



British
Association
Landscape
Industries



LANDSCAPE OPERATIVES CAN WORK SAFELY ON SLOPES

A Guidance Document for the Landscape Industry

In memory of **Neil Huck**

This code of practice document has been developed by the National Contractors Forum (BALI-NCF) on behalf of the British Association of Landscape Industries (BALI).

BALI-NCF is made up of the UK's largest landscape contractors and grounds maintenance providers, to create a formalised group of influence. It exists to address key challenges within the sector, and communicates and consults with stakeholders including equipment manufacturers, government bodies and other professional associations.

The aim of the document is to help control safety and health risks in the landscape maintenance industry that arise during the maintenance of vegetation on ground that features a gradient.

The document covers operational issues associated with the use of ride-on machinery, such as lawn mowers and tractors, as well as pedestrian or hand-held equipment, such as grass trimmers and knapsack spraying devices. It also provides practical examples of how to eliminate, or reduce, the risk of accidents occurring.

The document is written for employers, managers, supervisors, and workers, with principles that can be applied to all landscape operations for domestic, amenity and commercial clients on land which features a gradient of any description.

The Health and Safety Executive (HSE) was consulted in the production of this publication, which the Association has written with members for the benefit of members and the wider landscape industry.



Contents

1.0 Introduction	5.0 Management of working on sites with a gradient(s)	8.0 Maintenance of machinery
1.1 Industry context	5.1 Specific factors affecting slope safety	9.0 Suitability of machine
2.0 Appointment of competent person to assess risk	5.2 Dynamic aspects of site	10.0 Monitoring and review of guidance
2.1 Appropriate risk assessment	6.0 Options for risk reduction	10.1 References and useful information
3.0 Competency of staff to operate tools, equipment and machinery	7.0 Machinery	11.0 Disclaimer
3.1 Options for training staff	7.1 Remote controlled rotary slope mower	
3.2 Monitoring staff training	7.2 Ride-on tractors and mowers	
4.0 Managing the risk associated with slopes	7.3 Pedestrian mowing machinery	
	7.4 Brush-cutter/grass trimmer/strimmer	

1.0 Introduction

The Health and Safety at Work etc Act 1974 is the primary piece of legislation covering occupational health and safety in Great Britain.

The Act places a legal duty on employers to ensure, so far as reasonably practicable, the health, safety, and welfare of employees, and to ensure that employees and others are kept safe. The Act also outlines the general duties employees have to themselves and to each other, and self-employed individuals have towards themselves and others.

People and companies who own, operate or have control over work equipment also have obligations under the Provision and Use of Work Equipment Regulations 1998 (PUWER), which requires equipment provided for use at work is:

- suitable for the intended use
- safe for use and maintained in a safe condition
- used only by people who have received adequate information, instruction and training
- accompanied by suitable health and safety measures e.g. guarding, rollover protection systems and emergency stop devices

1.1 Industry context

The Association's own accident statistics, as well as wider industry data, report landscape operatives suffer a disproportionately high number of serious and fatal accidents when completing landscape maintenance tasks on sloping ground.

Through consultation with members and the wider industry, the Association became aware of a gap in knowledge associated with this type of work; existing guidance was difficult to find or too generic to be of use.

Therefore, in conjunction with members and the wider industry, the Association undertook a project to identify best working practice when working on a gradient, to collate this information and disseminate it as a code of practice document.

Working on slopes, and particularly operating machinery on slopes, is a high-risk activity which poses a variety of hazards.

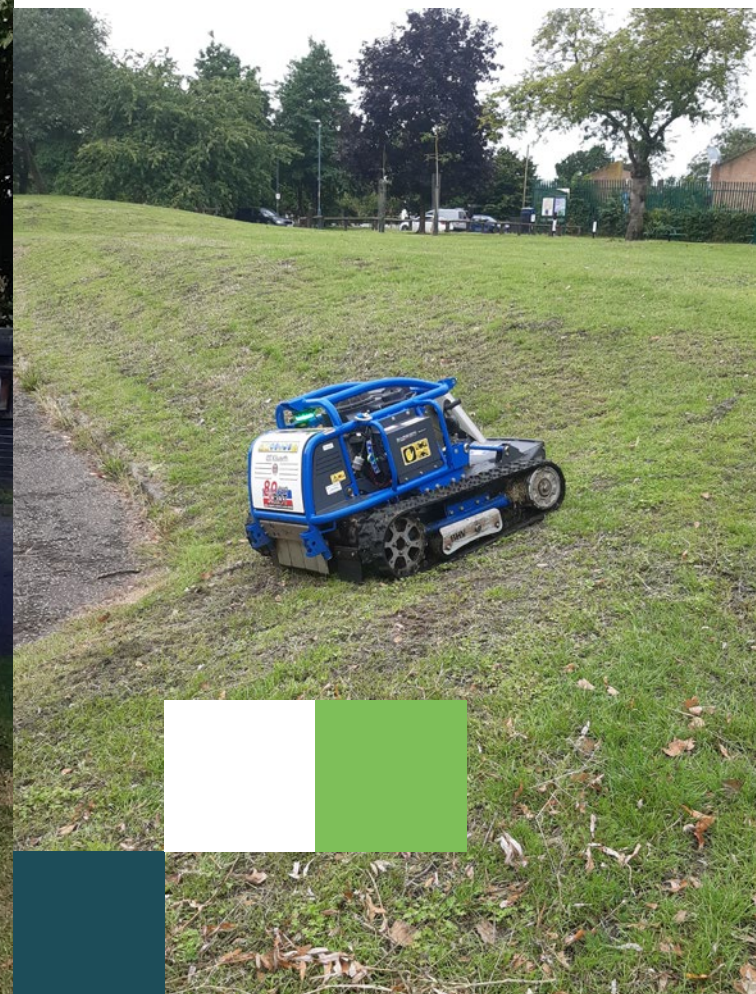
Safe completion of landscape maintenance tasks on sites with a gradient requires:

- Site specific risk assessment
- Equipment suited to the task and site
- Equipment that is correctly maintained
- Knowledgeable and experienced staff
- Detailed briefing document
- Regular review of processes

A site may vary widely, not only in terms of gradient but also topography, terrain, and obstacles. The nature of landscape maintenance results in work being undertaken throughout the year, which means the risks associated with a single site may evolve throughout the course of a maintenance season.

Whilst a range of machinery and equipment is available to complete landscape maintenance tasks, machinery varies between brands and models, as well as between machines, due to factors such as maintenance and age. Operators of machinery are also likely to vary in experience and knowledge.

The writers of this guidance wish to furnish the industry with a versatile document that helps educate stakeholders on the correct procedure when undertaking works on all types of gradients.



2.0 Appointment of a competent person to assess risk

Employers have a legal responsibility to appoint a competent person or people to meet their health and safety duties. This competency applies to persons or people who assess risk as well as persons or people who carry out work on behalf of the employer.

In the context of risk assessment, the HSE define a competent person as someone who has the skills, knowledge, and experience to recognise hazards in a business and help implement controls to protect workers and others from harm.

The HSE does not specify qualifications in relation to risk assessment but acknowledge formal training may be beneficial.

The options open to an employer when appointing competent persons to assess risk within their business activities include:

- themselves (i.e., the business owner)
- one or more of their workers
- someone from outside the business (i.e., a consultant)

Managing health and safety remains the legal duty of an employer regardless of whether they use a consultant or adviser to assess risk on their behalf.

Most landscape business owners are likely to either possess the relevant skills to assess risks themselves or employ staff who are sufficiently experienced. Such staff members may either be office-based and already perform a dedicated health and safety role or may be site-based (such as foreman, team leader or operative) but experienced and skilled in performing landscape maintenance tasks which involve works on a slope.

2.1 Appropriate risk assessment

Whilst the process of risk assessment and the nature in which it is recorded is likely to differ between businesses, all businesses must ensure risk is correctly assessed.

Any business responsible for operatives who perform landscape maintenance operations on ground that features a gradient should be aware they are dealing with operations which carry a high risk. These risks must be controlled.

Whilst generic risk assessments are a good starting point for a specific task or activity, they are unlikely to contain sufficient detail to accurately identify hazards on a specific site.

Site specific risk assessments should be used to capture hazards associated with one site only. Assessment must be carried out by a competent person, and operatives must assess a site during each visit before commencing works. See section 5.0 for more information on site-specific risk assessment.

REMEMBER

If you employ five or more people you have a legal duty to record the significant findings of your risk assessment and share the results of your findings with employees. Whilst there is no requirement for businesses with less than 5 employees to record the findings of a risk assessment, it is considered best practice to do so.

Employers should ensure operatives are regularly monitored to ensure agreed systems of work are followed in practice, and to make sure prescribed activities remain appropriate for the task.

3.0 Competency of staff to operate tools, equipment and machinery

The law states all people using equipment at work must be provided with information and instruction, and be adequately trained to ensure health and safety in its use, supervision or management.

The term 'adequate training' is open-ended due to the variable nature of workplace tasks, the competency of workers, the circumstances of work (e.g., level of supervision) and work equipment involved.

Employees are likely to have individual training needs, depending on:

- their length of service
- role (and changing responsibilities)
- age
- experience
- skills

3.1 Options for training staff

Whilst the law requires those providing training in the use of work equipment to be sufficiently skilled and competent, it does not prescribe the use of external training providers for all work equipment training. Fulfilling their legal obligation to provide adequate training may therefore lead employers either:

- to outsource training (for example, through an awarding body such as Lantra or City & Guilds/NPTC)
- or
- to deliver training in-house using the manufacturer's instructions, combined with the knowledge and skills of more experienced workers and managers.

3.2 Monitoring staff training

Attendance of training sessions alone is not sufficient to guarantee employee competency in operation or inspection of tools, equipment, or machinery.

Internal assessment (such as questionnaire or informal examination) of staff knowledge after completing in-house training will help confirm knowledge and identify areas of knowledge requiring additional training.

Periodic re-training in the form of refresher training may be undertaken according to the individual but is likely to range from 3 years to 5 years. Additional training needs may also arise from risk assessment and review of near-miss reports.

NOTE

Competency to operate tools, equipment and machinery should be regularly reviewed when new machinery, new staff or new work sites are introduced.



4.0 Managing the risk associated with slopes

Incidents on slopes commonly involve one of 2 scenarios:

1. **operator loses control of ride-on machinery**
 - machine loses traction or becomes unstable due to gradient
 - machine over-turns with operator on-board
2. **operator slips or trips whilst using pedestrian or hand-held equipment, resulting in**
 - operator falling
 - operator losing control or struck by equipment

Causes of incidents include:

- Machine over-turns due to gradient of slope
- Loss of traction between machine tyres and slope, causing machine to slide
- Sharp steering input from machine operator causing machine to tip
- Operator of pedestrian equipment slips on slope
- Operator of pedestrian equipment trips on slope
- Inadequate maintenance of machine/equipment

The potential consequences of incidents include:

- Operator of machinery being crushed by weight of machine when it slides or overturns resulting in serious or fatal injury
- Operator of machinery striking moving part of machine (e.g., blade) resulting in serious or fatal injury
- Pedestrian operative slips and falls resulting in minor or moderate injury
- Pedestrian trips and falls resulting in minor or moderate injury
- Damage to equipment
- Damage to property
- Injury to third parties

To prevent/reduce the likelihood of incidents:

- Comprehensive assessment of site by competent person prior to works and regular review of conditions by operatives
- Use machines and equipment in accordance with manufacturers' instructions with regard to site conditions, gradient, terrain and vegetation type (Right machine - Right place)
- Train operatives to identify changeable site-specific factors, such as weather and surface conditions, and empower them to adapt working practices as appropriate
- Never exceed manufacturers stated maximum angle of usage

5.0 Management of working on sites with a gradient(s)

Detailed assessment of a site requires thorough review of every significant aspect by a competent person. Assessment should consider the following variables:

■ Accurate measurement of slope gradient

The gradient of all slopes should be measured by a competent person using suitable tools. Suitable slope measuring instruments, also referred to as inclinometers or clinometer, are available in various formats including:

- Angle slope measuring tool
- Mobile phone-based clinometer tool
- Angle finder
- Digital level box

TIP

iPhone has a built-in application called 'Measure'. Once the application is opened, switch the setting to 'level'. Free applications are also available for devices using the Android operating system.

Place the phone on a straight length of wood or metal to accurately identify the slope angle over a longer span.

Digital display allows fast and accurate identification of gradient



Person using angle measuring device on a slope



Consider using a straight edge in conjunction with slope measuring device when surveying longer spans

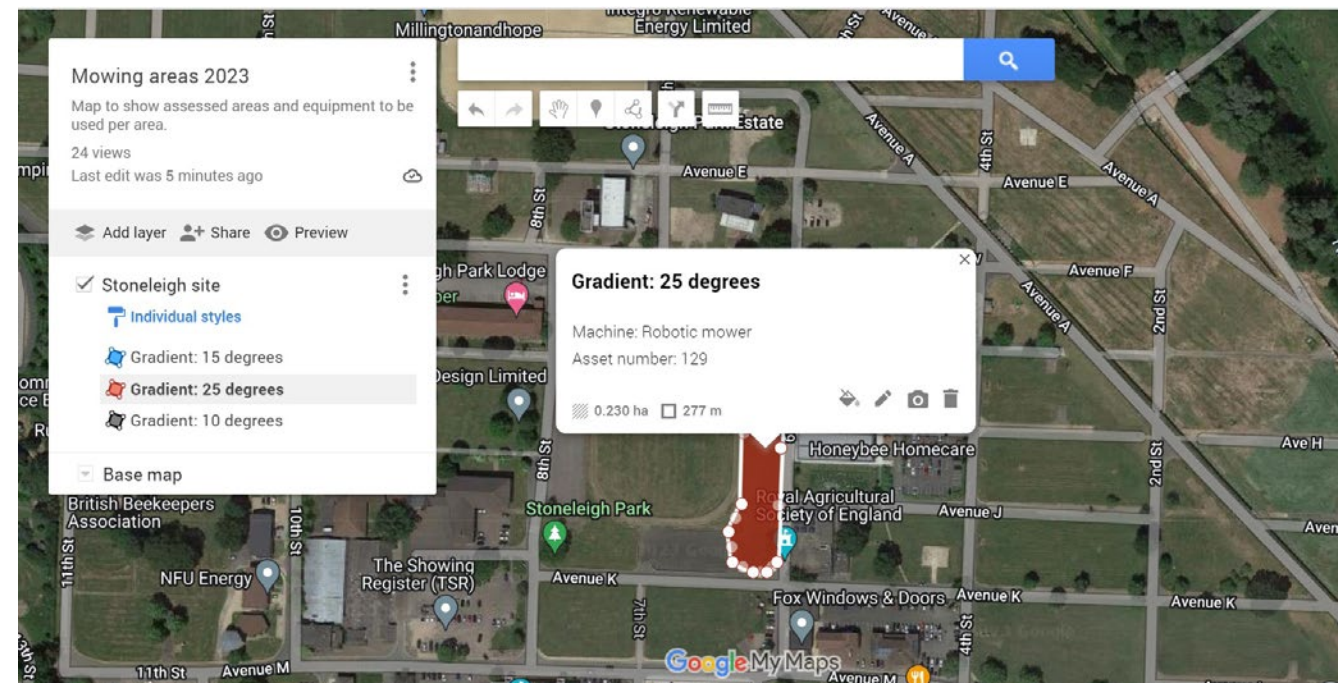
The gradient of slopes is likely to vary across a site, so it is important these are recorded, highlighted and matched to appropriate equipment.

The map may be used to prescribe suitable equipment for each area of site.

Following inspection, a map may be created to highlight the location of site attributes such as:

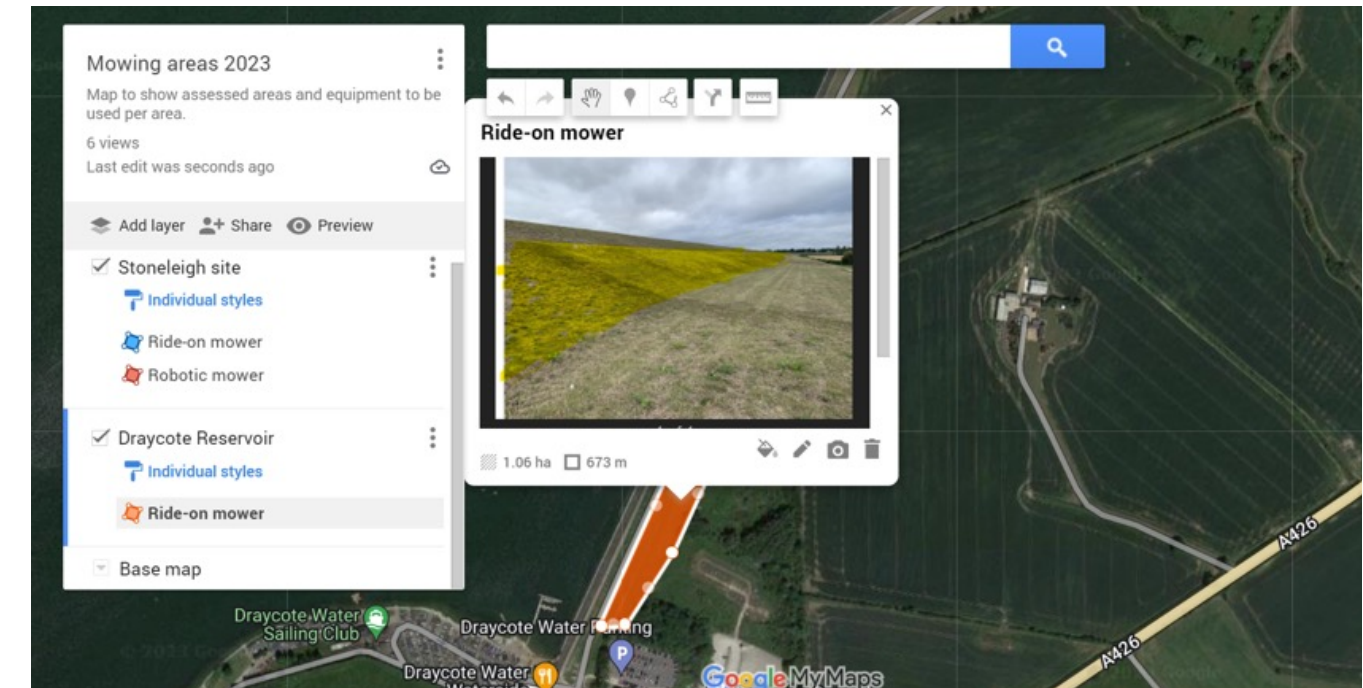
The map may be printed and provided to staff or shared online and accessed via smartphones or tablets.

- Gradients
- Obstacles and site furniture
- Steep edges and retaining walls



The map above was created using Google Maps to demonstrate how free mapping tools can be used in conjunction with site information to provide employees with up-to-date information regarding slope gradient, obstacles and machinery.

For added clarity, annotated photos may be attached to mapping.



■ Assessment of slope gradient

Slope gradient should be considered in conjunction with all other factors when reviewing a site prior to work. As a result, few existing guidance documents commit to specific gradients in relation to working practices.

Whilst these categories were provided by the author as a guide when constructing slopes rather than maintaining them, they nevertheless give a broad indication of the method which may be used – subject to equipment capability and prevailing site conditions – for maintenance activities if there are no other limiting factors on the site.

The broad categories of gradient below are outlined in British Standard (BS) 4428:1989 Code of practice for general landscape operations (excluding hard surfaces):

- Maximum gradients for hand maintenance 1 in 1.5 (33°)
- Maximum gradients for special bank machines 1 in 2 (27°)
- Maximum gradient for suitable tractor mounted mowers 1 in 3 (15°)

NOTE

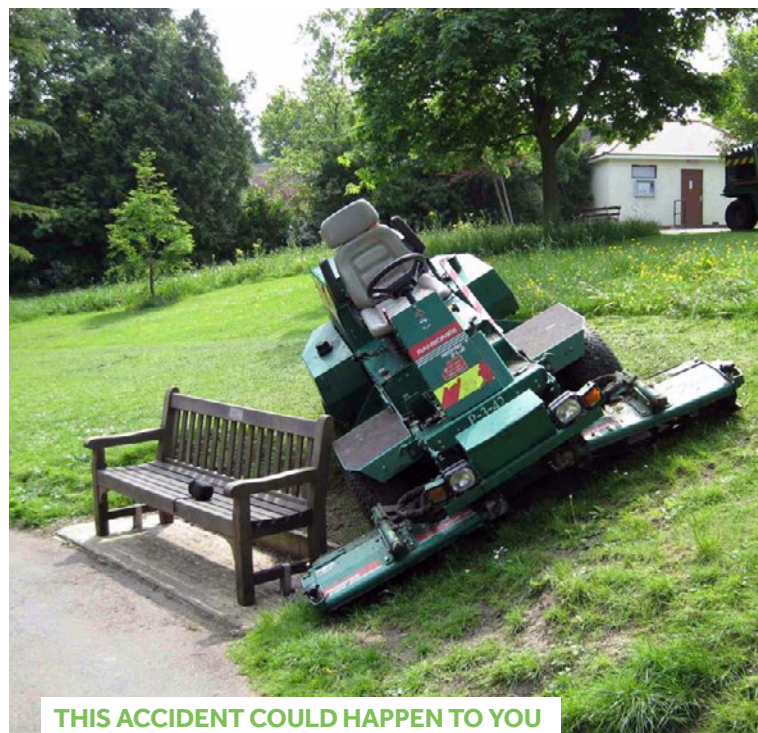
BS 4428:1989 advises plant used on steeply sloping ground during construction should be designed to protect the operator in the event of overturning. It also advises mechanical plant should only be operated parallel to the line of maximum gradient and all operators should be trained in the use of their equipment.

5.1 Specific factors affecting slope safety

■ Topography of site

Sites which feature a significant gradient should be surveyed in their entirety and work planned according to each area of site where there is a gradient. Working practices are likely to differ within each site according to gradient, terrain, and run-off area.

Whilst a general mowing machine may be suitable for some areas of a site, other areas may require a specialist machine or use of hand operated or remotely operated machine. The plan of work should identify what methods should be employed in each area.



An operative was strimming a small bank with a concealed inspection hatch for a buried water tank. The operative, unaware of the inspection hatch, slipped on the hatch and fell onto the concrete surrounding the inspection hatch. The operative sustained bruising to their collarbone.

A site-specific risk assessment would have identified the location of the inspection hatch and warned the operative to its presence on site.

■ Obstacles (e.g., bench, sign, play equipment)

Manoeuvring machinery around obstacles on any slope increases the risk of losing traction. Activities involving machinery on slopes should be planned to avoid significant steering inputs around obstacles.

See image, left:

Benches adjacent to a gradient pose a particular risk to machinery where the rear of the bench meets a significant localised gradient.

In this example the front tyre of the machine lost traction due to the localised steep gradient behind the bench.

A grass trimmer/ brush-cutter/ strimmer could have been used to maintain grass within 5m of the bench and prevent the need for the ride-on machine to work close to a hazardous area of site.

In this example the front tyre of the machine lost traction due to the localised steep gradient behind the bench. Note the lack of rollover protection system (ROPS) on this machine.

■ Ground disturbance (e.g., animal holes, tree roots)

Areas of localised ground disturbance pose a hazard to both operators of ride-on machinery and pedestrians. Holes dug by animals may arise between maintenance visits and should be identified prior to work commencing on-site.

Areas of ground disturbance, depending on size, may cause a ride-on machine to tip or the machine operator to steer away from the obstacle, leading to the machine becoming unstable whilst working on the slope.

Pedestrians working on slopes may trip or fall after contact with areas of ground disturbance.

■ Low-hanging limbs on trees

Low tree limbs may result in machine operators steering to avoid a collision or using one hand to move vegetation out of the way. Both approaches are potentially dangerous and may lead to either the machine tipping or the operative and machine striking vegetation.

■ Surface conditions

The presence of water molecules (for example, rain or dew) on surfaces reduces the level of friction available. Therefore, it should be assumed the presence of any water on the surface of a grass slope will affect the level of grip available. This should define the approach to maintenance activities carried out.

Any activity which results in the wheels of machinery sliding or losing traction must cease and the works re-arranged for when the surface is drier.

NOTE

Most manufacturers of equipment reduce the maximum recommended slope that can be tackled in wet conditions. Moderate your working practice to reflect this guidance.

THIS ACCIDENT COULD HAPPEN TO YOU

An operative was mowing a grass bank with a pedestrian flail mower as had been safely undertaken previously. There was no rain, and the surface of the slope did not exceed the capabilities of the mower, but the surface of the grass was covered in dew. The mower slipped down the bank into a car parked on the road next to the slope.

Assessment of the site by trained operatives prior to works would have identified the risk posed by dew and resulted in appropriate measures being taken.

■ Turn-round area (safe area at top of slope)

The area required for machinery to turn around adjacent to a slope should be considered and a safe method of working developed accordingly. Remember: Vehicles with their steering wheels turned are significantly less stable on slopes than vehicles with their steering wheels pointing straight.

Avoid the need for operatives to turn equipment round at a distance of less than 1 metre from the top of a slope. If turn-around areas with a suitable safety area cannot be achieved the vehicle should be driven from bottom to top forwards, then top to bottom backwards.

■ Retaining structure

Retaining structures such as walls are commonly found at the bottom of slopes, where the slope meets a footpath, road or hard surface.

The location of retaining walls should be noted in risk assessment material and considered when identifying a safe working practice.

As with obstacles (discussed in the section above) retaining structures often represent the first hard object likely to be encountered when either a machine or operative loses grip or control of a task.

In both the images below the machine slid from a slope and off a low retaining wall. The wrong machine was used in the wrong place.

Even relatively low retaining walls have the potential to cause significant damage to machinery and injury to operators. One particular hazard associated with retaining structures, is the risk they pose in relation to overturning large, heavy items of machinery.

THIS INCIDENT COULD HAPPEN TO YOU

A landscape operative was killed when the ride-on mower he was using slid down a grass embankment, over-turned and landed on the operative. The accident occurred whilst the operative was turning the machine round at the top of the embankment, but lost control on wet grass.

Circumstances of incident:

- Gradient of slope was 25° but maximum working gradient of machine being used was 19°
- The mowing operation was carried out when the surface of the grass was wet
- No turn-around area had been identified
- No site-specific risk assessment had been carried out



In the scenarios above, a pedestrian/walk-behind mower could have been used to maintain grass on the slope and avoid the need for a ride-on machine to be used adjacent to the retaining structure.

■ Near-by hazards (road, river, hard surface)

Slopes are frequently found adjacent to additional near-by hazards. For example, the images above show examples of a slope adjacent to retaining wall and hard surface.

Always consider the presence of near-by hazards when planning activities involving a slope. Examples include:

- Road
- Watercourse
- Boundary such as fence, railings, or wall
- Vegetation

5.2 Dynamic aspects of site

Identification of temporary or short-term features of a site by operatives during each visit can help raise awareness of potential risks and efforts to mitigate these.

■ Weather and surface conditions

Machinery and operatives are significantly more likely to slip on wet grass than dry. Most manufacturers of equipment reduce the maximum recommended slope that can be tackled in wet conditions. Operatives should be encouraged to moderate working practices to reflect surface conditions.

NOTE

Prolonged periods of dry weather may also result in reduced traction. Dry grass, resembling straw in colour, poses a greater risk of slipping than dry, green grass.

■ Site furniture/obstacles

New site features or obstacles present a hazard where operatives or machinery are required to negotiate these whilst working on a gradient. Encourage operatives to avoid sudden changes in direction when working on slopes or manage vegetation surrounding obstacles with alternative equipment.

■ Condition/maintenance of equipment

Aspects of equipment maintenance may significantly affect performance under use. Too low or too high tyre pressures on ride-on equipment is one such example of this. Ensure operatives are equipped with knowledge and tools to ensure machinery is checked and suitable for all tasks.

6.0 Options for risk reduction

Measure gradient of slopes accurately and allocate machinery accordingly

- Use either phone-based app or inclinometer
- Measure entire length of slope
- Use machinery fitted with an inclinometer

Map all slopes on site and perform site-specific risk-assessment

- Highlight key hazards
- Make operatives aware of hazards

Use machinery which meets needs of site/user

- Ride-on
- Pedestrian
- Hand-held (e.g., Brush cutter, strimmer or line trimmer)
- Robotic mower/remote-controlled mower

Train operatives in safe use of equipment

- Set-up
- Operation (including operational limits)
- Maintenance

Provision of training and documentation for operatives

- Plans (site-specific)
- Photos
- Site-specific induction to highlight hazards

7.0 Machinery

A range of machinery is available for undertaking landscape maintenance tasks on either flat ground or ground with a minor gradient, as well as specialist machinery capable of working on steeper gradients.

Use of specialist machinery alone is not guaranteed to protect operators and third parties from risk when undertaking landscape maintenance tasks on slopes. Furthermore, the use of specialist machinery does not guarantee compatibility with all types of slopes and working conditions. For example, the maximum working angle of ride-on machinery is likely to reduce significantly in wet conditions.

POWER requires people and companies who own, operate or have control over work equipment to select suitable machinery for a task and take manufacturer recommendations into account. Regardless of the type of machinery, detailed site inspection by competent person and regular reviews of safe working practice are essential to guarantee the safety of operatives and third parties.

Whilst the user manual should be the first point of reference for managers and operators of equipment in relation to working parameters, the information below can be used as a general guide for specific risks associated with machinery and working on slopes.



7.1 Remote controlled rotary slope mower

Remote controlled rotary slope mowers may be used to cut grass on level ground as well as slopes. Their design enables them to safely operate on slopes steeper than most ride-on machines, without the need for the operator to be present on the slope at the same time.

Whilst this type of machine has the potential to protect the operator from some of the risks associated with working on a gradient, precautions must still be taken to avoid incident.

Specific risks associated with operation of remote-controlled rotary mower on slopes:

- Machine loses traction on slope due to surface conditions results in operator losing control.
- Machine becomes unstable/over-turns on slope resulting in operator losing control.
- A component of the machine becomes detached and is ejected from the machine.
- Mown debris is ejected from the machine.
- The operator slips or trips whilst operating the machine.



To prevent/reduce the likelihood of incidents:

- Remote controlled mowers are subject to operational limits in terms of gradient, which must be adhered to. Specific models of mower differ in their operation and risks associated with their use. The manufacturer handbook must always be consulted prior to allocation of equipment to sites and operation.
- Some remote-controlled mowers feature a winch, which a) enables the mower to work on particularly steep slopes and b) reduce ground disturbance. Consult the manufacturer's instruction manual to ensure this device is used correctly.
- The maximum recommended working gradient of remote-controlled mowers is significantly lower in wet weather. Check operator manual for more information.
- When using any machine on a slope, the operator must not enter the area directly above or below the machine when it is in operation. Respect the safety distance between operator and machine specified by the manufacturer (commonly a minimum of 5 metres).
- Ensure third parties do not breach the safety distance specified by the manufacturer, commonly in the region of 15 metres. Cordons, barriers or signage may be used to delineate this safe distance.
- If the machine is stopped on a slope, the wheels must be positioned across the slope to prevent the vehicle moving.
- Maintenance and pre-use checks of all machinery are essential to guarantee safety and useability of equipment.
- A site-specific assessment must be carried out by a supervisor prior to allocation of the machine, together with a risk assessment by the operative prior to use on site.
- The risk assessment should note the presence of significant obstacles, as well as the terrain and nature of slopes. A risk assessment carried out by the operator prior to each work activity should note the weather conditions and terrain and take these into account during use.

7.2 Ride-on tractors and mowers

Ride-on machinery may be used to cut grass on level ground as well as slopes. This category of machinery and its abilities vary widely according to brand, model, attachment fitted, terrain, driving style and weather.

Due to the presence of an operator, the use of ride-on tractors and mowers on slopes must be assessed and managed with caution, and precautions taken to avoid situations where the operator is placed at risk.

Specific risks associated with operation of ride-on tractors and mowers on slopes:

- Machine loses traction on slope due to surface conditions and operator loses control.
- Machine becomes unstable/over-turns.
- A part of the machine becomes detached and is ejected from the machine at high speed.
- Debris is ejected from the machine at high speed.

To prevent/reduce the likelihood of incidents:

- A site-specific assessment must be carried out by a competent person prior to selection of a suitable machine for a task, together with a risk assessment by the operative prior to use on site. The risk assessment should note the presence of significant obstacles, as well as the terrain and nature of slopes. The risk assessment carried out by operative should note the weather conditions and terrain.
- Third parties must not breach the safe working distance from the machine specified by the contractor. This is commonly in the region of 15 metres. Cordons, barriers or signage may be used to delineate this.

- Do not assume a machine can work at the maximum specified gradient on all sites and conditions. The maximum gradient of operation is dependent on the method/direction of mowing, weather conditions and terrain.
- Ensure roll-over protection system (ROPS) are in place and seatbelts are worn. No machine should be operated on a slope without ROPS and seatbelt.
- When working on slopes avoid:
 - Sudden sharp acceleration, steering or braking
 - Reducing engine speed whilst moving
 - Turning on slopes unless necessary. If necessary, turn slowly and gradually
 - Attempting to stabilise the machine by putting your foot on the ground
 - Freewheeling/disengaging the engine from the transmission
- Be mindful of moving between surfaces which offer different levels of grip
 - Moving from areas exposed to sun to shade
 - Uneven ground
 - Driving over mowed material

Specific models of mower differ in their operation and risks associated with their use. The manufacturer handbook must always be consulted prior to allocation of equipment to sites and operation.

- Ensure the maximum operating gradient of a machine is not exceeded when loading and unloading a machine from a vehicle or trailer, and note the potential risk posed by moisture and debris on ramps.

7.3 Pedestrian mowing machinery

Pedestrian mowing machinery may be used to cut grass on level ground as well as slopes. This category of machinery and its abilities vary widely according to brand, model, terrain, operator and weather.

Pedestrian mowing machinery may include:

- Wheeled mower with rotary blade
- Wheeled or tracked mower with flail deck
- Roller mower with cylinder
- Hover mower

Specific risks associated with operation of pedestrian mowing machinery on slopes:

- Machine loses traction on slope due to surface conditions and operator loses control
- Machine becomes unstable/over-turns on slope
- Operator slips whilst operating machine and foot comes into contact with spinning blade
- A part of the machine becomes detached and is ejected from the machine at high speed
- Mown debris is ejected from the machine at high speed



To prevent/reduce the likelihood of incidents:

- A site-specific assessment must be carried out by a competent person prior to allocation of the machine to a site and task, together with a risk assessment by the operative immediately prior to use on each occasion. The site-specific risk assessment conducted by the competent person should note the presence of significant obstacles, as well as the terrain and nature of slopes, whilst the risk assessment conducted by the operative should note dynamic factors such as weather, conditions and terrain

- Do not assume the machine can work at the maximum specified gradient on all sites and conditions. The maximum gradient of operation is dependent on the method/direction of mowing, weather conditions and terrain.
- Mowing must be completed across the face of slopes, not up and down
- The operator should not pull the mower towards them at any time, particularly when working on a slope
- Stop the blade or engine if the mower needs to be transported between sites where the terrain is unknown

NOTE

Due to the perception of reduced operator risk associated with pedestrian mowers on slopes, pedestrian machinery is commonly used on gradients which exceed the parameters specified by the user manual.

Aside from the risk to operatives, extended operating periods on gradients which exceed those specified by the machinery user manual may result in damage to the machine due to oil starvation.

THESE ACCIDENTS COULD HAPPEN TO YOU

An operative was mowing a slope in a public park with a pedestrian mower. The mower slipped on wet grass resulting in the hand of the operative being crushed between the handle of the mower and park railings. The operative suffered cuts, bruises, and a broken finger.

Assessment of the site by trained operatives prior to works would have identified the risk posed by dew and resulted in appropriate measures being taken.

7.4 Brush-cutter/grass trimmer/strimmer

Brush-cutter or grass trimmer machinery may be used to cut grass on level ground as well as slopes. This category of machinery is commonly used on gradients which exceed the specified limitations of ride-on equipment as well as remote-controlled machinery.

Specific risks associated with operation of pedestrian mowing machinery on slopes:

- Operator slips whilst operating machine and falls down slope
- Part of the machine becomes detached and is ejected from the machine at high speed
- Mown debris is ejected from the machine at high speed



To prevent/reduce the likelihood of incidents:

- A site-specific risk assessment must be carried out by a competent person prior to allocation of the machine, together with a dynamic risk assessment by the operative prior to use on site. The risk assessment should note the presence of significant obstacles, as well as the terrain and nature of slopes. The dynamic risk assessment should note the weather conditions and terrain.
- Operatives required to use brush-cutter or grass trimmer machinery should be provided with suitable safety footwear that affords sufficient grip and ankle support. Depending on ground conditions, accessories such as grips or crampons may also be worn.
- Slopes with a gradient exceeding 33° necessitate consideration of a rope and harness system. This method of working requires the following precautions:
 - Personnel involved in the work process must have received specific training and be assessed in relation to rope access and work positioning
 - Works requiring rope access or work positioning cannot be undertaken solo. Minimum two-person teams to be enforced, with additional team members depending on complexity of works
- Operatives required to use pedestrian machinery on slopes should be provided with suitable safety footwear that affords sufficient grip and ankle support.
- Do not operate machinery at the base of over-head power line poles or structures, as cables may be present at ground level which the brushcutter/grass trimmer/strimmer may strike.

NOTE

Due to the perception of reduced operator risk associated with brush cutter use on slopes, operatives commonly undertake works on slopes which exceed safe working practice.

8.0 Maintenance of machinery

The law places duties on employers in relation to equipment used for work by employees. The Provision and Use of Work Equipment Regulations 1998 (PUWER) places duties on people and companies who own, operate or have control over work equipment. PUWER also places responsibilities on businesses and organisations whose employees use work equipment, whether owned by them or not.

Inspection of equipment is necessary where a risk assessment has identified any significant risk (e.g., major injury) to operators from the equipment's installation or use. Inspection of equipment is required to identify whether work equipment can be operated, adjusted and maintained safely, with any deterioration detected and remedied before it results in a health and safety risk.

The detail of an inspection can vary in its extent from a quick check before use (pre-start check), to a weekly check and more extensive examination. The inspection regime will depend on the equipment, its use, and the conditions to which it is exposed.

Equipment can be inspected by anyone who has sufficient knowledge and experience; including in-house staff taking into account manufacturer recommendations and industry advice. The necessary level of knowledge and experience will vary depending on the type of inspection.

In addition to the checks and maintenance activities outlined in the user manual, specific aspects of machine maintenance are of relevance to safe working on slopes:

■ Condition of tyres

Whilst tyres fitted to lawn maintenance equipment do not wear at the same rate and in the same fashion as automotive tyres, they are susceptible to abrasion, cracks and punctures. Lawn tyres do not contain tread wear indicators, nor do manufacturers supply advice regarding the safe limit of tyre wear, meaning operators of machinery must monitor tyre wear themselves.

■ Tyre pressure (where applicable)

Refer to the manufacturer handbook for recommended tyre pressures and check these monthly, with a gauge. Specified tyre pressures for most ride-on mowers are significantly lower than automotive tyre pressures; in the region of 14 psi for front tyres and 10 psi for rear tyres.

NOTE

Over or under-inflating tyres can significantly reduce traction.

■ Condition of brakes

Correctly functioning brakes are essential for the safe use of ride-on equipment on slopes and gradients. Refer to the manufacturer handbook for inspection and maintenance regimes.

9.0 Suitability of machine

The manufacturer instruction manual should be the first point of reference when identifying the suitability of machinery for working on slopes.

NOTE

The ability of many machines to work on slopes varies according to:

- Attachment fitted
- Accessory fitted
- Tyre configuration (e.g., Standard, Wheelbase extension, dual wheel arrangement)

10.0 Monitoring and review of guidance

Deviation from agreed safe working practices may lead supervisors and managers to consider the following:

- Is the method established appropriate or are changes needed?
- Have all reasonably foreseeable circumstances and risks been anticipated?
- How effective is the current training?
- Is there a need for external training for specific activities or machinery? This approach may be necessary in smaller businesses that lack in-house training staff or relevant experience/knowledge
- Is improved supervision needed?

Reviews of incidents, accidents, ill health reports and near misses can help managers identify potential flaws in systems.

To be effective, risk assessments and safe working practices should be reviewed periodically or following an accident or change in procedures.

The following checks might be suitable:

- Vehicle check inspection sheets
- Periodic on-site inspections of working practices (e.g., use of machinery, appropriate PPE, pre-use checks of equipment)

Those carrying out monitoring and supervision should be appropriately trained.

10.1 References and useful information

British Standard (BS) 4428:1989 Code of practice for general landscape operations (excluding hard surfaces)

Health and Safety at Work etc. Act 1974

<https://www.legislation.gov.uk/ukpga/1974/37/contents>

Health and Safety Executive: Employer's responsibilities

<https://www.hse.gov.uk/workers/employers.htm>

Health and Safety Executive: Managing risks and risk assessment at work

https://www.hse.gov.uk/simple-health-safety/risk/index.htm?utm_source=hse.gov.uk&utm_medium=referral&utm_campaign=risk&utm_content=home-page-info

Health and Safety Executive website: Mower removes slip victims toes (GRAPHIC IMAGE)

<https://www.hse.gov.uk/slips/experience/mower.htm>

Safety And Health Practitioner website: Council failed to learn from previous mower incidents

<https://www.shponline.co.uk/safety-management/council-failed-to-learn-from-previous-mower-incidents/>

11.0 Disclaimer

The guidance contained within this document is not a substitute for duty holder judgement and/or professional safety advisor's judgement.

Nothing in this document constitutes legal or other professional advice and no liability is accepted for any loss of damage suffered as a consequence of reliance on the guidance contained within this document.



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