



FORS
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TRAINING, INFORMATION, KNOWLEDGE

**BRIDGE
SMART**



Prevention of Bridge Strikes Toolkit

The quality standard for all fleet operators

Foreword

The Bridge Smart Toolkit aims to promote a series of 'smart' measures needed to prevent heavy good vehicles (HGV) bridge strikes.

The aim of the toolkit is to create sustained behaviour change and enhanced awareness of HGV bridge strikes within the transport industry. It is specifically intended for transport managers, supervisors and driver trainers via three complementary tools.

The Bridge Smart module includes the following:

- Toolkit – the toolkit is applicable and accessible to HGV operators via the Fleet Operator Recognition Scheme (FORS) website. This toolkit contains easily applied practical advice, sample policies, resources and internal communications material to help transport managers adopt industry best practice regarding route planning, measuring vehicle height and meeting the legal requirements for displaying vehicle heights and reporting incidents.
- eLearning – an online module used to embed the knowledge gained through the toolkit in an interactive and engaging way.
- Group training – based on the eLearning, this option gives transport managers, supervisors and driver trainers the tools to run training sessions in a face-to-face environment if the eLearning option is not appropriate for their business.

Acknowledgements

The Bridge Smart Toolkit and the associated learning materials were developed in collaboration with industry stakeholders. The expert contributions made by the organisations and individuals consulted during the development of this toolkit are gratefully acknowledged

With thanks to:

Construction Plant Equipment Association
DHL
Freight Transport Association
GBA Group
High Speed Two (HS2) Limited
JDC Transport
Murphy Group
Network Rail

Richard Williams Images
Road Haulage Association
Metropolitan Police Service
Ted Cottrell Photography
Transport for London
Walkgrove
Wincanton
WSP



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Introduction

1. Introduction

Bridge strikes by HGVs happen every day. They cause millions of pounds of damage each year, as well as causing negative social and environmental impacts such as injuries, congestion and air pollution. Bridge strike incidents also incur significant costs for HGV operators and public agencies, generating possible reputational damage and legal action.

Bridge strikes are entirely avoidable if the right measures are put in place. Transport for London (TfL) joins Highways England, Network Rail, local authorities and emergency services around the country in taking action to reduce the harm caused by bridge strikes.

The Bridge Smart Toolkit is formed of three themes to:

- **Re-set** the culture about preventing bridge strikes in the freight transport sector
- Help operators **re-learn** best practices through raising awareness, education and training
- **Re-gain** industry best practice to prevent bridge strikes

This toolkit explains smart, practical and easily adoptable measures that all HGV operators can take to reduce their risk of bridge strikes and, in the worst-case scenario, respond appropriately if they happen. It includes tools for improving driver knowledge, examples of best practice and internal communications resources.

Who is this toolkit for?

This toolkit is targeted at HGV operators of all fleet sizes and types. It is recommended for transport managers, supervisors and driver trainers.

How to access further training

Two other training resources support this toolkit:

- An online, interactive eLearning module that embeds toolkit knowledge about how to prevent bridge strikes
- A group delivery version of the eLearning, which is suitable if online learning is not appropriate for an operator's business

These short and interactive training modules are aimed at driving staff, but transport managers and supervisors should also access one of these learning resources so that they are fully aware of all relevant issues.

For more information, see the Training area of the [FORS](#) website.

Operators should also refer to the [FORS Collision Management Toolkit](#), which includes many complementary policies and practices and is available in the Toolkits area of the FORS website.



The impact of bridge strikes

2. The impact of bridge strikes

What is a bridge strike?

A bridge strike is an incident in which a vehicle, its load or equipment collides with a bridge. Most bridge strikes happen where roads pass under a railway bridge, a road bridge or a footbridge, but they can also take place on road bridges over a railway line or road.



Did you know?

Bridge strikes reach their peak in October/November, with around 10 incidents reported every day. This could be due to the clocks changing back to GMT from BST or to increased deliveries ahead of Christmas. Statistically, most bridge strikes happen between 10:00 and 11:00, but the number of incidents remain high all day until around 18:00 and can cause hours of travel chaos.

The cost of bridge strikes

On average, there are five HGV bridge strikes every day and 1,800 every year.¹ Although the annual number of bridge strikes has decreased slightly in recent years, they are still very common. These frequent collisions have wide-ranging social, environmental and commercial impacts.



Did you know?

There are some bridges that are prone to being hit. The most 'bashed' bridge in Britain is currently Stuntney Road Bridge in Ely, which has been hit 222 times between 2000 and early 2018.

Kenworthy Road Bridge in Homerton, London, comes second with 99 strikes over the same period. Third in the unwanted list, is a bridge on Thurlow Park Road in Tulse Hill, South London which has been struck 92 times.

For members of the public, the most serious risk is of injury and death to road users and passengers. Extreme cases are fortunately rare, but for every major incident there are many more near misses (Figure 1).

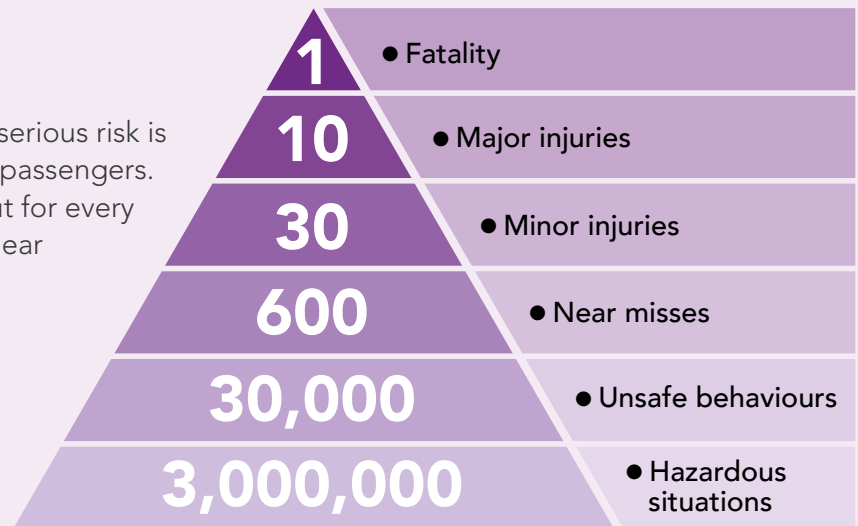


Figure 1. Heinrich's Law (Heinrich, 1931)²

Other impacts of bridge strikes on the general public include:

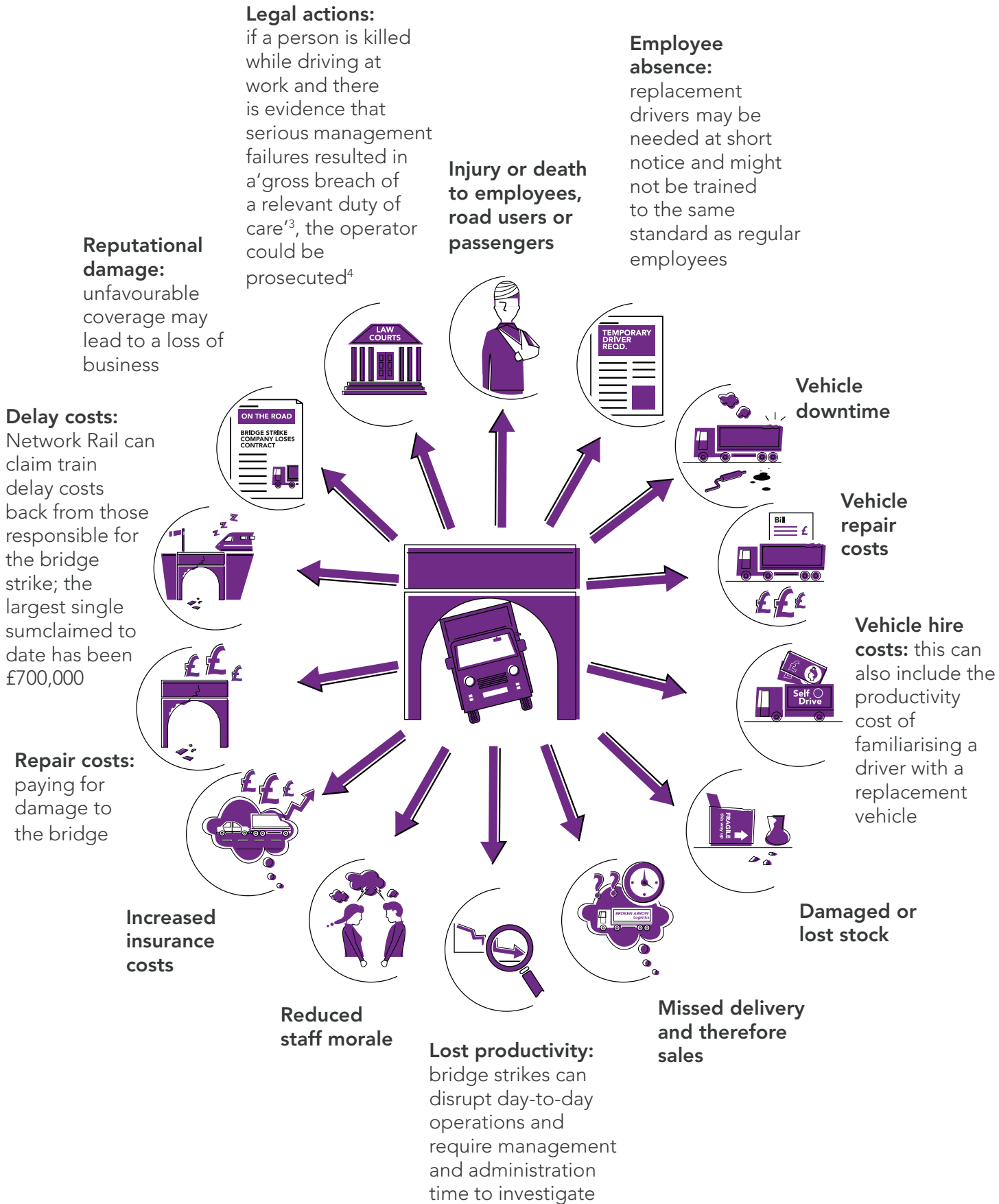
- **Delay causing congestion:** caused by bridge strikes and the work to repair them can result in significant and unpredictable delays, which impact businesses and individual road users. Each bridge strike delays trains by an average of two hours.
- **Environmental damage:** the congestion caused by bridge strikes negatively impacts air quality.

- **Financial burden:** each year, bridge strikes cost the taxpayer £23m in damages and delays.

For agencies that are responsible for the bridge involved, bridge strikes also incur significant costs. Network Rail has fitted steel beams on rail bridges that experience a large number of strikes to reduce damage to infrastructure. However, the average cost to Network Rail for each bridge strike is £13,000 and costs can rise to **£1m per hour**, for example if the collision results in the closure of a railway line.



For HGV operators, the impacts of a bridge strike can be substantial and affect the whole organisation:



For drivers, collisions such as bridge strikes can cause injury or death. Drivers who are found responsible for a bridge strike might face disciplinary action, potentially receive fines and incur fixed penalties, and/or may be prosecuted for careless driving. Negligent drivers can also be held personally liable for costs related to damages and repairs. These consequences can all impact future employability.

The cost of bridge strikes: case studies

Some examples of bridge strikes are shown next.

Injuries: In 2010, a lorry collided with the parapet of a road bridge in Oxshott, Surrey, fell onto the railway and struck the roof of a passing train. The lorry driver was injured and trapped inside the lorry's cab. The rear three carriages of the train were damaged, and the rear carriage of the train was derailed. One passenger, sitting directly beneath the point of impact, was seriously injured and five other passengers received minor injuries.⁵

Delays: In 2017, a very busy road in Bristol was closed for a week due to a lorry striking a low footbridge with its crane, which had been left in the 'open' position (Figure 2). This caused severe delays to all road users.⁶



Figure 2: Bristol. (Source: Bristol Post)

Legal action and driver penalties: In 2016 a lorry became stuck under a bridge near Byfleet, Surrey (Figure 3). This delayed trains for 41 minutes, costing Network Rail over £3,000. Network Rail

recovered costs from the negligent driver, who also received five penalty points on their licence and a £454 fine for careless driving. However, claims against a driver/company found to be responsible for damaging a Network Rail bridge (or other infrastructure) can reach significant amounts; in 2017 one of the largest claims reached over £700,000. This is made up of cost of inspecting, repairing and paying compensation to rail companies for the disruption caused. Network Rail is focussed on controlling its' costs and will not bear the financial impact of these incidents which should be correctly be borne by those responsible.



Figure 3: Byfleet, Surrey. (Source: Surrey Roads Police)



Did you know?

The organisation responsible for a bridge depends on whether the bridge involves a railway line (Network Rail), an underground line (London Underground) or a footbridge (Highways England and/or local authorities), and where in the country the bridge is located.

Why do bridge strikes happen?

A recent piece of research has indicated that the vast majority of bridge strikes are caused by driver actions. According to Network Rail, three-quarters of incidents are caused by driver error.

During these investigations, 43 per cent of interviewed lorry drivers admitted that they did not know the size of their vehicle, and 52 per cent said they do not take low bridges into account when planning their journeys.⁷

Driver education and behaviour change is therefore crucial to reducing the number of bridge strikes.

Reasons for bridge strikes



- Lack of driver awareness**
- Arch - lorry not in the centre of the road**
- Lifting arm left in raised position**
- Driver did not know height of vehicle**
- Other non-driver related reasons**

Figure 4: Reasons for bridge strikes



Size matters!

'Size does matter when you're a professional driver in a heavy vehicle. Not knowing the size of your vehicle or load could lead to a serious accident and the loss of your licence. Every incident creates potential delay for tens of thousands of passengers and potential costs for taxpayers, and this is happening multiple times a day.

It's only a matter of time before road or rail users are killed as a result of this carelessness; we need professional HGV drivers and their operator employers to get behind and support this campaign to eradicate bridge bashing.'

Sir Peter Hendy, Chairman of Network Rail



Terminology

3. Terminology

- **Bridge strike** - An unplanned event that involves an HGV vehicle colliding with a bridge and that results in damage, injury or loss.
- **Dangerous occurrence** - An unplanned and undesired incident that has the potential to cause injury, and which may or may not cause damage to property, equipment or the environment.
- **Defect report** - A form completed by a driver on discovering a vehicle defect. It is usually completed before setting out on a journey and passed to a supervisor or manager after completing a daily vehicle check.
- **Fatal collision** - A collision where at least one person is killed.
- **First notification of loss (FNOL)** - The initial contact to the insurer regarding a claim or incident that has resulted in loss or damage to an insured vehicle.
- **Fleet operator** - Any organisation that operates one or more vehicle(s).
- **Fleet Operator Recognition Scheme (FORS)** - The voluntary recognition scheme that requires operators to obtain and maintain standards of certified operating procedures.
- **Health and Safety Executive (HSE)** - The body responsible for the encouragement, regulation and enforcement of workplace health, safety and welfare, and for research into occupational risks in Great Britain.
- **Heavy goods vehicle (HGV)** - Vehicles over 3.5 tonnes.⁸
- **Height indicator (in-cab)** - Equipment inside the driver's cab that displays the vehicle travelling height for that shift.
- **Incident** - This can refer to collisions and near misses.
- **Killed or seriously injured (KSI)** - A collision that results in serious injury or fatality.
- **Near miss** - An unplanned event that has the potential to result in injury, ill health, damage or loss.
- **Policies** - The guidance and objectives that drive the processes and procedures. They answer the questions: 'What do I need to do?' and 'What are we aiming to achieve?'
- **Procedures** - The series of sequential tasks that should be performed within a process. They answer the question: 'What steps do I need to take to do something?'
- **Processes** - High-level description of a series of tasks performed by a range of roles. They answer the question: 'How do I do something?'
- **RIDDOR** - Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (2013).
- **Toolbox talk** - A short briefing or presentation to drivers and other transport staff by managers or supervisory staff.
- **Vulnerable road user (VRU)** - A pedestrian, cyclist, motorcyclist, equestrian or person of reduced mobility.
- **Walk around check** - An activity carried out by the driver that involves walking around the vehicle to check that important in-cab equipment is in full working order.



How to prevent bridge strikes

4. How to prevent bridge strikes

Take responsibility

To reduce the risk of bridge strikes, operators must ensure their drivers adhere to best practice. All employers have a legal obligation to maintain health and safety standards to minimise the risk of workplace collisions. Employers have a duty of care towards their employees and must ensure that they are working in a safe environment, either with equipment or in a company vehicle.⁹

Identify risk

Planning for the prevention of bridge strikes should be incorporated into a risk management process. Operators should assess the risk of their organisation having a bridge strike, considering any bridge strikes that have already occurred and fully investigating the circumstances in which they happened.

Risk assessments should also acknowledge the different risk levels of bridge strikes for vehicles of various heights, such as vans or light goods vehicles.

Adapt policies and procedures

HGV operators should clearly document all necessary procedures and policies that ensure their drivers avoid and learn from potential bridge strikes.

Operators may already have policies and procedures in place that are relevant to bridge strike prevention, such as health and safety reporting or collision procedures.

It is recommended that operators use this toolkit to revise their existing policies and procedures with additional best practice measures, as required.

Communicate

Operators should use all available in-house communication tools, such as team briefings and newsletters, to ensure that drivers are aware of the measures they need to take to avoid bridge strikes.

If new procedures are introduced, all drivers should be given training to ensure that they are following company policy and best practice. Driver handbooks should be updated as necessary.

Enclosed within this toolkit, operators will find toolbox talks (Appendix 2) and posters (Appendix 3) that can help businesses to communicate any new or updated procedures to their driving staff.

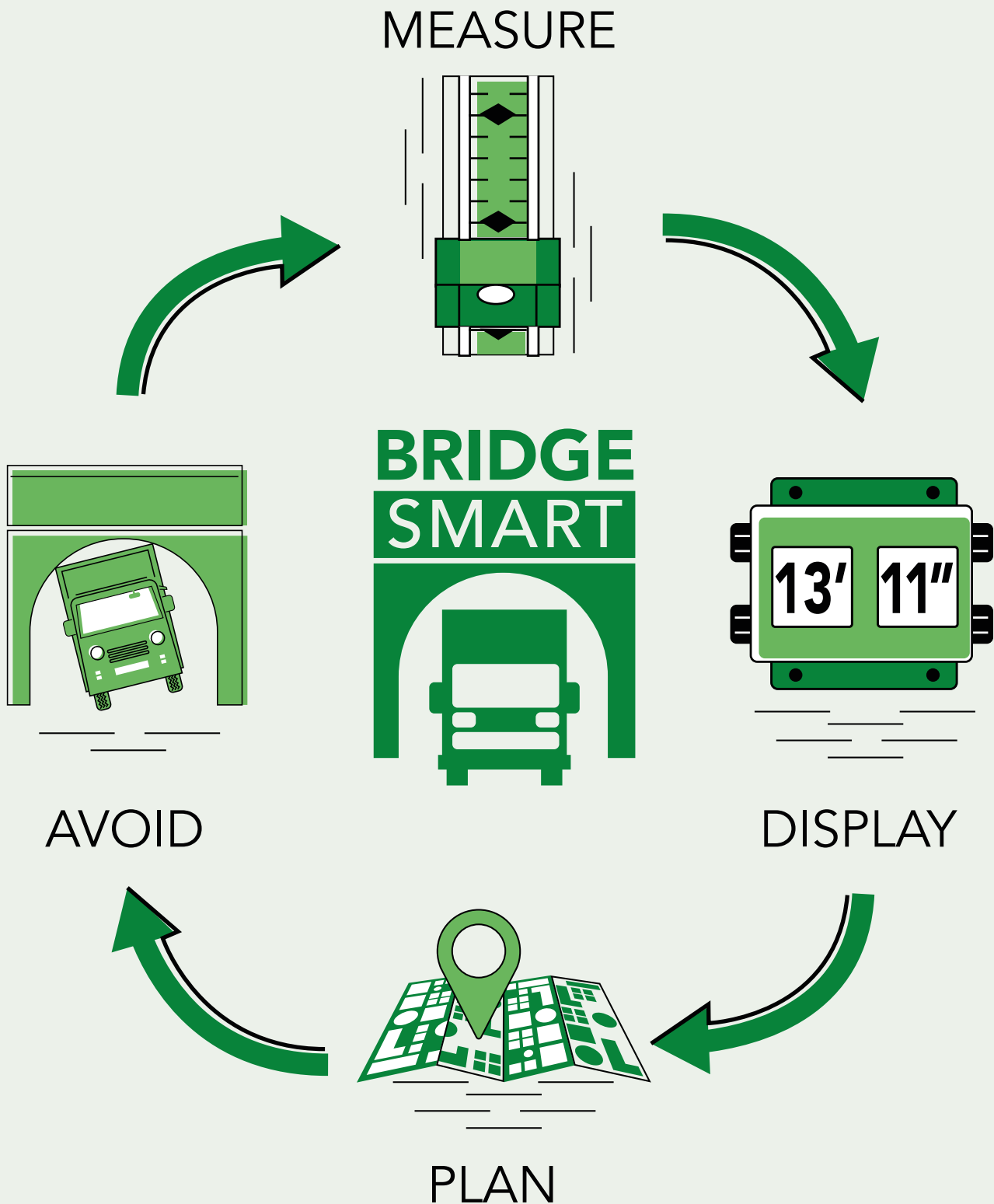
Operators should also consider appointing a Bridge Strike Prevention Champion to coordinate bridge strike prevention measures, such as a transport manager, supervisor or driver trainer.

Recruit wisely

A responsible attitude is an important character trait for a driver. To reduce the risk of bridge strikes, the recruitment of permanent and agency drivers is key. A robust recruitment procedure could include assessing the approach of an applicant towards preventing bridge strikes; this would be a good way of gauging their general attitude to responsible and professional driving. There is extensive information on this area that can be found in the [Effective Driver Management \(EDM\) Guide](#).

Take action

Operators can take action to avoid bridge strikes by ensuring that their drivers follow four key steps for every vehicle trip.



1. Measure

To avoid a bridge strike, drivers must know the height of their vehicle (this is also a legal requirement for HGVs).¹⁰ All new drivers and agency staff should understand when and how to measure their HGV accurately.

When should vehicles be measured?

At the start of a shift

Drivers should check the vehicle's overall height at the start of each shift. This is because the fifth wheel height can change depending on the make of the tractor unit and the semi-trailer combination being used.

If the same tractor unit/semi-trailer combinations are being used, drivers should still measure their vehicle's overall height at the start of each shift. Differing fixed height unit/semi-trailer combinations may have variable travelling heights, because the overall combination height will vary between different makes and variants.

At the start of a journey

Drivers should be made aware that they need to re-measure their vehicle during their shift, because their load heights can vary from journey to journey. The vehicle should be re-measured before beginning the next trip if there is a change of tractor or trailer (eg moving from a curtain-sider to a double-deck high-sided trailer).

When the vehicle is laden

For operations where the load height varies (eg transporting cars, plant equipment or waste), drivers should measure their vehicles when laden at the highest point of the load or vehicle – whichever is greater.

How should vehicles be measured?

All operators should have procedures in place so that drivers can measure vehicle heights accurately. Measurement of vehicle height should be incorporated as part of drivers' vehicle walk around checks, which are required by law.¹¹

Drivers should use a measuring stick to ensure accurate vehicle height measurement and operators should make these available to all drivers. There are a number of measuring sticks available commercially.

Best practice recommends the following steps:

1 Prepare vehicle for measurement.

Ensure the vehicle is parked on a flat level surface.



Ensure that any adjustable ancillary equipment (eg lorry-mounted crane or grab) is put into the **closed** position.



If there are adjustable aerodynamics (ie cab air deflectors), these need to be taken into consideration and the vehicle needs to be measured at its highest point.



For vehicles with a variable load height, such as those transporting cars, waste or plant equipment, drivers should measure up to the highest point of the load. This point is known as the vehicle travelling height.



2 Measure the highest point of the vehicle or its load, whichever is the highest.

The driver should take a height measurement that combines the tractor unit's fifth wheel height and the height of the semi-trailer. These measurements may already be displayed on the vehicle exterior (Figure 5), but a physical measurement should always be carried out to check that this is correct.

3 Record the height on the walk around check report.

The vehicle height should be recorded when completing the walk around check report. An example of this is included in Appendix 4.



Figure 5: Height displayed on vehicle



2. Display

All vehicles with an overall travelling height of more than three metres (or 9ft 10in) are required by law to display the maximum vehicle height in the vehicle cab. For further information on the regulations, see Appendix 1.

In-cab display equipment

Best practice requires that transport operators install variable height indicator equipment in all tractor unit cabs (Figure 6). For rigid vehicles with a fixed height, a means to adjust the height displayed is not needed; however for artics and those with different load heights, a variable height indicator is required because different tractor-trailer combinations can create vehicle height variability, as can different load heights, eg cars or plant equipment.



Figure 6: In-cab variable height indicator. (Source: Road Haulage Association)

After measuring their vehicle height, drivers must display the height in the cab using the indicator.

In addition to displaying the height, drivers should memorise their vehicle height so that they can take appropriate action to avoid bridge strikes when travelling.

At the end of each shift, drivers should re-set the variable height indicator back to zero.

What if there is no display unit or sign?

If there is no display unit in the cab, drivers should report this as a defect immediately as height, by law, must be displayed in a place where a driver can see it. As a temporary measure, a driver could write their vehicle measurement on a sheet of paper and place this in their cab where they can see it clearly, such as next to the mirror.

The operator will then need to action this defect of not having a working display unit according to their standard procedures and organise for a display unit or sign to be installed.

How can operators ensure that measurement and display procedures are followed?

To ensure that drivers complete all tasks, operators are recommended to include the measuring and display of vehicle dimensions on the walk around check reports, guidance for which can be seen in Figure 7.

Operators also need to implement procedures to check that their drivers have measured the vehicle and are displaying the correct vehicle height. This could include conducting visual checks that measuring sticks are being used, audits of walk around check reports or asking drivers their vehicle height and verifying this before they leave the site. Transport managers need to consider what corrective action they need to take in the event of a driver not completing pre-journey checks and being able to confirm the vehicle height. This could be retraining or disciplinary action.

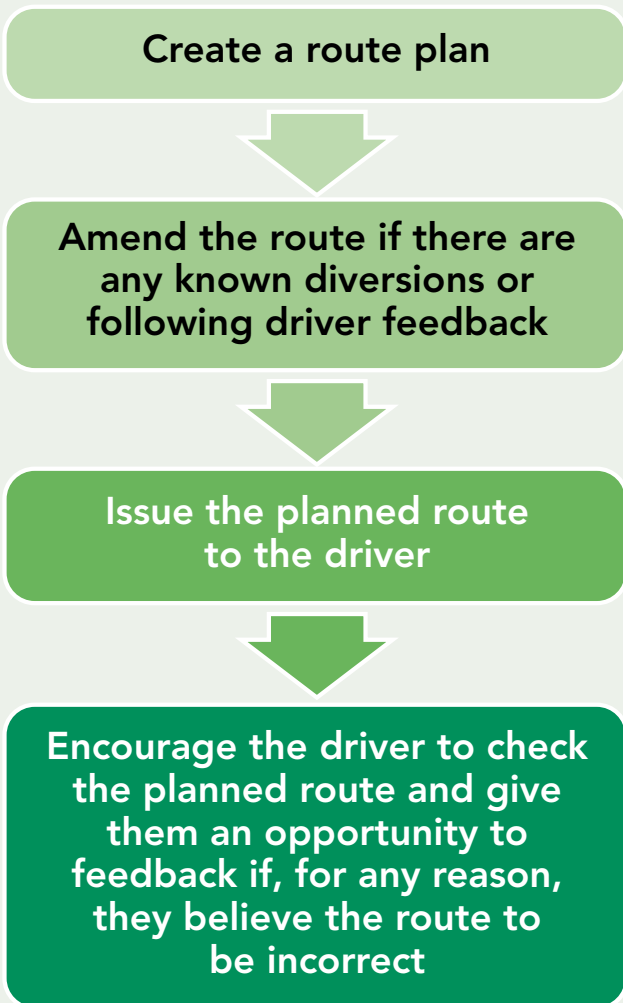


Figure 7: Walk around check report

3. Plan

Operators should support drivers in planning a safe route that avoids potential bridge strike situations.

Transport managers and supervisors need to take the following steps:



Operators should have a well-defined policy that instructs drivers to follow their planned route and to investigate any unauthorised deviations. Investigations can be assisted by vehicle tracking devices, which can be used to access past route information. Clear consequences for not following the agreed route must be agreed and communicated.

Mapping tools

There are many tools available to support route planning including traditional maps, bespoke planning tools and online route maps. It is best practice for operators to select planning tools that are HGV-appropriate, accurate and easy to use.

Low-cost tools

If operators wish to use low-cost mapping tools, they can refer to a truck driver's atlas. Searching online for 'trucker's atlas' brings up a range of options to purchase. Operators can also make use of web-based tools in order to check locations and close-up images of low bridges, which are based on [Google Maps low bridge data](#).



Planning software

Routing and scheduling software that considers HGV data (such as height, width, length, weight or restricted roads) can help vehicle operators to conduct safe and appropriate route planning.

Operators can record the dimensions of each of their vehicle types in the software. This functionality makes it easy to avoid low bridges based on the chosen vehicle for the trip, because the software can suggest alternative routes (Figures 8 and 9). If an operator has a selection of suitable vehicles for a particular load, routing software can also suggest switching vehicles to one with a lower height.

As with all software planning tools these are dependent on their data being accurate, so it is important to also use local knowledge and other information sources where appropriate.



Figure 8: Route-planning software advises HGVs to take the alternative route to Stuntney Road Bridge, which is safe for vehicles up to 5 metres. (Source: Google Maps, 2017)



Figure 9: Stuntney Road Bridge (2.7 metres) in Ely with low bridge warning sign on the left and an HGV vehicle taking the adjacent route on the right. (Source: Google Maps, 2017)

4. Avoid

Even with good planning, unforeseen situations can happen out on the road. This could be a diversion in place, or the route provided by the transport manager is for some reason incorrect. Drivers should be equipped and trained to react to unforeseen situations in a safe and responsible manner. There are now developments in in-cab sensors that forewarn of low bridges and, increasingly, technology can provide helpful solutions to prevent incidents from happening.

Low bridge response

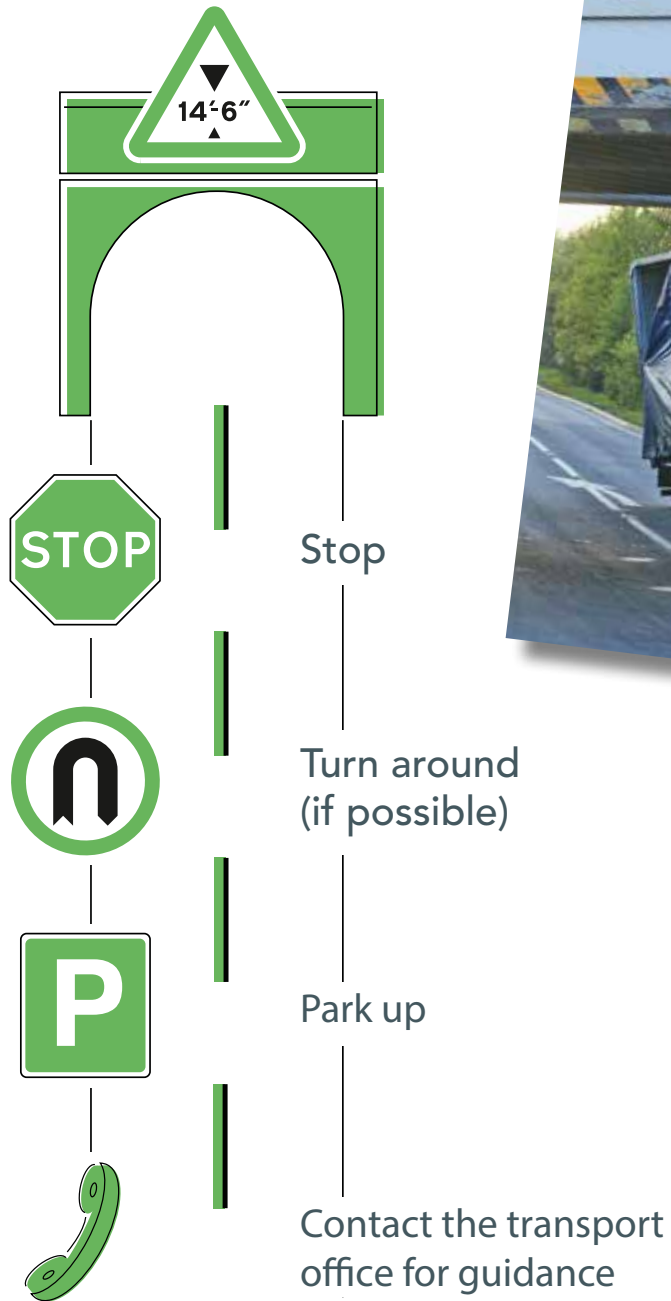
All operators should have clear instructions for drivers about how to respond if they are approaching a low bridge and believe that by proceeding they would be at risk of striking it.

Best practice recommends that drivers should allow a reasonable tolerance between their vehicle height and available headroom to ensure safe passage under the bridge.

The most important message is:
if in doubt, don't risk it.



If there is any risk of striking a bridge, drivers should:



Hazard awareness

There are a number of hazards that may affect the safe clearance height of a low bridge that drivers should be made aware of. These include:

Resurfaced roads. A resurfaced road directly under a low bridge may affect the available headroom if, for example, the road has only been recently resurfaced and the height and signage has not been re-checked by the Highways Agency.



Bends and adverse cambers near to or under a bridge. Bends will affect the path of an HGV on approach to a bridge (dependant on configuration) and any adverse camber angle can affect the overall height of the HGV on one side. This should be considered when conducting route planning.



(Source: The Daily Post)

Arched bridges. The available headroom under arched bridges is at the highest at the centre and many arched bridges will have 'goal post' markings to show the position of the HGV on approach. If the driver follows this path, then the available headroom as signposted will be available, if there is any deviation then there is a risk of a collision with the lower segments of the arch. So, the emphasis is on the correct positioning whilst transiting under the bridge. In some cases, further aids such as chains are used as a warning to high vehicles.



Diminishing bridges. Similar to those on a bend or adverse camber, some bridges may have different heights at different points, often meaning that the available headroom as you enter is reduced considerably the other side. In these cases, the height will be measured at its lowest passable height and, similar to arched bridges, may have markings to guide vehicles through the safest point.



Signs

All bridges with a clearance of less than 16ft 6in (5.03 metres) are signed. Drivers should be familiar with relevant warning and information signage.

TfL, Highways England, Network Rail, local authorities and the emergency services continue to check the accuracy and location of bridge height warning signs to support operators in avoiding bridge strikes.

Both regulatory roundels and warning triangles can be used, depending on the type of bridge (Figure 10).



Figure 10: Warning and regulatory signs

Circular signs indicate that no vehicles over the height shown may pass the sign. Metric measures in metres are shown on the top row and imperial measures in feet and inches are on the bottom.

Triangle signs are a warning of a height limit. The maximum safe headroom at an arch bridge is shown on triangular warning signs.

Often, signs are combined with road markings to indicate where the vehicle should position itself in the road to gain maximum clearance. Road markings (known as 'goal posts') guide high vehicles through the highest part of arch bridges (Figure 11).

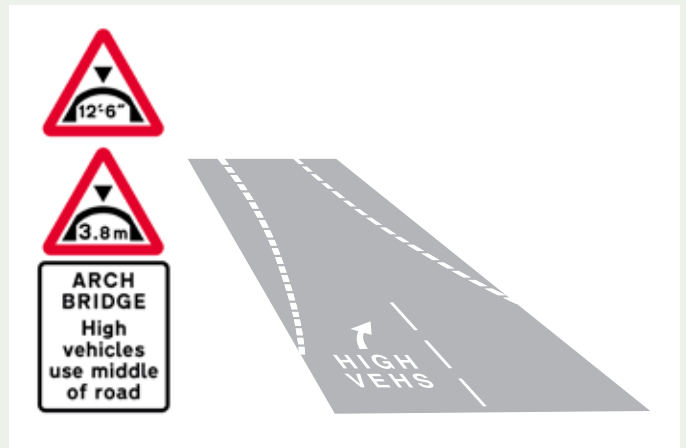


Figure 11: Road markings

Drivers of all vehicles should give way to oncoming high vehicles in the middle of the road when there is insufficient room to pass. Drivers of cars and other low vehicles may keep to the left-hand side of the road, crossing the road markings where this would enable them to pass oncoming vehicles safely.

Signs may show a sharp deviation of the route in the direction of the chevrons (Figure 12). Sharp turns near to or under a bridge may prevent longer vehicles from passing through safely.

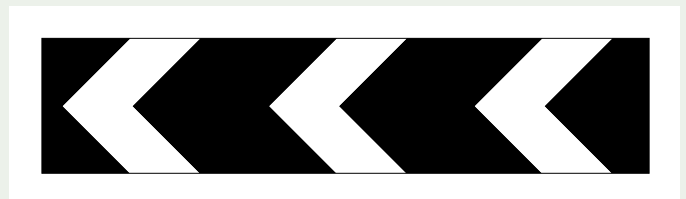


Figure 12: Sharp turning to the left

Signs can show advanced warnings of a mandatory height restriction (Figure 13). The sign may include an arrow if the restriction is on a side road, sometimes providing an alternative route.



Figure 13: Advance warning signs

To improve the visibility of the physical constraints of a bridge, black and yellow bands may be added to the arches or beams and to the structures that support the bridge (Figure 14). Sometimes other safety features are provided such as warning lights or chains.

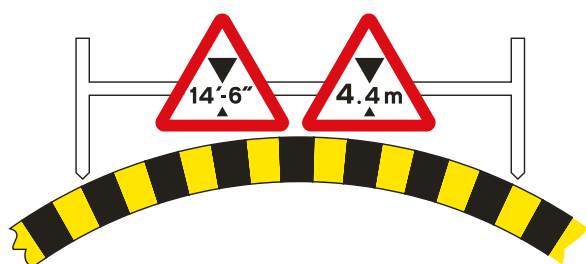


Figure 14: Bridge visibility signs

Vehicle tracking devices

Vehicle tracking devices can be a useful management tool in helping to prevent a bridge strike. Once a transport manager or supervisor has been notified of a diversion (eg by a driver or seen on the news), they can contact all the relevant drivers to ensure they are given a new, alternative route.

Satellite navigation systems (Sat Navs)

HGV-oriented Sat Nav systems can be helpful in conjunction with good practice procedures. It is recommended that if operators purchase Sat Navs that the software package has up-to-date low bridge information and is updated regularly. Several companies make HGV Sat Nav systems; operators should choose the most appropriate for their business from the range available on the market.

In-car Sat Navs are **not suitable** for HGVs because they are not configured to take vehicle heights into account when planning routes, or indicate low bridges in their software.

Operators should have an agreed and well-communicated policy on drivers' use of Sat Navs. Robust company procedures need to be in place to prevent the use of personal in-car Sat Navs. It is recommended that drivers who fail to comply are subject to disciplinary measures.

However, operators don't have to rely on costly technology; providing drivers with a truckers' atlas can be a low-cost way to help drivers respond and find alternative routes.



Disruption

'Disruption to the transport system caused by a small number of drivers not knowing the heights of their vehicles is completely avoidable. The simple act of checking the height of your vehicle and being vigilant for bridge height road signs will make a huge difference to keeping our roads and railways reliable for everyone.'

Glynn Barton, Director of Network Management at TfL

The background is a solid orange color with several overlapping, semi-transparent orange shapes of various sizes and orientations, creating a layered effect. A thin, white vertical line is positioned to the left of the text.

Responding to bridge strikes: reporting and investigation

5. Responding to bridge strikes: reporting and investigation

In the event of a bridge strike occurring, a robust accident and incident procedure needs to be in place; and drivers need to be fully trained and aware of the immediate actions to be taken.



Drivers should:

STOP

Stop and park up.

P

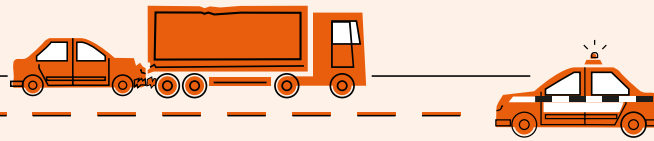
**START
STOP**

Switch off engine and isolate the vehicle (move it to a safe place if possible) - warn other road users.

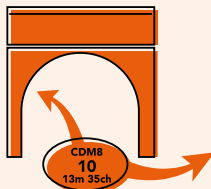


999

Call the appropriate emergency services (eg police, fire and rescue, ambulance) if the vehicle is blocking the highway as a result of the collision, or is stuck under the bridge or if there are any injuries.



Report the collision immediately to the bridge owner and the police. This is a mandatory legal requirement for all bridge strikes.

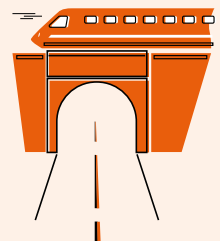


Drivers should locate the bridge owner's identification plate (Figure 15) and write down the ID number and the telephone number.

Damage Report



The bridge owner will conduct an assessment of the bridge structure and stability and decide what actions they need to take to ensure the bridge, railway and road are safe to use.



Contact the transport office to report the incident.

Complete an accident/incident form on return to the depot.

Incident Report



The [Collision Management Toolkit](#) has a clear process for what information the driver needs to record if they have had a collision: access it on the FORS website.



Figure 15: Bridge identification plates

In some respects, a bridge strike is no different to any other incident and appropriate legal obligations need to be met.

For the following types of incidents, the responsible person must notify the Health and Safety Executive on 0345 300 9923 without delay, in accordance with the reporting procedure:

- Those resulting in the death of any person
- Those resulting in specified injuries to workers
- Non-fatal incidents requiring hospital treatment to non-workers
- Dangerous occurrences

Reporting is easily done [online](#). A report must be received within 10 days of the incident.

For incidents resulting in the incapacitation of a worker for over seven days, the enforcing authority must be informed within 15 days of the incident using the appropriate online form.



Did you know?

All collisions resulting in third party damage must be reported. All bridge strikes must therefore be reported, because structural damage may not be immediately visible (the Road Traffic Act 1988 Section 3: failure to comply with road traffic signs and careless driving).



The background is a solid teal color with several overlapping, semi-transparent geometric shapes. There is a large circle on the right side, a smaller circle inside it, and a triangle at the top right. A vertical white line is on the left side.

Creating a culture

6. Creating a culture

In order to embed best practice, it is important to gain 'buy-in' from senior management and this should be cascaded to employees at all levels. To develop a positive culture to preventing bridge strikes, it is very important to regularly reinforce the message and ensure that the consequences for non-compliance are outlined in procedures and company policies.

Different parts of the organisation have different roles to play in creating the right culture.





Managing Director

- Set company policies and procedures to prevent bridge strikes
- Set an annual budget to carry out the agreed policies and procedures including the purchase and maintenance of relevant equipment, such as measuring poles
- Discuss the issue with other stakeholders to maintain this as a key agenda point
- Consider how deviation from policy should be dealt with as part of the businesses overall HR procedures and communicate this



O-Licence Holder/Transport Manager

- Manage the annual budget for bridge strike prevention equipment
- Purchase the measuring equipment required and organise the prompt repair or replacement when necessary
- Be the lead advocate for health and safety practices and policies towards the prevention of bridge strikes
- Manage the transport supervisor and driver trainer to ensure they are implementing company policies and procedures
- Conduct spot checks on vehicles and check actual height against the in-cab height indicator



Transport Supervisor / Driver Trainer

- Train drivers to use the bridge strike prevention equipment correctly
- Inspect and maintain the bridge strike prevention equipment
- Supervise drivers to complete their walk around checks at the start of each shift
- Supervise drivers to complete a walk around check report at the start of each shift and hand this in promptly
- Plan and use safe routes that take into account low bridges and issue to the drivers
- Supervise drivers to re-set the in-cab height indicator back to zero at the end of each shift
- Undertake a vigorous investigation if any bridge strikes occur
- Collect and file all driver walk around check reports on an agreed basis (usually weekly)



Drivers

- Carry out their walk around checks including the measuring of their vehicle travelling height
- Ensure the in-cab height indicator is displaying the correct height
- Complete a walk around check report and note any defects to the transport supervisor as soon as they are found
- Follow the prescribed route which has taken into account low bridges
- Use on-board safety equipment carefully and according to company policy
- Drive their vehicle safely and remain vigilant of low bridges at all times
- Report any bridge strikes if they occur
- Hand in their completed walk around check report on a periodic basis (usually weekly)



A culture of checking and planning

As a business, DHL place significant efforts, focus and training on helping our drivers avoid bridge strikes and see them as a wholly preventable incident. A culture of checking and planning is an important element of avoiding these unnecessary incidents.

Steve Squires, Head of SHE and Risk – Transport UK&I, DHL Supply Chain

The background is a solid purple color. It features several geometric shapes: a large, light purple triangle pointing downwards from the top right; a horizontal light purple bar at the top; and a diagonal light purple bar running from the bottom left towards the top right. A thin white vertical line is positioned to the left of the text.

Best practice industry standards: case studies

1. Best practice industry standards: case studies

There are some very good examples of how industry has responded to the need to avoid bridge strikes and have incorporated bridge strike prevention procedures to guide and support drivers within their company policies.



Eddie Stobart

'We have worked really hard to highlight the importance of our drivers knowing the height of their vehicles. As well as carefully planning routes to avoid low bridges, we carry out manual vehicle checks at the beginning of every journey which requires the driver to adjust the trailer height on a measurement in the cab.

Additionally, we are installing software early next year which will warn drivers with an audible alarm when they are approaching a bridge. We have also tried some quirky ways of engaging drivers in the issue including our giant giraffe 'Bridget' in our Training Academy, which serves as a constant reminder to our drivers of why they need to be bridge aware!'

Dave Pickering, Chief Operating Officer, Eddie Stobart





All photos supplied by JDC

CASE STUDY

JDC: Preventing bridge strikes

The Company

JDC Transport has been supplying services to the haulage industry for 25 years and is based in Stoke-on-Trent. Since 2006 its fleet has increased from five to 26 vehicles and is still growing.

The fleet comprises low-loaders, lorry-mounted cranes and forklifts, artics and rigid vehicles. JDC Transport can handle abnormal loads, groupage and international haulage. JDC is a FORs Gold member, Crossrail compliant, Tideway Compliant and holds a five-star ECOSTAR rating.

Concern about bridge strikes

Darren Shaw, the company's Commercial Director, says JDC is concerned about bridge strikes, firstly from a safety perspective due to the potential loss of life and injuries to road or rail users. The reputational damage to a company's image as a result of a bridge strike is also a concern. A bridge strike is likely to attract attention from the local media, and the aftermath of an incident will be captured on camera and quickly circulated on various media platforms. If the vehicle is damaged, it could be out of use for some time undergoing repairs.

Darren's concerns don't stop there either! Goods may be damaged, customers inconvenienced, a re-delivery needing to be scheduled... all are possible outcomes of a bridge strike. For the most extreme incidents, train delays, bridge repairs and infrastructure costs may prolong the cost, impact and inconvenience to road and rail users for an extended period.

Bridge strike incidents

JDC have an impressive track record in preventing bridge strikes. In 25 years of operating, they have had only one incident, which involved a collision with a bridge pre-warning sign rather than the bridge itself.



Checking the vehicle travelling height



A thorough internal investigation into the incident followed, and it was found the driver was using a car Sat Nav (which doesn't pick up low bridges) because his truck Sat Nav wasn't working at the time. JDC Transport now brief all their drivers in a toolbox talk regarding the dangers of following unsuitable devices such as car Sat Navs. The company now offers a replacement Sat Nav if a driver's device is unavailable. Drivers are instructed to set up their device for relevant conditions before leaving the yard.

Reducing the chances of a bridge strike

The senior management team at JDC have implemented a number of effective measures at their transport depot, as follows:

1. **Communication tools** – 'Have you checked your height?' posters and driver talks.
2. **Driver training** – Inductions include specific training around measuring loads.
3. **Measuring loads** – Tape measures are issued to all drivers during induction, measuring sticks are on hand and a permanent measurement post is in place on the exit from the yard.
4. **UK road maps with bridge height markings** have been issued to all drivers.
5. **Driver records** – JDC drivers have to record each vehicle trip's load height on the company daily defect forms, along with the trailer ID if the vehicle is an artic, altering the in-cab height marker to match.
6. **Route planning** – For all over-sized and abnormal loads, JDC uses the Electronic Service Delivery for Abnormal Loads (ESDAL) system to notify the authorities of their planned routes. The system does contain some low bridge information, although this is not its primary purpose. The driver is then issued with a route map and any hazards, including low bridges, are highlighted.

Darren concludes by saying, 'It is our belief that bridge strikes are so rare that we find it difficult to keep awareness in drivers' thoughts. We now emphasise to the drivers how disastrous bridge strikes can be by painting an awful picture of all the knock-on effects'.

The rigorous practices and approach being taken by the JDC Transport team (and supported by senior management) has proved to be highly effective in preventing bridge strikes.¹³



A vehicle being measured by the JDC Transport team as part of the vehicle pre-use checks



A fixed measuring post

MURPHY

WORLD-CLASS INFRASTRUCTURE



All photos supplied by J Murphy & Sons

CASE STUDY

J Murphy & Sons Limited: Becoming Bridge Smart

The Company

J Murphy & Sons is a leading global, multi-disciplined engineering and construction company founded in 1951. Operating in the United Kingdom, Ireland and Canada, J Murphy & Sons provide a range of construction services to infrastructure sectors including rail, water, power and natural resources. The company is a CLOCS Champion and FORS Gold member, achieved in part through significant emissions and accident reductions, and investment in safety features on their vehicles.

The importance of being Bridge Smart

Bridge strike avoidance is a key concern to J Murphy & Sons. As a leading infrastructure contractor in the London area, with numerous contracts for high profile clients such as TfL, Thames Water and Network Rail, a single bridge strike by one of their vehicles could mean damage to reputation and, furthermore, severely impact on relationships with the client. Richard Burnham, Compliance Manager, highlights that a bridge strike would be seen as a failure of good service.

Knowing your vehicle height

Scheduling and route planning is a key activity in moving plant around the London area for the company – both to and from their depots and the operation sites. The size of the vehicle and its load – both height and width – affects the routes that can be used, along with the time of day for the delivery. If not undertaken correctly, this will also impact on the utilisation of the vehicle. Consequently, the planning of delivery routes to identify restrictions to our vehicles (such as bridge height, road width and road closures) is





key to the success of the business. Part of the planning of the delivery involves evaluating the load size, particularly height, and the vehicle to be used. Richard believes the time spent on this aspect, and the final height check before departure, is one of the key factors that explains why they have not be involved in a bridge strike in the last five years.

Reducing the chances of a bridge strike

All Murphy's vehicles that carry loads that can vary in height are fitted with height indicators, and all drivers have tools to measure their load. The checking of the load height is part of the load security checks that are carried out prior to leaving the sites, as loads can differ on a daily basis, from smaller items such as generator sets to large excavators.

Vehicle height measurement is included in a set of toolbox talks available to transport supervisors and delivered on a regular basis throughout the year.

Managing the unexpected

In the event of an unexpected diversion, all drivers are instructed to pull over in a safe place and contact the logistics department for further instructions. The logistics department will take responsibility for planning another

route and any liaison with the authorities. This is necessary as a high proportion of our work involves moving loads consisting of large construction plant that has been planned with a Movement Order.

The consequences of a bridge strike

Richard notes that the impact to the company of having a bridge strike is the potential damage to the company's reputation as a leading UK infrastructure contractor. There are significant potential financial costs to the company as a result of the damages caused to the bridge, the vehicle and its load, along with lost revenue during the repair of the vehicle and plant.



The background is a solid orange color with several large, semi-transparent orange circles of varying sizes scattered across it. A thin white vertical line is positioned on the left side of the page, starting from the top and extending downwards, ending just below the text.

References and further reading

8. References and further reading

References:

1. Network Rail, Bridge Strike Campaign (2017), <https://www.networkrail.co.uk/communities/safety-in-the-community/safety-campaigns/check-it-dont-chance-it/>
2. Heinrich, H. W. (1931). Industrial accident prevention: a scientific approach. New York: McGraw-Hill
3. Corporate Manslaughter and Corporate Homicide Act 2007
4. Ed Corbett (2008). The Consequences of a Bridge Strike, 'Accidents in the Transport Industry', Health and Safety Executive; Health and Safety Commission, 'Reduce Risks, Cut Costs – The Real Costs of Accidents and ill Health at Work'
5. Rail Accident Report, Rail Accident Investigation Branch (2011), Department for Transport
6. <http://www.bristolpost.co.uk/news/bristol-news/bristols-feeder-road-remain-closed-607178>
7. Driver and Vehicle Standards Agency, guide to lorry types and weights 2013
8. Health and Safety at Work Act, 1974
9. The Road Vehicles (Construction and Use) Regulations 1986
10. The Goods Vehicles (Licensing of Operators) Act 1995
11. Regulation 10 Road Vehicles (Construction and Use) Regulations 1986.

Further reading:

The Department for Transport (DfT) and Network Rail have developed a series of good practice guides in conjunction with freight and passenger transport industry bodies. These are designed to raise the awareness of the risks and consequences of bridge strikes. Access them on www.gov.uk

In 2017, Network Rail launched an awareness-raising campaign developed with the haulage and public transport industries in mind. Access them at <https://www.networkrail.co.uk/communities/safety-in-the-community/safety-campaigns/check-it-dont-chance-it/>

A Rail Safety and Standards Board Research paper determined the effectiveness of current and future bridge strike prevention methods and it made recommendations for improvement and adoption of new methods. This interesting read brings the issues of bridge strikes into context and can be found on www.rssb.co.uk

The background is a solid blue color with several large, semi-transparent geometric shapes. There are two overlapping circles in the upper right quadrant, and a large, stylized shape resembling a 'V' or a wide arrow pointing downwards in the lower right quadrant. A thin white vertical line is positioned to the left of the text.

Appendices

Appendix 1: Regulations

Regulation 10 Road Vehicles (Construction and Use) Regulations 1986 states:

Height indicators

If the overall travelling height of a motor vehicle or its trailer, including load, exceeds 3 metres (9ft 10in) (4 metres if an EC-registered vehicle on an international journey), a notice clearly indicating the height in feet and inches (in characters at least 40 millimetres tall) must be displayed in the cab so that it can be clearly read by the driver, indicating:

- Not less than actual overall travelling height or more than 150mm (6in) greater
- If high level equipment (lorry-mounted crane or grab etc) is fitted, the height at which a warning device would give a visible warning to the driver if exceeded – alarm must set to activate within 1 metre of overall travelling height

Height indicator exemptions

1. Where it is highly unlikely that the driver would encounter any bridge or other overhead structure that is less than 1 metre higher than the overall travelling height or the maximum height of any of high level equipment when fully extended, allowing for unforeseen diversions or the driver getting lost
2. Where document(s) are within easy reach of the driver describing:
 1. His route(s) without risk of colliding with any bridge or overhead structure PROVIDING the driver is on that route or is off that route because of unforeseen diversion
 2. Which bridges and structures on his route the vehicle/load could safely pass under and those it could not, allowing for unforeseen diversions or the driver getting lost.



Appendix 2: Toolbox talks

1. Know your signs

This toolbox talk can be delivered by the transport manager, transport supervisor or driver trainer. You should find the toolbox talk quick and easy to deliver.

Delivered by:

Signature:

Date:

1. Aim

The aim of this toolbox talk is to communicate the key signs associated with low bridges on UK roads.

2. Reason why

It's hard to believe but there are still five bridge strikes per day around the UK, so knowing your height is a very important part of driving an HGV. Equally important is understanding the road signs that relate to low bridges and what they are trying to tell you!

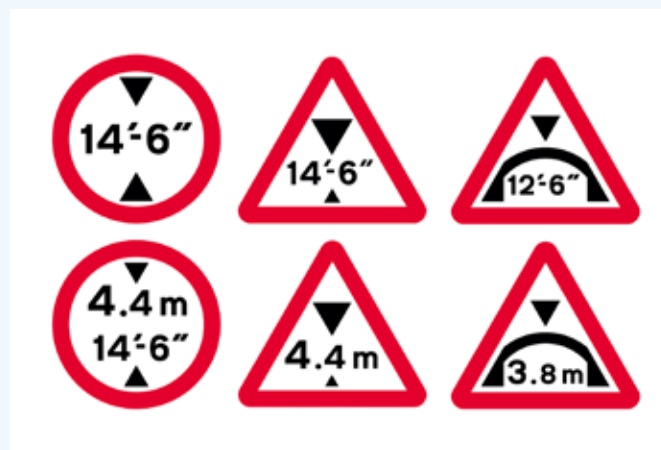
3. Outline

This toolbox talk will cover the main signs you can expect to see on UK roads that relate to low bridges. The handout provided illustrates the signs we will be talking about. The talk will end with some questions, so you may wish to take notes.

4. Low bridge signs

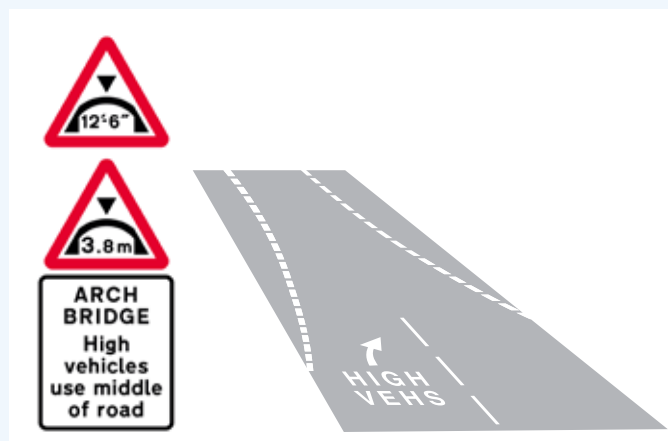
All bridges with a clearance of less than 16ft 6in (about 5 metres) are normally signed.

4.1 Both regulatory round signs and warning triangles can be used, depending on the type of bridge. The numbers indicate the height in either in feet and inches or in metres (or both). If the bridge is an arched bridge, the height will relate to the highest point that a lorry can pass under.



The circular signs indicate that no vehicles over the height shown may pass the sign (height shown in metric on the top row and imperial on the bottom). The triangle signs are a warning of a height limit.

4.2. Often these are combined with road markings ('goal posts') to indicate where the vehicle should position itself in the road to gain maximum clearance.



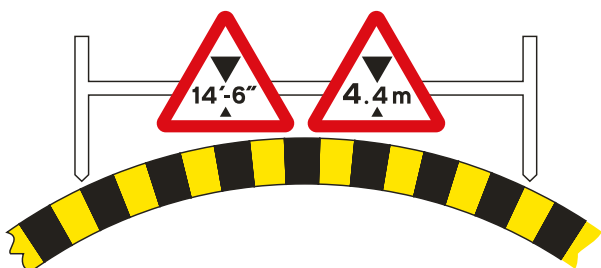
The maximum safe headroom at an arch bridge is shown on the triangular warning signs. Road markings guide high vehicles through the highest part of the arch.

Drivers of all vehicles should give way to oncoming high vehicles in the middle of the road when there is insufficient room to pass. Drivers of cars and other low vehicles may keep to the left-hand side of the road, crossing the road markings where this would enable them to pass oncoming vehicles safely.

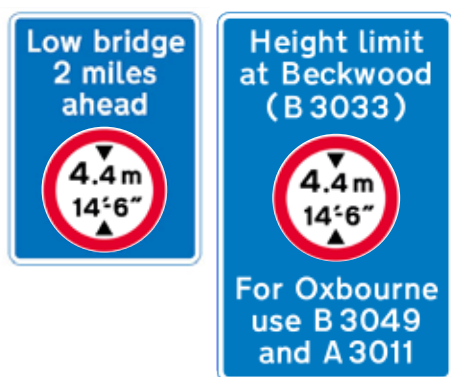
- 4.3 Sharp deviation of route to the left (right if chevrons reversed) – which may be found on a bridge and impact longer vehicles safely passing through.



- 4.4 Often there is additional signage to improve the visibility of the bridge, eg black and yellow stripes. In this example it is accompanied by a sign to indicate the height and where that height relates to on the width of the arch.



- 4.5 Other warning signs you may see give you advance warning of a mandatory height restriction ahead; the sign may include an arrow if the restriction is on a side road, sometimes providing an alternative route.

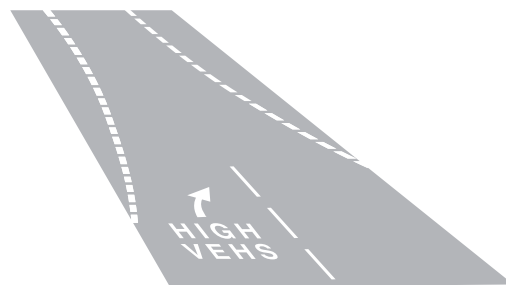


You may also see other features such as warning lights or chains.

5. Questions to ensure understanding

What is the difference between circular and rectangular signs?

What do these road markings mean?



What measurement units are used on low bridge signs?

6. Final summary

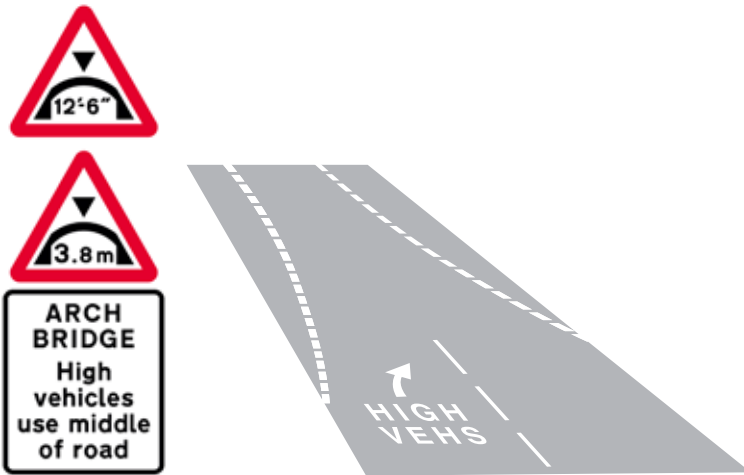
Being involved in a bridge strike is a serious thing: it costs the business financially, can negatively impact our reputation and can have consequences for your driving record. Being aware of the height of your vehicle and the road signs can help ensure you remain 'Bridge Smart'.

Know your signs – Handout

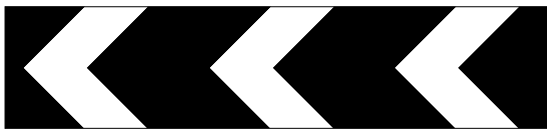
4.1



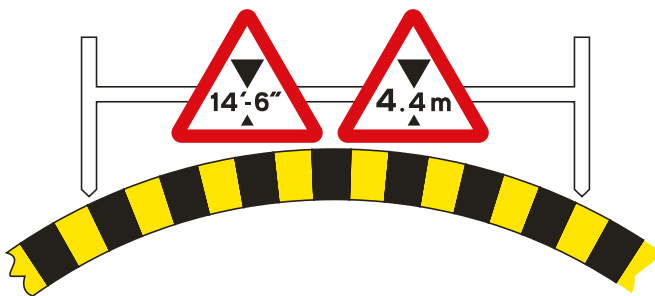
4.2



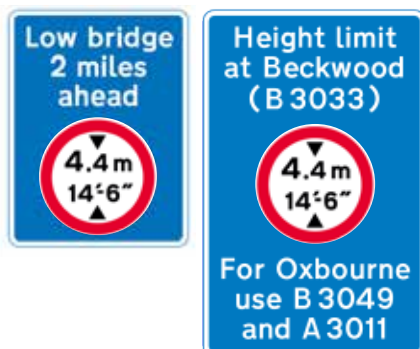
4.3



4.4



4.5



2. Know your height

This toolbox talk can be delivered by the transport manager, transport supervisor or driver trainer. You should find the toolbox talk quick and easy to deliver.

Delivered by:

Signature:

Date:

1. Aim

The aim of this toolbox talk is to communicate the actions you must take to make sure you know the height of your vehicle.

2. Reason why

It's hard to believe, but there are still five bridge strikes per day around the UK, so knowing your height is a very important part of driving an HGV.

3. Outline

This toolbox talk will cover the main steps that you need to take as part of your walk around checks. The talk will end with some questions, so you may wish to take notes.

4. Measuring your vehicle

- **Prepare vehicle for measurement:**
 - Ensure the vehicle is parked on a flat level surface
 - Ensure that any adjustable ancillary equipment (eg lorry-mounted crane or grab) is put into the **closed** position
 - If there are adjustable aerodynamics, the vehicle needs to be measured at its maximum height position

- **Measure the highest point of the vehicle and its load:**
 - The driver should take a height measurement that combines the tractor unit's fifth wheel height and the height of the semi-trailer – these measurements may already be displayed on the vehicle exterior but a physical measurement should always be carried out to check that this is correct
 - For vehicles with a variable load height (such as those transporting cars, waste or plant equipment), drivers should measure up to the highest point of the load – this point is known as the vehicle travelling height
- **Record the height on the walk around check report and on the in-cab height indicator:**
 - The vehicle height should be recorded when completing the walk around check report; you also need to change the height indicator in the vehicle's cab
- 5. **Questions to ensure understanding**
 1. Why do we need to check the height of vehicles?
 2. Where do you measure the vehicle height?
 3. Where do you record the height of the vehicle?


6. Final summary

It's hard to believe but there are still **five bridge strikes per day** around the UK. Given the frequency of bridge strikes, measuring the vehicle height and displaying the height in the cab are two important parts of the process to ensure that you remain 'Bridge Smart'.

Appendix 3: Posters

**"Why do I need to measure?
Nothing ever changes"**

BRIDGE SMART



Every day is different.
The only way to be sure is to measure up - every time, every journey.

11 91 Measure - display - plan - avoid **FORS** PROFESSIONAL

Measure

**"I know exactly how high my truck is,
I don't need reminding"**

BRIDGE SMART



Display your height - show it, know it.

11 91 Measure - display - plan - avoid **FORS** PROFESSIONAL

Display

"I know this route like the back of my hand"

BRIDGE SMART



Things change.
No matter what you think you know, always check your route against your vehicle's height.

11 91 Measure - display - plan - avoid **FORS** PROFESSIONAL

Plan

**"I've been doing this job for 20 years,
it won't happen to me"**

BRIDGE SMART



It happens to someone.
There is an average of five bridge strikes a day in the UK.
That's at least 1825 drivers per year that thought it wouldn't happen to them.

11 91 Measure - display - plan - avoid **FORS** PROFESSIONAL

Avoid

Appendix 4: Walk around check report

Walk around check report



Driver: _____ Signature: _____ Date: _____

Vehicle type: _____ Odometer reading: _____

VRM: _____ Trailer number: _____

Vehicle travelling height: _____

Walk around check list		No defect identified ✓	Defect identified ✗
Vehicle exterior		Signage and markings	Inside the cab
Body condition		Registration plate	In-cab height indicator
			Windows and mirrors
Fuel and oil leaks		O Licence disc and permits	Windscreen wipers
Fluid levels		Reflectors	Windscreen washers
Mirror condition and security		Conspicuity markers	Seat adjustment and seatbelt
Battery security and condition		Blindspot warning signage	Lights, indicators and hazards
Lights, indicators and hazards		FORS signage	Horn
			Dash warning lights
Windscreen and glass		Trailer items	Tachograph operation
Wheels and wheelnut indicator		Coupling security	Heating and ventilation
Tyres – condition, tread, pressure		Electrical connections	Camera/sensor system
Mudguards and spray suppression		Brake lines	Audible turn left alarm
Vehicle security and locks		Registration plate	Pre-drive checks
Fuel and AdBlue		Parking brake	Exhaust smoke
Sideguards		Landing legs or jockey wheel	Steering control
Lashing points		Crank handle stowed	Brake efficiency
Headboard condition			Speedo operation
Load security			

Details of defects identified	Action taken

Name: _____ Authorised by: _____

Signature: _____ Date: _____

BRIDGE
HEADROOM
REDUCED TO
13'-3" (4.0m)

END OF
BICYCLE
ROUTE





FORS
PROFESSIONAL
TRAINING, INFORMATION, KNOWLEDGE