follows:

- Risk assessments are carried out for the management of slips and trips, recorded and reviewed when necessary
- The risk assessment will include suitable control measures to eliminate or minimise risks of slips and trips using the slip potential model and trip potential triangle. The risk assessments must include: checking the condition of floor surfaces, reducing floor contamination, defining an appropriate footwear policy where appropriate, checking lighting is suitable and sufficient.
- Areas within management control are inspected at least 6 monthly for defects and appropriate action is taken where required.
- Any incidents involving slips and trips are recorded and investigated where necessary.

The specific responsibilities of the Heads of Building Operations and Maintenance are described below:

- **Head of Building Operations**

Has the role for ensuring that Building Managers undertake regular inspections of floors and stairs within their respective buildings which are under the control of Estates Operations. These inspections will be undertaken as part of the wider building inspection programme.

Where Building Managers act in the capacity as Project Manager for an internal refurbishment they should ensure that full consideration is given to the specification of new floor coverings which minimise the potential for slips, trips and falls.

- **Head of Maintenance**

Is responsible for ensuring that a programme of planned maintenance and inspections is in place for all external walkways, paths and road surfaces. These are undertaken on a monthly basis and any defects discovered are registered through the 'defect reporting system'.

- **All staff**

Staff are responsible for their own safety and that of others and, should always take due care when moving about the College so as to avoid injuring themselves or others as a result of their acts or omissions.

5. Maintenance of External Pedestrian Routes

Estates Operations employ the services of a Measured Term Contractor to assist them to discharge their responsibilities for the maintenance of pedestrian and vehicle routes in and around the College. The Measured Term Contractor appoints a specialist contractor who will, under a planned preventative maintenance schedule, carry out monthly inspections of all surfaces and report the findings to the College.

All findings of inspections which identify the need for remedial works will be evaluated and a course of action determined to rectify the defect in a timely and cost effective manner.

The College, in association with the specialist contractor, will apply the standard advocated by the Local Authority which is used to determine when a surface irregularity qualifies as a trip hazard and use this to determine what action is to be taken.

6. Defect Reporting

In addition to the programme of inspections for internal and external areas the College encourages all staff and students to report any defect they may come across whilst on College premises that could result in a slip or trip. Any flooring defect can be reported on-line at eo.csc@imperial.ac.uk or by telephone to the Estates Operations Customer Services Centre on ext. 48000.

All defects will be 'logged' and assigned a ranking according to the hazard the defect presents which then determines the period in which it will be investigated and/or resolved.

7. Training and Competence

All Estates Operations staff have access to an e-learning module which identifies the hazard associated with slips, trips and falls at work and gives advice on how to prevent personal injury.

8. Monitoring and Inspection

As described in this document, Estates Operations have put measures in place to regularly inspect internal and external pedestrian routes and for any faults to be raised through the management arrangements.

In addition to regular inspection and the defect reporting system the College will monitor any reported accidents and incidents which may have been caused by sub standard pedestrian surfaces.

Appendix 1 - Assessing the slip resistance of flooring

When specifying new flooring the guidance contained in CIRIA publication '*Safer surfaces to walk on*' should be followed. This includes the following decision making process:

Stage 1 Selection of surface options

This will normally be led by the architect, designer and Project Manager, in consultation with the end user.

Stage 2 Obtaining prime parameters

It is essential that the correct information is available on the floor surface products likely to be used. This will enable the appropriate design decisions to be made based on established parameters. This will mainly consist of pendulum coefficient of friction test and surface microroughness. The likely contaminants must also be taken into consideration, and also features such as slopes.

The Health and Safety Laboratory (HSL) on behalf of the Health and Safety Executive (HSE) has developed a reliable and robust test method. It is described in their [technical information sheet "Assessing the Slip Resistance of Flooring"](#). The methodology is based on using two instruments:

- Pendulum coefficient of friction (CoF) test
- Surface microroughness meter

The Pendulum CoF test BS 7676: Parts 1-3, 2002

This gives a reading in slip resistance value (SRV) also known as pendulum test value (PTV) from high to low.

Surface microroughness meter

Surface roughness can be used to supplement pendulum test data. The roughness results should be interpreted using the information reproduced in Table 3 (from UKSRG, 2005). Where only roughness data is available then the HSE Slips Assessment Tool (SAT) should be used. This will take account of other factors which affect the likelihood of slips and trips and will provide a High, Moderate or Low score.

Dry contaminants

The pendulum test data should be used for assessing the effects of dry contamination on surfaces, although where this is carried out an adapted method must be used. Where the contaminant is likely to be dry it may be difficult to rely on the data.

Stages 3 – 9 consider the influencing factors

All of the influencing factors need to be considered, in addition to the data provided on the floor surface material.

Stage 4 Contamination

The types of contamination which may be present should be identified. This should also include potential future use, where this can be identified. e.g. the installation of café areas in foyers. Contamination may be from water, grease, dust, food product or waste material. This can be the result of spillages, leaks, footfall or cleaning.

Stages 5 & 7 Use and behaviour

The use of the floor surface must be considered. This will include general walking, carrying items, pushing and pulling items, persons in a hurry, elderly persons, young persons, persons with a disability. Issues such as the area being used for dancing, social events and sale of alcohol must be considered. The behaviour of people using the floor surface needs to be considered, and whether or not behaviour can be controlled. If the area is open to the public this may be difficult.

Stage 6 Flooring material

There are more issues to consider when selecting a floor, in addition to the slip resistance.

Stage 7 Environment

Consider how detrimental effects can be minimised or avoided. Overall design must be considered to reduce contamination as much as possible. One example of this would be the provision of suitable canopies and drainage at entrance ways, to prevent water being brought into the entrance of buildings.

Condensation can also lead to contamination, so this should be designed out as far as possible. Lighting must be considered – the amount of light in an area can help people distinguish between areas which are contaminated or clean. Lighting will also have an impact on glare from the floor surface. Visual distraction must be considered for issues such as changes in level - see chapter 8 of the CIRIA guide for more information. Colour selection is important, in that a change in colour can have an effect on visual perception and the ability to see contaminants such as water.

Stage 8 Footwear

Where there is no control over footwear such as in a public access building, this needs to be taken into account and the worst case scenario assumed. Where there is control over footwear then significant reductions in risk can be made - see Chapter 7 of the CIRIA guide for more information.

Stage 9 Drainage

Having considered stages 4-9, the next step is to consider if the floor is effectively drained, and will the floor be free from contamination, as far as possible? If yes, move to surface specification, taking into consideration any slopes.

Stage 10 Maintenance strategy

Derive the maintenance strategy statement associated with the choices made. The maintenance strategy should involve monitoring the SRV of the floor through the life of the asset. This will enable replacement or restoration of the SRV where necessary. The specifier should agree the maintenance strategy with the end user/occupier and FM Services, if they are responsible for cleaning the area.

The statement should include the following:

Physical characteristics

- Slip resistance parameters (SRV (dry and surface wet), Rz)
- Anticipated life of the floor product and limiting characteristics
- The locations where is anticipated the surface will require treatment after a period of use
- It may also be desirable to provide the design SRV under the worst contamination conditions envisaged if these differ from the surface wet values.

Contamination issues

- Anticipated hazards
- The assumed cleaning regime and associated maintenance

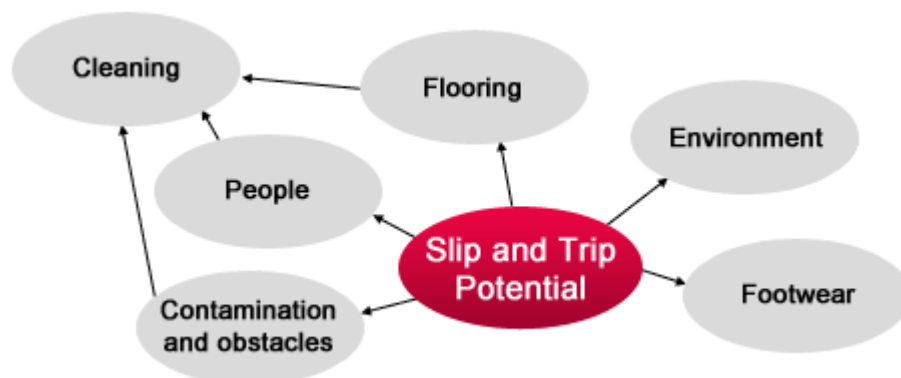
Other influences

- The design assumptions regarding other influencing factors, including environment, footwear, use and behaviour (where relevant)

Management

- The anticipated maintenance regime (its type, frequency and methodology)
- Day to day management issues e.g. drying and cleaning of door mats
- Lighting issues
- This statement will provide important information for those who have responsibility for the flooring surface during its lifespan.

Appendix 2 - The HSE Slip Potential Model



A good model to apply when conducting slip risk assessment is the 'The Slip Potential Model'. The essence of the Slip Potential Model approach is the recognition that a number of issues contribute to the potential for pedestrian slip accidents: it is not sufficient to consider one or two in isolation. It is by understanding the inter-relationship, and the relevance, of each component in a particular circumstance that a holistic assessment of the slip potential may be made. The slip potential model looks at those factors which are controllable and those which are predictable.

Controllable factors

The controllable factors are those that usually can be changed or influenced by a direct or indirect action: the floor type, the environment, use, footwear (employees only) and the contamination.

Predictable Factors

The predictable factors are assessed with an understanding of the final use of the surface in question. The users, their footwear (public access) and the expected behaviour are all significant.

In any site investigation you should look at the (intended) application of the floor within the building such as:

- Lighting conditions
- Noise
- Entrance systems
- Public and/or employee access
- Contamination
- Condensation
- Maintenance regime
- Obstacles, stairs, ramps
- Changes in surface
- Distractions
- Human behaviour (ergonomics, biomechanics, psychology, tribology, age, gait, pushing, pulling and carrying loads)
- Perception
- Expected user groups

Once you have a full understanding of the application you can identify the actions that are required to ensure the floor surface is adequate for intended use.

Flooring

- The floor in a workplace must be suitable for the type of work activity that will be taking place on it.
- Where a floor can't be kept dry, people should be able to walk on the floor without fear of a slip despite any contamination that may be on it. So it should have sufficient roughness.
- The floor must be cleaned correctly to ensure that it does not become slippery or keeps its slip resistance properties (if a non slip floor)
- The floor must be fitted correctly :
 - to ensure that there are no trip hazards
 - to ensure that non slip coatings are correctly applied
- The floor must be maintained in good order to ensure that there are no trip hazards e.g. holes, uneven surfaces, curled up carpet edges
- Ramps, raised platforms and other changes of level should be avoided, if they can't they must be highlighted

Stairs should have:

- high visibility, non slip, square nosings on the step edges
- a suitable handrail
- steps of equal height
- steps of equal width

Contamination

- 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 e.g. 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. If product ends up on the floor it is costing the company money.
- First think about whether you can eliminate the problem, e.g.
 - Fit effective canopies to external entranceways to stop rainwater from entering a building
 - Fix leaking machines
 - Change the system of work
 - If not, can the contamination be controlled?
 - If you can't stop contamination from getting onto a floor you will need to ensure that it is cleaned effectively and quickly
- If you are relying on the floor to be good enough to cope with the contamination and still be non-slip you need to remember that the more viscous (the thicker) the contamination the rougher a floor needs to be in order for slips not to happen.

Obstacles

50% of all trip accidents are caused by bad housekeeping. So improving housekeeping would eliminate a large number of accidents.

- Ensure there is a suitable walkway through the workplace
- Keep it clear, no trailing wires, no obstructions.
- Look at people's workstations, are the floors tidy, do they have enough storage space?
- What about other rooms? Are they tidy, are goods suitably stored, are there enough bins?

Good housekeeping doesn't cost money; it just takes a little personal effort. Do all staff at your workplace (workers, managers, cleaners, maintenance technicians etc.) have a see it, sort it attitude?

Cleaning

Cleaning affects every workplace, nowhere is exempt. It is not just a subject for cleaning managers and staff; everyone in the workplace has a job to do e.g. keeping your workspace clear; and dealing with your own spillages.

The process of cleaning can create slip and trip hazards, especially for those entering the area being cleaned, such as the cleaners, for example, smooth floors left damp by a mop are likely to be extremely slippery and trailing wires from a vacuum or buffing machine can present a trip hazard.

An effective cleaning regime requires a good management system to help you identify problem areas, decide what to do, act on decisions made and check that the steps have been effective. Good communications are needed at all levels e.g. between equipment and chemical suppliers to ensure suitability of product for the type of contaminant and floor.

Effective training and supervision is essential to ensure cleaning is undertaken to the correct standard. Cleaners need to be informed of their duties and why the cleaning needs to be undertaken in a particular way or at a particular time. Lack of understanding can lead to inappropriate shortcuts.

Contamination is implicated in almost all slip accidents. Regular and effective cleaning to remove contamination helps reduce accidents.

Top tips -

- Use the right amount of the right cleaning product
- Detergent needs time to work on greasy floors
- Cleaning equipment will only be effective if it is well maintained
- A dry mop or squeegee will reduce floor-drying time but whilst the floor is damp there will be a slip risk.
- A well-wrung mop will leave a thin film of water sufficient enough to create a slip risk on a smooth floor.
- Spot clean where possible.

People often slip on floors that have been left wet after cleaning. Stop pedestrian access to smooth wet floors by using barriers, locking doors, or cleaning in sections. Signs and cones

only warn of a hazard, they do not prevent people from entering the area. If the spill is not visible they are usually ignored.

People or human factors

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

Individual behaviour

- A positive attitude toward health and safety, a 'See it, sort it!' 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.
- What footwear is worn can also make a difference e.g. wearing high heels at work will make you more vulnerable to a slip.
- Things that prevent you from seeing or thinking about where you are going, can also increase the risk of an accident e.g. rushing about, carrying large objects, Becoming distracted whilst walking e.g. using a mobile phone

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 that effects gait and ability to walk.

Factors in work, or created by the work activity can help stop or increase the risk of slips and trips.

Look at:

- What tasks are taking place? Can they be improved? e.g. fewer/smaller boxes to carry so worker can clearly see route ahead.
- Maintenance of equipment
- Housekeeping systems
- Provision of appropriate personal protective equipment

Environment

Environmental issues can increase the risk of, or prevent slips and trips, so it is important to take them into consideration. But firstly, what does the term 'environment' mean as regards slips and trips? Lighting (natural or otherwise), loud or unfamiliar noises, the weather, humidity, condensation etc.

The following gives an indication of how they can affect slips and trips:

- Too much light on a shiny floor can cause glare and stop people from seeing hazards on the floor and stairs.
- Too little light will also prevent people from seeing hazards on the floor and stairs.
- Unfamiliar and loud noises may be distracting.
- If rainwater gets onto a smooth surface inside or outside of a building, it may create a slip hazard. Good entrance design (e.g. canopies) can help.
- Cold weather can cause frost and ice to form, which may create slippery surfaces.
(Link to gritting)

- Condensation may make a smooth floor slippery.

Footwear

Footwear can play an important part in preventing slips and trips.

- Where you can't control footwear e.g. pedestrians using a shopping centre thoroughfare. It is vitally important to ensure that smooth floors are kept clean and dry.
- For work situations where you have some control over footwear, but where floors are mainly clean and dry, a sensible footwear policy can help reduce risks. For slips and trips sensible means: - flat, with a sensible heel, with the sole and heel made in a softer material that provides some grip.
- In work situations where floors can't be kept dry or clean e.g. food preparation, the right footwear will be especially important, so a slip resistant shoe may be required. If an employer introduces a slip resistant shoe policy, the footwear will be considered to be personal protective equipment and will be subject to the requirements of the Personal Protective Equipment Regulations e.g. will have to be provided to employees free of charge (Choosing the most suitable slip-resistant footwear for a particular environment / work activity can be difficult. Descriptions of slip-resistance given in suppliers brochures range from 'improving the grip performance' to 'excellent multi-directional slip-resistance', but often 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 - Personal protective equipment – Footwear – Test method for slip resistance, often using SATRA test method TM 144. 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. So how can you make the best choice?

- Undertake a footwear trial before buying sufficient stock for your entire workforce.
- Footwear can perform differently in different situations. For example, footwear that performs well in wet conditions might not be suitable where there are food spillages.
- A good tread pattern is essential on fluid-contaminated surfaces. The pattern is characterised by, among other things, leading edges in all directions to sweep away lubricant leaving dry contact under cleats.
- Sole tread patterns should not become clogged with any waste or debris on the floor. If they do then that design of sole is unsuitable for the situation.
- Sole material type and hardness are key factors; caution is needed in making generalisations and testing is always recommended.
- When choosing footwear take account factors such as comfort, durability and any additional safety features required, such as steel mid-sole. The final choice may have to be a compromise.

Appendix 3 – How this model is applied at the College?

Flooring

All new flooring is installed to specifications laid down by the Estates Operations in line with current guidance on the prevention of slips and trips. Planned Preventative Maintenance schedules include the regular maintenance of flooring to ensure that pedestrian routes are kept in good condition as far as is reasonably practical.

Contamination

Regular cleaning regimes are in place across the campuses and 'soft services' teams are available to respond to spills. This allows flooring to be kept in a clean and non-slip condition as far as practical.

Flooring in areas where spills are more likely e.g. cafés etc have appropriate flooring installed to reduce the risk of slipping should something be spilt on them.

Obstacles

Employees working within Estates Operations undertake regular inspections of the pedestrian routes to ensure that no obstacles are present. Students and staff alike can use the online defect reporting system to report any obstacles in the pedestrian routes and prompt a rapid response from the Operations team.

Cleaning

Daily cleaning regimes are in place across the campus and ensure that flooring in the internal and external pedestrian routes are kept free from contaminants. Cleaning materials, equipment and processes are selected carefully so as to reduce further risks of slipping and not increase any risks by, for example, over polishing floors or leaving a slippery coating on a surface.

Human Factors

The College actively encourages a 'See it, Sort it!' culture within its staff and students, and has a defect reporting system on the College website whereby both staff and students can report any defects identified on the College premises. Both staff and students are encouraged to be both proactive and reactive in their attitudes to slips and trips – proactive in that if they see something that may become a hazard they are encouraged to report it, reactive in the sense that as soon as they see a defect or hazard they are encouraged to report it.

Continual review of work activities and risk assessments by the safety team allow them to be adjusted where there have been significant changes and as such maintain the high level of risk control.

Environment

The College undertakes regular inspections of the premises, both internally and externally and as such poor lighting can be identified quickly – this may be lighting which is considered either too bright or too dark and the inspection regime allows the College to adjust lux levels to reduce risks. The defect reporting procedures also allow staff and students to report where lighting may have failed or where it could be considered too bright.

Footwear

The College cannot control the footwear worn by students and visitors, however it does recommend a safe footwear policy for all staff members. For teaching staff flat shoes are recommended. For staff working in areas where there is likely to be flooring that becomes contaminated e.g. kitchen areas, specific footwear developed for these environments is recommended/provided.

Designated Estates Operations staff also have PPE provided in the form of protective footwear and this will be chosen in line with recommendations in Appendix 2.