

# Smart motorways stocktake

First year progress report 2021



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# Foreword

**Every road death is a tragedy, and we are determined to reduce the number of fatal incidents, and injuries, on our roads. That includes on smart motorways.**

All road journeys involve risk, but the chance of death on smart motorways is less than on any other major road. It is less than on conventional motorways, and it is far less than on any strategic road network A-road.

But that does not mean that we do not need to do more.

We accept drivers want to know more about what driving on motorways without a hard shoulder means for their safety. They deserve to understand what we are doing to help keep them safe and what new technologies can be deployed to assist if things go wrong.

I want the organisation I lead to continue to be one that listens, puts the needs of drivers first and helps drivers feel safe and be safer.

In March 2020, the Transport Secretary published a *Smart motorway evidence stocktake and action plan* which set out 18 steps to improve public confidence in smart motorways. This report sets out what we have already done to deliver those promises, and our plans to accelerate it. While we have made good progress, we cannot be complacent. So we are going faster.

We recognise drivers value emergency areas. We have made them more visible to drivers by turning them orange, so they can be seen more easily, and we've improved the frequency of signage to them. We will accelerate our work to provide more signage showing the distance to the next emergency area.

We have launched a national public information campaign about what to do in a breakdown situation on a high-speed road and we've brought forward our work to update The Highway Code. We're now committing to complete that this year. And we will continue to give drivers good, clear information, with campaigns and advice to help their journeys.

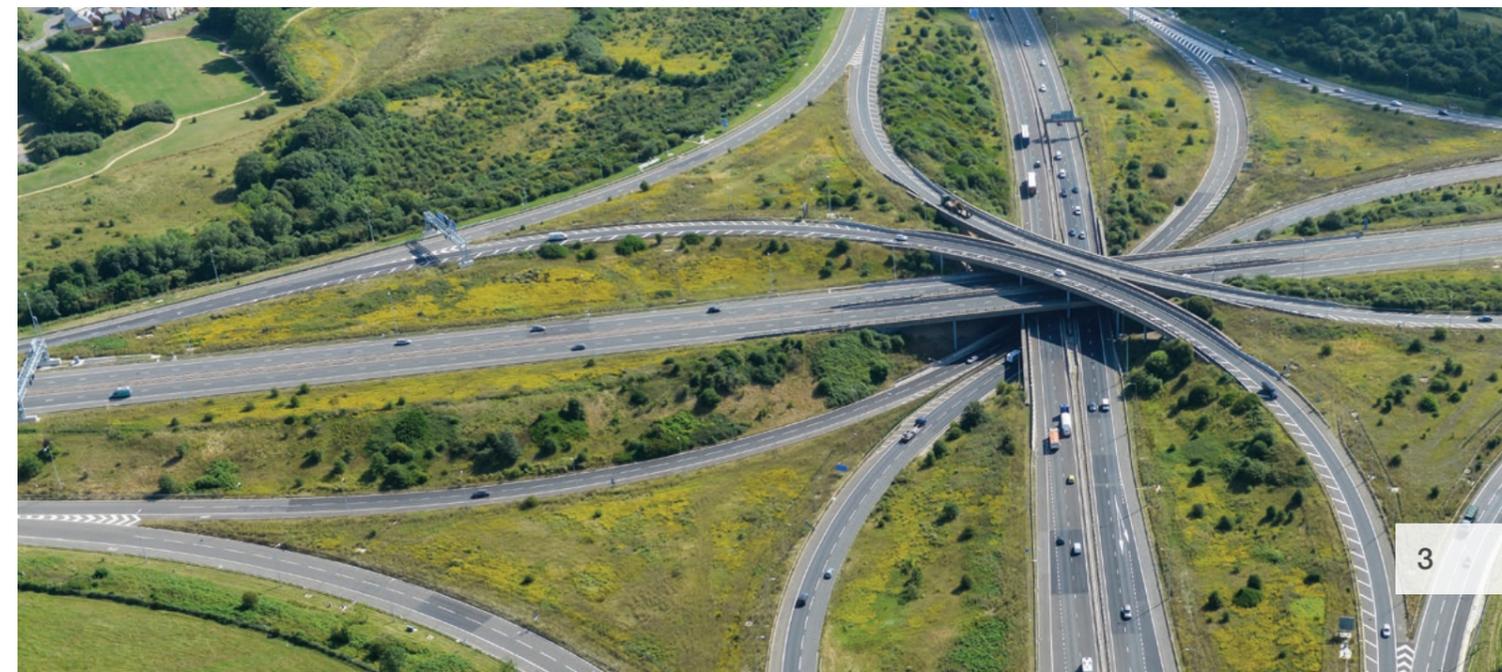
We had already trialled radar technology to detect stationary vehicles on the M25. Over the past 12 months we've introduced it on stretches of the M3 and M20 and are now installing it on the M1. Going forward, we will ensure every new section of smart motorway has this technology in place when it opens, and we will fit it across all existing all lane running motorways too. We had already committed to ensuring the system was fitted on all lane running smart motorways by March 2023. Today we commit to complete that work six months early, by the end of September 2022.

The Transport Secretary has asked the Office of Rail and Road (ORR) to undertake an independent review of the available safety evidence to ensure the conclusions are robust. We welcome this and will support the ORR in their work.

I believe that our actions are having an effect and will continue to make a positive difference to people's journeys. The risk of an accident on a motorway compared to other roads remains low, but we want to make this figure as close to zero as possible. Highways England will learn from and continue implementing the findings of the 2020 Stocktake, and work with drivers to make increasingly busy motorways safer for drivers who use them.



**Nick Harris**  
Acting Chief Executive  
March 2021



# Executive summary

## Last year's *Smart motorway evidence stocktake and action plan*<sup>1</sup>, the 2020 Stocktake and Action Plan, sought to gather the facts on smart motorway safety and set out an action plan to ensure smart motorways are as safe as possible.

One year on from the 2020 Action Plan, this Progress Report sets out our progress in delivering the 2020 Action Plan, the latest evidence on the safety of smart motorways, and commitments we are making to accelerate measures to further help drivers feel safe and be safer on smart motorways.

All road journeys involve risk and the UK has some of the safest roads in the world. Across Europe, only Sweden, Norway and Switzerland have lower road fatality rates than the UK. Our motorways are the safest type of road in the country - of the 7,515 deaths on England's roads between 2015-2019, 431 were on motorways, and of those 24 on All Lane Running (ALR) motorways (that is, smart motorways without a hard shoulder).

But we recognise that concerns have continued to be raised about smart motorways and, in particular, the impact that removing the hard shoulder has on driver safety.

When a motorway is converted to smart motorway, the hard shoulder is removed. The hard shoulder is not an entirely safe place; one in 12 motorway fatalities occur on a hard shoulder. On smart motorways a system of safety measures is introduced instead. These include technology, signs and signals which close lanes to other traffic when a stopped vehicle is identified, emergency areas that are set back from the road for drivers to pull into, and signs and signals which can alert drivers to hazards and change the speed limit if necessary. And to further enhance safety we are continuing to roll out stopped vehicle detection.

The 2020 Stocktake found that for the first nine ALR schemes, the overall casualty rate improved significantly, following the conversion to ALR, by 18% compared to what might have been expected without the conversion.

This Progress Report shows that in terms of fatality rates, smart motorways are the safest roads in the country. Per mile travelled, fatal casualty rates are a third higher on conventional motorways (0.16 per hundred million vehicle miles, hmvm) than on ALR motorways (0.12 per hmvm). Per mile travelled, fatal casualty rates on strategic road network A-roads (0.44 per hmvm) are more than three and a half times the rate on ALR motorways.

This is in line with the findings of the 2020 Stocktake that “overall, what the evidence shows is that in most ways, smart motorways are as safe as, or safer than, the conventional ones. But not in every way”.

These figures have been compiled on a five-year basis (2015-19 inclusive), because single-year figures are too low and variable to draw consistent conclusions from. For the year 2019, the total number of deaths on all motorways was 85, of which 15 were on ALR and Dynamic Hard Shoulder Running (DHS) motorways. This was a rise of four since 2018, reflecting in part the increase in traffic on the motorway network generally and on these roads in particular. We will continue to monitor and evaluate safety on our network.

The 2020 Stocktake found collisions between a moving vehicle and a stopped vehicle are more likely on ALR and DHS motorways. But collisions between two or more moving vehicles – which is how more people die – are less likely. Technology introduced on smart motorways regulates speeds more safely.

Technology, in the form of stopped vehicle detection, can also reduce the risk of collision between a moving vehicle and a stopped vehicle. So we are continuing to roll out this technology, too – and faster than we previously planned.

We are determined to do all we can to help drivers feel safer and be safer on our roads – all our roads. While some have suggested changes, for example converting a smart motorway live traffic lane back to a hard shoulder, this would reduce their capacity by a quarter. The resulting congestion on the motorways would cause significant numbers of drivers to divert to far less safe roads, increasing the numbers of people killed and seriously injured on our nation's roads overall. It would almost certainly increase overall danger, not reduce it.

However, we will accelerate our efforts to enhance the current position. As part of this Progress Report we are, therefore, committing to further raise the bar on safety, to address public concern around and improve public confidence in smart motorways. This builds on the £500m the Transport Secretary has already committed to smart motorway safety improvements.

<sup>1</sup> <https://www.gov.uk/government/publications/smart-motorway-evidence-stocktake-and-action-plan>

**On existing smart motorways:**

- By the end of September 2022, six months earlier than previously committed:
  - On existing ALR motorways we will have completed the installation of radar technology which detects stopped vehicles (radar SVD technology)
  - We will have installed around 1,000 additional signs to better inform drivers of the distance to the next place to stop in an emergency
- By the end of September 2022, 10 months earlier than previously committed:
  - We will have upgraded cameras that automatically detect vehicles passing illegally under a Red X or entering the lane beyond a Red X, so the police can take enforcement action. We are doing this for the safety of those in the closed lanes and because it's illegal to enter the lane beyond a Red X, until such time that you pass a sign and signal cancelling the restriction
- We will continue to consider a national programme of retrofitting additional emergency areas on existing smart motorways where places to stop in an emergency are more than one mile apart. This review will be complete by April 2022.

**On smart motorways under construction:**

- We will ensure that every new smart motorway will have radar SVD technology in place when it opens.

**For smart motorways in the design phase:**

- SVD technology will be in place before any scheme opens
- Going forward, and as previously announced, drivers will reach places to stop in an emergency<sup>2</sup> every three-quarters of a mile where feasible, with a maximum spacing of one mile<sup>3</sup>.

In addition, we will also work collaboratively with the Office of Rail and Road (ORR) as they progress the Transport Secretary's requirement for them to independently review the latest safety data to provide further analytical assurance and ensure that the conclusions arrived at are robust.

<sup>2</sup> places to stop in an emergency include motorway services, emergency areas and remaining sections of hard shoulder, such as on slip roads

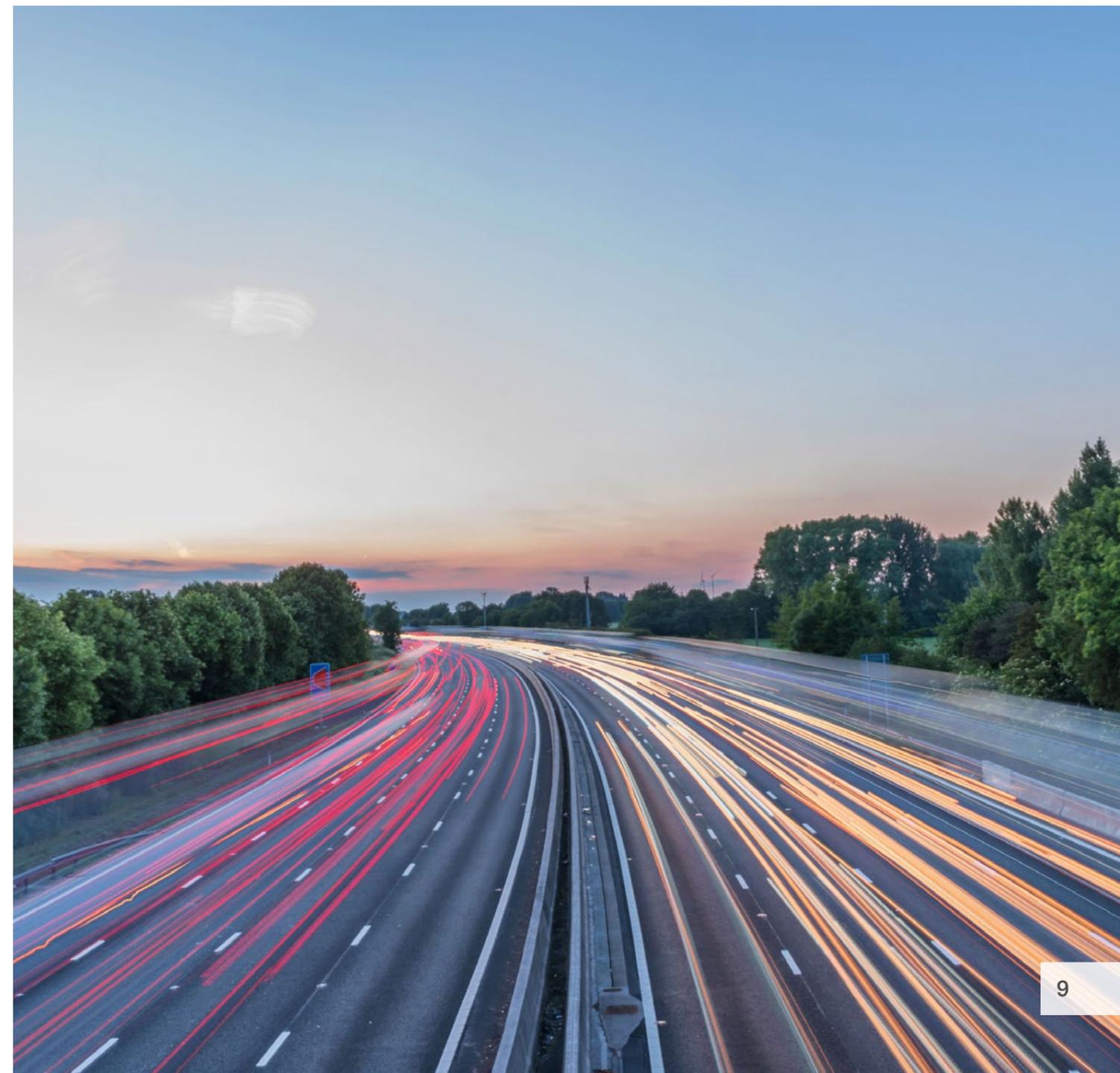
<sup>3</sup> with some exceptions where not feasible to construct additional emergency areas, such as where junctions intersect or on bridges



These measures build on the 2020 Action Plan, which we have made significant progress in delivering over the past year:

- We have launched our biggest ever road safety campaign to give drivers clear advice about what to do in the event of breaking down on any kind of high-speed road. The 'Go left' campaign appears on television, radio, in print and digital advertising
- We have completed work to turn emergency areas orange so they are more visible to drivers and we've improved the signage letting drivers know how far they are from the next place to stop in an emergency. We have also installed 10 more emergency areas on the M25
- We have held a public consultation on proposed changes to The Highway Code that will provide more information about motorway driving
- We have worked with the Home Office to improve compliance of Red X signs by upgrading our cameras so they can automatically detect Red X offences
- We have introduced radar SVD technology on stretches of the M3 between London and Farnborough and the M20 in Kent, with work under way on the M1 in Yorkshire. We had already trialled the technology on the M25 around London
- We have signed an agreement with the vehicle recovery industry on a set of safe operating procedures for providing roadside assistance
- On the M6 (Bromford) and sections of the M1, where there have been clusters of road incidents we have completed feasibility work and are developing a programme of extra measures
- We have completed a large-scale trial on the M4 junctions 19-20 of new technology that analyses CCTV images to identify stopped vehicles, enabling us to respond quicker. Trial results were positive, and we will now investigate further whether the system would be suitable for future use on the network.

Smart motorways have greatly increased the capacity of the country's most important roads, and therefore provide more space for drivers who would otherwise be on roads which are less safe. They reduce congestion, make journeys smoother and support the economy; doing so in a way that has a reduced impact on the environment. But we want all drivers to both be safe and feel safe when driving on them. Through the commitments we are making to accelerate measures we are determined to further reduce the number of casualties on our high-speed road network, improve public confidence in our smart motorways, and to continue to build and operate one of the safest and best performing road networks in the world.



# Giving clarity to drivers

We know from feedback that many drivers do not know exactly what a smart motorway is and are not aware of whether they are on one or not. We also know drivers are not always clear what to do if they need to seek refuge and get help. And we know from feedback that Dynamic Hard Shoulder Running motorways have the potential to cause confusion for drivers because the hard shoulder is sometimes in use for traffic, and sometimes not.

A number of commitments were made in the 2020 Action Plan to give clarity to drivers.

These were:

- **Communicating with drivers:** an additional £5 million for national and targeted communications campaigns to further increase awareness and understanding of smart motorways, how they work and how to use them confidently
- **Reducing confusion:** ending the use of DHS as they have potential to cause confusion for drivers because the hard shoulder is sometimes in use for traffic and sometimes not. The 2020 Action Plan committed to end the use of DHS and to convert all existing DHS smart motorways into ALR by the end of March 2025 so there is only one type without a permanent hard shoulder. This will provide a more consistent experience for drivers
- **Improving guidance:** improving The Highway Code so drivers can more easily find information on how to drive on high-speed roads, including smart motorways. Having listened to feedback we plan to publish The Highway Code update in Autumn 2021, which is ahead of the original commitment of March 2022
- **Working with partners:** working more closely with the recovery industry to strengthen our relationship, which means we have a common and agreed set of safe operating procedures across the industry to help drivers who get into difficulty on smart motorways
- **Increasing visibility:** reviewing the use of red flashing lamps for recovery vehicles, in response to calls from the recovery industry.

These commitments will help drivers know what a smart motorway is and what to do if they need to seek refuge and get help on their journey. By providing better information to drivers, we will reduce confusion, increase driver confidence and make everyone's journey safer.

Action	What we have delivered since March 2020	What will happen next
<p><b>Communicating with drivers:</b> additional £5 million for national and targeted communications campaigns</p>	<p>Having worked closely with drivers and motoring organisations, in March 2021 we launched our latest national public information campaign, 'Go left', to give drivers clear information about what to do in a breakdown. We worked with campaigners, recovery operators, the freight industry and others to ensure the messages address their concerns. The campaign includes high profile television, radio, print and digital advertising.</p> <p>Ahead of this campaign we ran public information campaigns focusing on specific elements of motorway driving. In 2020 these included activity urging drivers not to drive in lanes closed by Red X signs and to adhere to variable speed limits (February/March). We are planning a summer campaign encouraging drivers going on holiday or day trips to check their vehicles before setting out, to reduce the risk of breakdowns (July/August); and, a campaign discouraging tailgating, a factor in around one in eight casualties on England's motorways and major A-roads (September/October).</p>	<p>We will listen to public concerns and tailor our public information campaigns to focus on specific elements of motorway driving, to continue to raise awareness and provide clarity to drivers.</p>

Action	What we have delivered since March 2020	What will happen next
<p><b>Reducing Confusion:</b> ending the use of Dynamic Hard Shoulders</p>	<p>We are currently progressing five locations through the preliminary design and survey stages, with all due to complete this stage by June 2021.</p> <p>These locations are:  <b>M42 Junctions 4 to 7,</b>  <b>M1 Junctions 10 to 13,</b>  <b>M4 Junctions 19 to 20/M5 Junctions 15 to 17,</b>  <b>M6 Junctions 4 to 10a; and</b>  <b>M62 Junctions 25 to 30.</b></p> <p>These will meet the new design standard; ‘GD302 – Smart Motorways: Upgrading hard shoulder running to all lane running operation’ published in October 2020. It means that sections of smart motorway designed from that point will have concrete central reservation barriers, SVD technology, improved emergency signage, full CCTV coverage and places to stop in an emergency three-quarters of a mile apart, where feasible, with a maximum of one mile<sup>4</sup>.</p>	<p>All DHS motorways will be converted to ALR motorways by March 2025.</p> <p>We have a complex programme of work to make this happen, which is on track.</p>

Action	What we have delivered since March 2020	What will happen next
<p><b>Improving guidance:</b> an update of The Highway Code</p>	<p>The updates to The Highway Code will provide more guidance for motorists driving on high-speed roads, including smart motorways.</p> <p>We shared our proposals with 37 stakeholder organisations in a pre-consultation exercise.</p> <p>Working collaboratively with the Department for Transport and Driver and Vehicle Standards Agency we have been able to secure a timeline which will ensure the updates to The Highway Code are published later this year.</p> <p>The four-week public consultation on our proposed changes closed on 29 March 2021.</p>	<p>Following public consultation, we will present a final package of updates to The Highway Code and seek Parliamentary approval.</p> <p>Subject to this we plan to publish The Highway Code update in Autumn 2021, which is <b>ahead of the original commitment of March 2022.</b></p>
<p><b>Working with partners:</b> closer working with the recovery industry</p>	<p>We signed a strategic partnership agreement with the independent recovery industry in March 2020 to strengthen our relationship. This provides a structured approach to regular engagement with industry leads, a means to develop best practice training and to enhance safe operating procedures across the industry. The agreement encourages recovery operators to work safely on our network in a standardised way.</p>	<p>We will continue to work collaboratively with the recovery industry and drive forward the commitments made in the strategic partnership agreement.</p>

<sup>4</sup> with some exceptions where not feasible to construct additional emergency areas, such as where junctions intersect or on bridges

Action	What we have delivered since March 2020	What will happen next
<b>Increasing visibility:</b> review use of red flashing lights	The Department for Transport has completed its review of existing evidence relating to the use of red flashing lamps. Ministers have agreed to implement off-road trials to understand the likely impact of allowing the use of red flashing lamps for road recovery operators, and to work with the recovery industry to promote best working practices and develop specific industry guidance on vehicle lighting.	The trials will be led by the Department for Transport.



## Finding a safe place to stop

We know that drivers are concerned about not being able to find a safe place to stop in an emergency. The hard shoulder is perceived to be a place of safety but, in reality, it does not provide a completely safe place to stop; one in 12 motorway fatalities happen there. On smart motorways, as well as the introduction of technology (such as signs and signals that we can vary to display variable speed limits, Red X and driver information messages and the rollout of radar SVD technology), the hard shoulder is replaced by emergency areas which are wider than a hard shoulder and set back from live traffic lanes. The 2020 Action Plan committed to providing more emergency areas in new schemes, making them easier for drivers to see and adding better signage.

Actions were set out to make it easier for drivers to find a safe place to stop.

These included:

- **Frequent places to stop:** a new design standard which means emergency areas will be more closely spaced
- **More places to stop:** installing 10 additional emergency areas on the M25 so there are more places to stop in an emergency and considering a national programme to install more emergency areas on existing smart motorways where places to stop in an emergency are more than one mile apart
- **Easier to see:** upgrading all existing emergency areas so they are clearer and more visible to drivers
- **Better signage:** installing clearer, easier to understand and more frequent approach signs showing the distance to an emergency area
- **Easier to find:** showing places to stop in an emergency on sat navs.

Having listened to drivers and motoring organisations, we want to build on the 2020 Action Plan and go further to improve the safety of smart motorways and improve public confidence, so we are accelerating two commitments from the 2020 Action Plan:

- **Better signage:** by September 2022, six months earlier than planned, we will have installed around 1,000 additional approach signs which were committed to in the 2020 Action Plan. These signs are blue featuring an orange SOS telephone symbol and show how far it is to the next place to stop in an emergency, to help drivers reach one and avoid stopping in a live traffic lane
- **More places to stop:** we committed to complete the monitoring of the impact of additional emergency areas on the M25. We are accelerating this commitment to complete the monitoring and present a report to the Department for Transport by end of August 2021, four months earlier than planned.

The original actions from the 2020 Action Plan and our commitment to install extra signage sooner will increase the likelihood that a driver will be able to find refuge in an emergency and get help.

Action	What we have delivered since March 2020	What will happen next
<b>Frequent places to stop:</b> committing to a new standard for spacing of places to stop in an emergency	We have published a new standard for smart motorways which means there will be more places to stop in an emergency. GD 301 – Smart Motorways was published ahead of target in October 2020. This standard requires places to stop in an emergency to be three-quarter miles apart where feasible, with a maximum of one mile <sup>5</sup> .	The new standard will be adopted to schemes entering the design phase.

<sup>5</sup> with some exceptions where not feasible to construct additional emergency areas, such as where junctions intersect or on bridges

Action	What we have delivered since March 2020	What will happen next
<b>More places to stop:</b> delivering 10 additional emergency areas on the M25	We have installed 10 additional emergency areas on the M25 and all were open to traffic by early December 2020. This means that an additional 14 miles of ALR now have emergency areas at a maximum of one mile apart – nine additional miles between Junctions 23 and 27, and five additional miles between Junctions 5 and 7.	Now that the 10 emergency areas are open for traffic, we are monitoring their impact to understand if they have reduced the level of live lane stops. The monitoring period began on 1 January 2021.  In the 2020 Action Plan we committed to complete the monitoring period by 31 December 2021. We are <b>accelerating this commitment</b> to complete the monitoring and present a report to the Department for Transport by the end of August 2021.
<b>More places to stop:</b> considering a national programme to install more emergency areas on existing smart motorways	The 2020 Action Plan said we should consider a national programme to install more places to stop in an emergency on existing smart motorways, where places to stop in an emergency are more than one mile apart. This review is to be completed by April 2022.	We have listened to the concerns raised by the public about spacing of places to take refuge in an emergency, so we will report our findings to the Department for Transport by August 2021. We will continue our work to consider a national rollout programme by April 2022.  We will consider a variety of impacts including disruption during construction and damage to the environment. We will also look at opportunities to reduce the impact of construction, such as coordinating the work with other planned activity. We will also take account of the experience gained constructing the new emergency areas on the M25.

Action	What we have delivered since March 2020	What will happen next
<b>Easier to see:</b> making emergency areas more visible	We completed the work to make over 300 emergency areas more visible in May 2020. All existing emergency areas now have clearly visible orange surfacing and marked stopping areas with clearer, easier to understand and more frequent signage.	In addition to the work already completed to make emergency areas more visible on existing smart motorways, these emergency area enhancements are now standard on all new smart motorways designed and constructed.
<b>Better signage:</b> more traffic signs giving the distance to the next place to stop in an emergency	We have completed initial surveys and we will be installing around 1,000 new approach signs showing the distance to the next place to stop in an emergency. These additional signs mean you should almost always be able to see a sign wherever you are on the motorway.	We will <b>accelerate the completion</b> of our sign installation programme so that by September 2022 we will have installed around 1,000 additional signs in between places to stop in an emergency. This is six months earlier than planned.
<b>Easier to find:</b> showing places to stop in an emergency on sat navs	We have made location information for all smart motorway emergency areas available to sat nav providers.	Over the next year we will work with the Department for Transport to review whether the data is being shared with drivers.
<b>Places to stop:</b> reviewing existing emergency areas where the width is less than the current standard	We have completed an independent review of the widths of 249 emergency areas. The review found 13 are less than 4.4 metres wide, but that all 13 are considerably wider than the standard 3.3 metre width of a conventional hard shoulder.	We are now working on completing safety risk assessments to help guide our next steps for widening any narrow emergency areas.

## Being safer in moving traffic

Needing to stop, or being forced to stop, in an emergency on a live traffic lane is very rare. It can of course happen on any road but on high-speed roads it is more frightening, and help needs to be at hand quickly.

The 2020 Stocktake identified that because all lanes on motorways without hard shoulders are 'live' traffic lanes, the chance of vehicles stopping in a live traffic lane would increase. But it also identified that overall the risks a driver would face would be less than on a conventional motorway. This is because of the additional technology installed when the hard shoulder is removed, including variable speed limits enforced by cameras, more signs and signals, and electronic message signs giving information to drivers.

The 2020 Action Plan committed to implementing a range of measures to help drivers be safer in moving traffic. This included commitments to speed up the rollout of radar SVD technology to identify stopped drivers, improve the use of electronic overhead signs and signals to warn oncoming drivers and reduce the time it takes for help to arrive. It also included a commitment to investigate the safety performance of specific sections of the M6 and M1 smart motorways where clusters of incidents have occurred previously.

Radar SVD technology identifies a stopped vehicle, typically within 20 seconds, and provides an alert to our control room. At the same time, it can also automatically display a 'report of obstruction' message to drivers to warn oncoming drivers of a stopped vehicle ahead. Our operators then set a Red X sign to close one or more lanes, adjust speed limits and deploy traffic officers. This technology was trialled on the M25, where it remains in place, is being commissioned on stretches of the M3 and M20 and is currently being installed on the M1.

We are making additional commitments to accelerate delivery of the 2020 Action Plan and have identified new actions too.

- **Identifying stopped drivers quicker:** radar SVD technology will be in place on all existing ALR schemes by September 2022 and no new schemes will open without it
- **Improving compliance:** upgrade enforcement cameras by September 2022 to support improved compliance with Red X signs

- Working with fleet operators:** using the ‘Driving for Better Business’<sup>6</sup> programme to communicate with fleet operators the need for compliance with current legislation and guidance in relation to Advanced Driver Assistance Systems. This includes the use of Automatic Emergency Braking systems. And we will work with the Department for Transport to explore making it illegal to switch off Automatic Emergency Braking.

These commitments will allow us to get help quicker to drivers stopped in a live traffic lane to help drivers be safer in moving traffic and to reduce the likelihood of a collision.

Action	What we have delivered since March 2020	What will happen next
<b>Identifying stopped drivers quicker:</b> faster rollout of radar stopped vehicle detection technology	The 2020 Action Plan set a challenging target for us to install radar SVD technology on 21 schemes by March 2023. Radar SVD technology is currently being commissioned on the M3 Junctions 2 to 4a and M20 Junctions 3 to 5. Work on the M1 Junctions 32 to 35a started in February 2021. We have completed the design stages on three further schemes.	Based on our experience of installing the technology we will be <b>accelerating the completion</b> of this programme. We will install radar SVD technology on every existing ALR scheme by end of September 2022.  Current DHS motorway sections will have SVD technology installed as part of being converted to ALR by March 2025.  We are also <b>making a new commitment</b> that all new schemes will have radar SVD technology installed before they open, including the six schemes currently in construction:  M4 Junction 3 to 12, M1 Junction 13 to 16, M27 Junction 4 to 11, M6 Junction 13 to 15, M56 Junction 6 to 8 and M6 Junction 21a to 26.

Action	What we have delivered since March 2020	What will happen next
<b>Identifying stopped drivers quicker:</b> large-scale trial of CCTV analytics	As a result of the 2020 Stocktake, we committed to launch a large-scale trial of other technologies for detecting stopped vehicles. This action allowed us to look into making greater use of the full CCTV coverage on smart motorways, providing another option alongside current radar technology.  We have now completed this work, on the M4 near Bristol, to trial an alternative system that analyses CCTV images to identify stopped vehicles.  Video analytics, using 32 of our CCTV cameras, was used to detect stopped vehicles, with alerts being relayed to operators.	Results of the trial showed positive results that, subject to further work, could lead to future use elsewhere on the network.  We remain committed to installing radar SVD technology as our primary approach for stopped vehicle detection on existing ALR schemes by end of September 2022.  Current DHS motorway sections will have SVD technology installed as part of being converted to ALR by March 2025.

<sup>6</sup> [www.drivingforbetterbusiness.com](http://www.drivingforbetterbusiness.com)

Action	What we have delivered since March 2020	What will happen next
<b>Warning oncoming drivers:</b> displaying 'report of obstruction' messages	<p>The stopped vehicle detection system sends an alert to our control rooms which they respond to. At the same time, it can also automatically display a message on an electronic overhead sign on the motorway. This automatically displays a 'report of obstruction' message to drivers to warn oncoming drivers of a stopped vehicle ahead. We do this instead of automatically setting a Red X to reflect that the 'report of obstruction' is 'unverified', i.e. we've been told there is potentially an obstruction somewhere in the carriageway, but we need to investigate to confirm. This means we can warn oncoming drivers of a potential stopped vehicle ahead, and then in parallel, our control room will investigate and validate if it is a stopped vehicle, and when confirmed, they will set a Red X to close the appropriate lane.</p> <p>'Report of obstruction' messages were enabled on the M3 Junctions 2 to 4a in December 2020.</p>	<p>We are on target, by March 2023, to deliver automated display of 'report of obstruction' messages on signs and signals when radar SVD technology identifies a potential incident.</p>

Action	What we have delivered since March 2020	What will happen next
<b>Getting help to drivers faster:</b> faster attendance by more Highways England traffic officer patrols	<p>We are on target to deliver the roll-out of changes to our traffic officer patrols on certain smart motorway sections. We are doing this to support the aim, that by July 2021, we will reduce the average time it takes traffic officers to attend incidents from 17 to 10 minutes. This average response time compares favourably with the 15-minute target for police response time.</p> <p>To do this we have adjusted patrol route strategies across regions, giving greater focus to those sections of smart motorway where the average distance between places to stop in an emergency is more than one mile, and so where drivers may need extra help from our patrols, and introducing park up points either within, or closer, to those sections.</p>	<p>We will continue our work to support the aim, that by July 2021, we will reduce the average time it takes traffic officers to attend incidents from 17 to 10 minutes.</p>
<b>Getting help to drivers faster:</b> making it easier to call for help if you are forced to stop	<p>Increasing numbers of newer cars come with an eCall or 'SOS' button which can be used to call for help.</p> <p>We have completed work with the Society of Motor Manufacturers and Traders (SMMT) to jointly understand the range of eCall and bCall functions in newer cars, and to communicate the benefits to drivers.</p>	<p>We are working with stakeholders to agree the key messages for a public information campaign which will run later in 2021.</p> <p>For those whose cars do not have this feature, there is guidance on our website<sup>7</sup> on what to do if your vehicle has a problem or you get into trouble on a motorway.</p>

<sup>7</sup> <https://highwaysengland.co.uk/road-safety/breakdowns>

Action	What we have delivered since March 2020	What will happen next
<p><b>Improving compliance:</b> we have changed the law to enable automatic detection of Red X violations and enforcement (three points, £100 fine) using cameras</p>	<p>Following the change in the law, we are on target to deliver upgrades to enforcement cameras across the whole smart motorway network to enable automatic detection of Red X violations which can then be enforced by the police. To date we have upgraded 33 of the 85 cameras.</p> <p>We are doing this for the safety of those in the closed lanes and because it is illegal to enter the lane beyond a Red X, until such time that you pass a sign and signal cancelling the restriction.</p> <p>The vast majority of drivers comply with Red X signs and, for the very small minority who do not, the police have the powers to prosecute. The penalty can be three points on the driver's licence plus a £100 fine.</p>	<p>We will <b>accelerate the completion of our upgrade programme</b> so that by September 2022 we will have upgraded all cameras to provide automated detection. This is 10 months earlier than planned.</p> <p>We will work with police forces to raise awareness of Red X signs and enforcement measures, so that drivers know they must not drive in lanes closed by a Red X.</p>

Action	What we have delivered since March 2020	What will happen next
<p><b>Working with fleet operators:</b> use 'Driving for Better Business' programme to urge businesses to not switch off Automatic Emergency Braking</p>	<p>This measure is a <b>new commitment we have made</b> since the 2020 Action Plan.</p>	<p>We will use the Driving for Better Business programme to raise awareness of the benefits of using Advanced Driver Assistance Systems, together with the management of driver distraction, fatigue, and close following. This will help improve compliance with current legislation and guidance. We will particularly focus on Automatic Emergency Braking as these systems reduce the likelihood of rear end collisions involving heavy goods vehicles.</p> <p>It's already mandatory for Automatic Emergency Braking systems to be fitted to certain vehicles, but it's not currently illegal for it to be switched off.</p> <p>We will work with the Department for Transport to explore making it illegal to switch off Automatic Emergency Braking.</p>

Action	What we have delivered since March 2020	What will happen next
<p><b>Investigating safety performance:</b> investigate M6 Bromford viaduct and sections of the M1</p>	<p>The 2020 Action Plan committed to look further at clusters of incidents on sections of the M6 and M1 smart motorway, specifically:</p> <p><b>M6 Junctions 5 to 6 (Bromford viaduct), M1 Junctions 10 to 13, M1 Junctions 30 to 35, and M1 Junctions 39 to 42</b></p> <p>We have completed extensive independent investigations of these sections of smart motorway.</p> <p>Following the investigations, we have also undertaken feasibility work for the M6 Bromford and M1 and are developing delivery programmes for extra measures.</p>	<p>We are finalising the details of the measures we will take forward to enhance the safety of these sections of motorway.</p> <p>We intend to publish the findings of our safety reviews in June 2021.</p>

## Updated safety evidence

This section of our report supplements the data in the 2020 Stocktake with the latest available road safety statistics and a detailed consideration of live lane casualties.

### Safety on the strategic road network

Before comparing the safety performance of different motorway types, it is useful to first understand the latest overall safety of the United Kingdom's (UK) roads, and in particular its motorways.

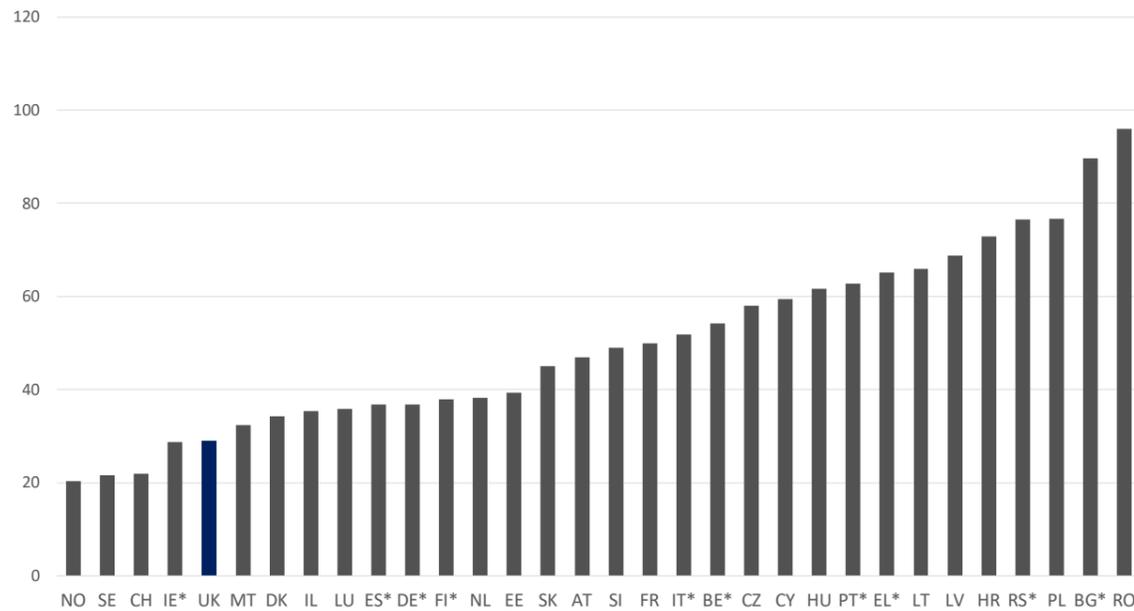
Across all road classifications, the UK has some of the safest roads in the world. Taking into account the varying levels of car use across different countries, the European Transport Safety Council's Performance Index (PIN)<sup>8</sup> programme enables comparisons of road safety progress between European countries to be made. The latest PIN report was published by the European Transport Safety Council in June 2020.



<sup>8</sup> The ETSC Road Safety Performance Index (PIN) is a policy tool to help EU Member States improve road safety

Figure 1 below shows that the number of road deaths per million inhabitants is lower in the UK than the majority of countries within Europe, at 29 road deaths per million inhabitants. Only Norway, Sweden and Switzerland perform better (Ireland<sup>9</sup> performs the same as the UK).

Figure 1  
Number of road deaths per million inhabitants in 2019<sup>10</sup>



Source: Visualisation from Highways England. Data based on ETSC.

Country	Code	Country	Code
Austria	AT	Lithuania	LT
Belgium	BE	Luxembourg	LU
Bulgaria	BG	Malta	MT
Croatia	HR	The Netherlands	NL
Cyprus	CY	Poland	PL
The Czech Republic	CZ	Portugal	PT
Denmark	DK	Romania	RO
Estonia	EE	Slovakia	SK
Finland	FI	Slovenia	SI
France	FR	Spain	ES
Germany	DE	Sweden	SE
Greece	EL	United Kingdom	UK
Hungary	HU	Israel	IL
Ireland	IE	Norway	NO
Italy	IT	Serbia	RS
Latvia	LV	Switzerland	CH

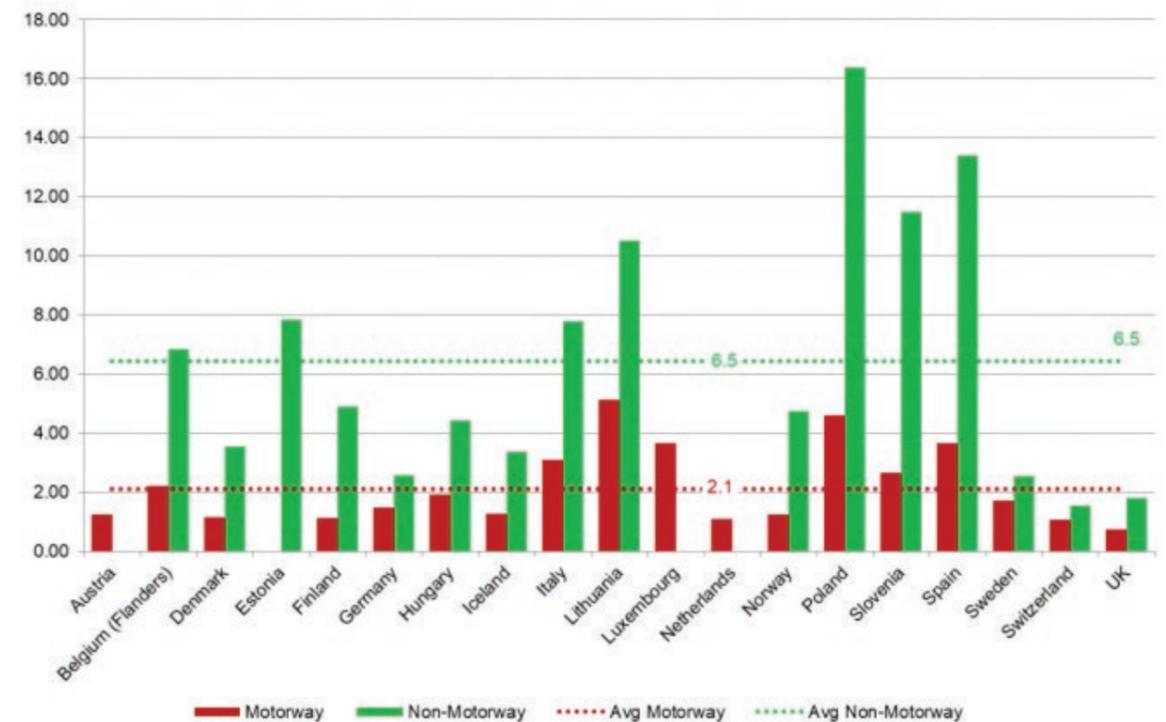
<sup>9</sup> the European Transport Safety Council's Performance Index defines Ireland as Republic of Ireland

<sup>10</sup> Countries with an asterisk (\*) indicate provisional fatality figures.  
<https://etsc.eu/14th-annual-road-safety-performance-index-pin-report/>

In its latest report published in October 2020, the Conference of European Directors of Roads found that the UK's roads have fatal accident rates well below the average across Europe (see Figure 2 below). The UK has a lower average annual fatal accident rate on motorways than any other participating country, and is second only to Switzerland for non-motorway strategic roads.

There is always scope for further improvement. We take road safety very seriously and have a strategic ambition that nobody should be harmed when using or working on our roads<sup>11</sup>.

Figure 2  
Average Annual Fatal Casualty Rate per billion vehicle kilometres by country 2019<sup>12</sup>



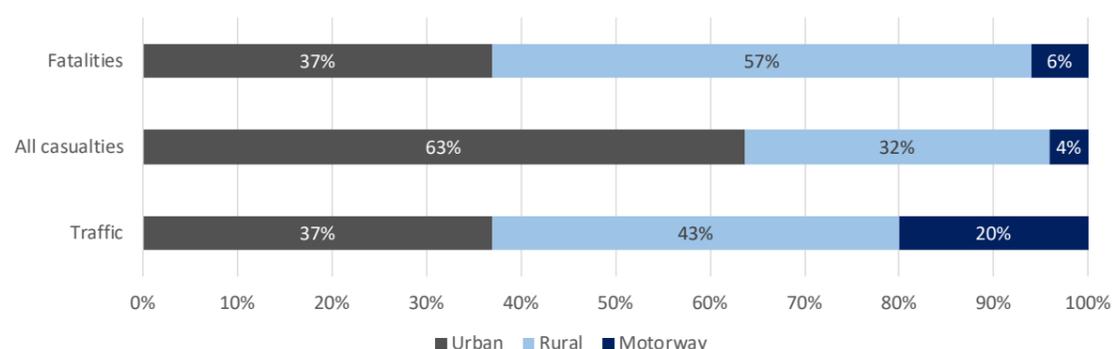
Source: Visualisation and data based on CEDR Report 2020.

Compared to other roads in Great Britain, motorways are comparatively the safest roads to travel on. Figure 3 also shows that in 2019, the majority of fatalities (57%) occurred on rural roads, whereas the majority of casualties (63%) occurred on urban roads. Although motorways carry around 20% of traffic, they only account for 6% of fatalities. Any move towards increasing capacity on our most safe roads, provides safer overall capacity for drivers on the road. That is because the extra capacity draws traffic from less safe roads where there are tragically more deaths and injuries.

<sup>11</sup> we have a stretching target to reduce the number of people killed or seriously injured on our roads by 50% by 2025

<sup>12</sup> Average Annual Fatal Accident Rate per billion vehicle kilometres  
<https://www.cedr.eu/download/Publications/2020/CEDR-Technical-Report-2020-01-TEN-T-2019-Performance-Report.pdf>

Figure 3 – Casualties by severity and road type in Great Britain 2019<sup>13</sup>

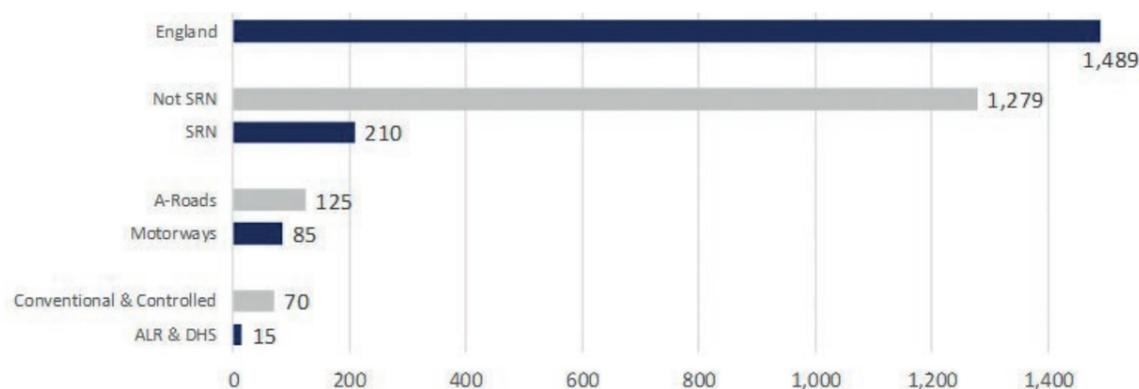


Source: Visualisation from Highways England. Data based on STATS19.

In England there were 1,489 fatal casualties in 2019 with 1,279 (86%) of them taking place outside of the strategic road network. Out of the 210 (14%) fatalities on the strategic road network, 125 (8%) took place on A-roads and 85 (6%) on motorways.

Out of the total fatalities in England in 2019, 15 (1%) took place on motorways without a permanent hard shoulder (ALR and DHS), in comparison to 70 (5%) on motorways with a permanent hard shoulder (conventional and controlled). Figure 4 also shows that within England, before accounting for road length or traffic flows, the strategic road network and motorways are comparatively the safest roads to travel on.

Figure 4 – Fatalities by country and road type in England 2019<sup>14</sup>



Source: Visualisation from Highways England. Data based on STATS19.

13 Please note this excludes Northern Ireland.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/922717/reported-road-casualties-annual-report-2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/922717/reported-road-casualties-annual-report-2019.pdf)

14 The data has been derived and visualised by Highways England based on the 2019 STATS19 data (<https://www.gov.uk/government/collections/road-accidents-and-safety-statistics>)

Our motorways are the safest type of road in the country - of the 7,515 deaths on England's roads between 2015-2019, 431 were on motorways, and of those 24 on ALR motorways.

### Safety update on smart motorways<sup>15</sup>

The 2020 Stocktake provided a comprehensive summary of the safety of smart motorways, considering all available data sources. The 2020 Stocktake found that for the first nine ALR schemes, the overall casualty rate improved significantly, following the conversion to ALR, by 18% compared to what might have been expected without the conversion. The report concluded that, overall, smart motorways are in most ways as safe as, or safer than, the conventional ones. But not in every way. It set out an action plan to further improve safety on the smart motorway network.

Now, 12 months after the publication of the 2020 Stocktake, we are building on the evidence base it provides using the latest safety evidence. This evidence includes 2019 safety data and measures, such as casualty rates (i.e. casualties per hundred million vehicle miles - hmvm), fatal and weighted injury rates (i.e. FWI per hmvm) and casualty trends. By considering these safety measures, there is a consistent comparison across schemes with different traffic levels. All measures and underpinning calculations have followed the methodology adopted for the 2020 Stocktake.

Since the 2020 Stocktake there has been understandable interest in incidents where vehicles have stopped in a live-lane, so we have considered additional data on live-lane fatalities (both moving and stopped).

This report aims to confirm whether, after considering the 2019 safety data, the safety conclusions outlined in the 2020 Stocktake remain valid<sup>16</sup>. It does not aim to fully replicate the 2020 Stocktake<sup>17</sup> or report on the effectiveness of the interventions outlined in the 2020 Stocktake. These interventions are currently being delivered and will be monitored and evaluated at appropriate intervals.

15 The 2020 Stocktake considered smart motorways to include ALR, DHS and controlled motorways.

16 The 2020 Stocktake considered smart motorways to include ALR, DHS and controlled motorways.

17 The 2020 Stocktake also considered other measures which are replaced by current or future analytical activities. For example, hazard assessments and evidence from the 'Smart Motorway All Lane Running Overarching Safety Report' were referenced in the 2020 Stocktake to demonstrate that the ALR concept was delivering its safety objective (to maintain or improve safety by the FWI measure). As their intended objective for the ALR concept was met, this will not be updated further. Instead, Post Opening Project Evaluation (POPE) reports will aim to compare the safety impact before and after an intervention or a project is delivered. At the time of drafting this report, no new POPE reports have been published. Scheme-specific POPE reports will follow later in 2021.

Data on road traffic casualties on the roads in Great Britain are collected via the STATS19 process<sup>18</sup>. These statistics are collected by police forces, either through officers attending the scene of incidents, from members of the public reporting the incident in police stations after the incident, or more recently online and then validated and published annually by the Department for Transport. The analysis presented here is developed by Highways England using STATS19 data (unless stated otherwise).

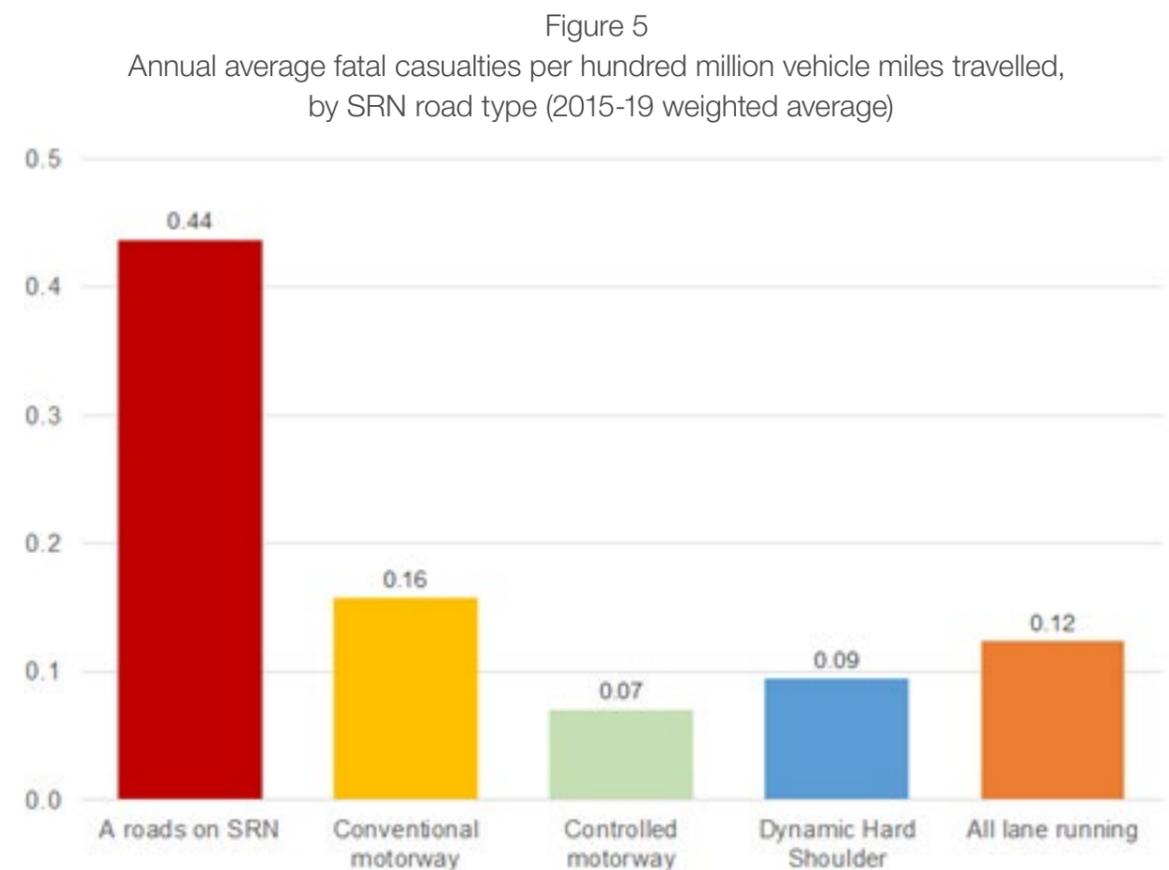
Like other transport authorities across the UK the key measure we use to assess the safety of roads, is Fatal and Weighted Injuries (FWI). This gives a fatality 10 times the weight of a serious casualty, and a serious casualty 10 times the weight of a slight casualty. In effect, it takes all the non-fatal injuries and adds them up using a weighting factor to give a total number of 'fatality equivalents'. This FWI figure is used to compare one year with another. The actual fatalities are also listed as it is possible for the FWI to go down even if the actual number of fatalities has gone up, due to a reduction in the number of less- severe accidents.

Casualty data can change significantly from year to year, depending on circumstances in any given year, and casualty rates can be sensitive to small changes in the absolute number of casualties. Volatility is an issue as it can obscure more meaningful conclusions that can be drawn from the data. When considering casualty statistics, looking at the average over a recent set of years reduces the impact of volatility and helps identify trends. This report uses the last five years of available data (2015-2019).

Fatal casualty data between 2015 and 2019 for A-roads on the strategic road network and all types of motorway are set out in Annex B and traffic statistics for the same roads are set out in Annex A. Using these two sets of data, the rate of fatalities can be calculated.

Overall, the data shows that fatality rates i.e. the rate of fatalities per hundred million vehicle miles (hvm) travelled, averaged across all years between 2015 and 2019 are lower on smart motorways at 0.09 per hvm versus conventional motorways at 0.16 per hvm. Furthermore, each type of smart motorway has a (slightly) lower rate of fatalities than conventional motorways: controlled is 0.07 per hvm, DHS is 0.09 per hvm and ALR is 0.12 per hvm. This is illustrated in Figure 5.

Figure 5 highlights that ALR has a slightly higher fatal casualty rate in comparison to DHS. DHS is an existing type of smart motorway where the hard shoulder is used as a live traffic lane to increase capacity temporarily only when it is needed most. The 2020 Action Plan highlighted that this type of smart motorway has the potential to cause confusion for drivers because the hard shoulder is sometimes in use for traffic, and sometimes not. Also, as time goes on and the motorway becomes busier, the hard shoulder is in use as a live traffic lane for longer periods of time and the motorway essentially acts as ALR. We acknowledge that there is a risk of confusion of operating a relatively intermittent hard shoulder on a DHS motorway and therefore, and as set out in the 2020 Stocktake and earlier in this report, DHS motorways are being converted to ALR to reduce confusion.



Source: Data from Highways England based on STATS19.

<sup>18</sup> The STATS19 database is a collection of all road traffic accidents that resulted in a personal injury and were reported to the police within 30 days of the accident. More information can be found at: <https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data>

A similar analysis using the FWI measure, over the same 2015 to 2019 period shows that smart motorways have a FWI rate of 0.33 per hmvm, slightly lower than conventional motorways at 0.37 per hmvm. The FWI for smart motorways are 0.32, 0.34 and 0.35 per hmvm for controlled, DHS and ALR respectively.

While the rate of fatalities and the FWI measure demonstrate that all types of smart motorways are safer than conventional motorways, it remains the case that they are not safer in every way.

In more detail:

- Casualty rates on all motorway types are lower than A-Roads on the strategic road network, for each type of severity and the Fatal and Weighted Injuries measure
- Fatal casualty rates on controlled (0.07 per hmvm), DHS (0.09 per hmvm) are lower than on conventional motorways (0.16 per hmvm), while ALR are slightly lower (0.12 per hmvm)
- Fatal and Weighted Injury rates on controlled (0.32 per hmvm), DHS (0.34 per hmvm) and ALR (0.35 per hmvm) schemes are slightly lower than on conventional motorways (0.37 per hmvm)
- Serious casualty rates on controlled (1.14 per hmvm) and ALR (1.24 per hmvm) schemes are slightly higher to conventional motorways (1.12 per hmvm), while DHS are slightly lower (1.10 per hmvm)
- Slight casualty rates are higher on controlled (13.59 per hmvm) and DHS (13.83 per hmvm) compared to conventional motorways (9.63 per hmvm), while ALR roads are slightly higher (9.73 per hmvm).

This means that based on the updated casualty data alone, the latest safety analysis is consistent with the conclusions of the Government 2020 Stocktake (see Annex C). Overall, what the evidence shows us is that in most ways, smart motorways are as safe as, or safer than, the conventional ones, but not in every way.

Through the actions we have already taken, and those accelerated commitments made in this report, we are determined to do all we can to make drivers both feel safe and be safer on our roads. Through monitoring and evaluation activities, we will continue to assess the overall safety of smart motorways and the effectiveness of the interventions outlined in the 2020 Stocktake. Additionally, Post Opening Project Evaluation (POPE) reports for specific schemes will be published to compare the safety impact before and after a project is delivered.

### Fatalities on motorways without a permanent hard shoulder

The risk of a live lane collision between a moving vehicle and a stopped vehicle is greater on ALR and DHS motorways. But the risk of a collision between two or more moving vehicles is lower. This is because ALR and DHS motorways have variable mandatory speed limits to smooth traffic flow, and electronic signs and signals to warn drivers of incidents ahead. This means less speeding, tailgating and fewer rapid changes of speed, which gives drivers more time to react if something happens.

In 2019, 50,995 live lane breakdowns (LLB) incidents were reported on the strategic road network. Half of these took place on conventional motorways, whereas approximately a quarter took place on motorways without a permanent hard shoulder (ALR and DHS). While these figures indicate the total number of breakdown incidents, most LLBs do not lead to fatal or serious casualties.

Since the publication of the 2020 Stocktake there has been significant interest in the number of LLBs on motorways without a permanent hard shoulder (i.e. ALR and DHS motorways). Breaking down in a live lane is the main concern drivers have about smart motorways. Here we look at how many fatal casualties have occurred in a live lane. By using STATS19 data, we have focused on all live-lane fatalities for the period 2015- 2019.

Table 1

Live Lane Fatalities (moving and stopped vehicles)	2015	2016	2017	2018	2019	Total (2015-19)
Fatalities on live lanes of conventional motorways	76	65	78	62	60	341
Fatalities on live lanes of controlled motorways	5	1	3	8	5	22
Fatalities on live lanes of DHS motorways	2	2	1	1	6	12
Fatalities on live lanes of ALR motorways	0	1	4	10	9	24

Source: STATS19, Highways England Statistics on live lane casualties in England, and DfT Road Traffic Statistics on the strategic road network in England from 2015-19

Table 2

Live Lane Fatality Rates (moving and stopped vehicles)	2015	2016	2017	2018	2019	Total (2015-19)
Fatality rates (per hundred million vehicle miles) on live lanes of <b>conventional motorways</b>	0.16	0.14	0.17	0.14	0.13	<b>0.15</b>
Fatality rates (per hundred million vehicle miles) on live lanes of <b>controlled motorways</b>	0.08	0.02	0.05	0.11	0.07	<b>0.06</b>
Fatality rates (per hundred million vehicle miles) on live lanes of <b>DHS motorways</b>	0.07	0.06	0.03	0.03	0.18	<b>0.08</b>
Fatality rates (per hundred million vehicle miles) on live lanes of <b>ALR motorways</b>	0.00	0.04	0.10	0.19	0.14	<b>0.12</b>

Source: STATS19, Highways England Statistics on live lane casualties in England, and DfT Road Traffic Statistics on the strategic road network in England from 2015-19

Taking traffic flow into account from tables 1 and 2 above, ALR motorways are overall slightly safer than conventional motorways. Over the period 2015-2019, conventional motorways had an average of 0.15 live lane fatalities per hundred million vehicle miles compared to 0.12 for ALR motorways.

Based on data and measures between 2015- 2019, this evidence shows fatality rates in live lanes are slightly lower on ALR motorways compared to those on conventional motorways.



# Conclusion

**Working in partnership with the Department for Transport and other stakeholders, we have made significant progress and remain on track to deliver the 2020 Action Plan. Drivers are better informed about the extra features of smart motorways and we are tackling perceptions and public confidence in their safety.**

But we recognise that concerns have continued to be raised about smart motorways and, in particular, the impact that removing the hard shoulder has on driver safety.

All road journeys involve risk and the UK has some of the safest roads in the world.

This Progress Report shows that in terms of fatality rates, smart motorways are the safest roads in the country.

In more detail, it also shows that approximately per mile travelled:

- fatal casualty rates are a third higher on conventional motorways (0.16 per hundred million vehicle miles (hmvm)) compared to ALR (0.12 per hmvm). Fatal casualty rates on strategic road network A-roads (0.44 per hmvm) are three and a half times the rate on ALR
- serious casualty rates are a tenth lower on conventional motorways (1.12 per hmvm) compared to ALR (1.24 per hmvm). Serious casualty rates on strategic road network A-roads (3.04 per hmvm) are two and a half times the rate on ALR
- slight casualty rates on conventional motorways (9.63 per hmvm) are similar to ALR (9.73 per hmvm) and are double on strategic road network A-roads (19.27 per hmvm) compared to ALR.

This is in line with the findings of the 2020 Stocktake that “overall, what the evidence shows is that in most ways, smart motorways are as safe as, or safer than, the conventional ones. But not in every way”.

These figures have been compiled on a five-year basis (2015-19 inclusive), because single-year figures are too low and variable to draw consistent conclusions from. For the year 2019, the total number of deaths on all motorways was 85, of which 15 were on ALR and Dynamic Hard Shoulder Running (DHS) motorways. This was a rise of four since 2018, reflecting in part the increase in traffic on the motorway network generally and on these roads in particular. We will continue to monitor and evaluate safety on our network.

The 2020 Stocktake found, collisions between a moving vehicle and a stopped vehicle are more likely on ALR and DHS motorways. But collisions between two or more moving vehicles – which is how more people die – are less likely. Technology introduced on smart motorways regulates speeds more safely.

Technology, in the form of stopped vehicle detection, can also reduce the risk of collision between a moving vehicle and a stopped vehicle. So we are continuing to roll out this technology, too – and faster than we previously planned.

We are determined to do all we can to help drivers feel safer and be safer on our roads – all our roads. While some have suggested changes, for example converting a smart motorway live traffic lane back to a hard shoulder, this would reduce their capacity by a quarter. The resulting congestion on the motorways would cause significant numbers of drivers to divert to roads which are less safe, increasing the numbers of people killed and seriously injured on our nation’s roads overall. It would almost certainly increase overall danger, not reduce it.

However, we will accelerate our efforts to enhance the current position. As part of this Progress Report we are, therefore, committing to further raise the bar on safety, to address public concern around and improve public confidence in smart motorways. This builds on the £500m the Transport Secretary has already committed to smart motorway safety improvements.

## On existing smart motorways:

- By the end of September 2022, six months earlier than previously committed:
  - On existing ALR smart motorways we will have completed the installation of radar technology which detects stopped vehicles
  - We will have installed around 1,000 additional signs to better inform drivers of the distance to the next place to stop in an emergency
- By the end of September 2022, 10 months earlier than previously committed:
  - We will have upgraded cameras that automatically detect vehicles passing illegally under a ‘Red X’ or entering the lane beyond a Red X, so the police can take enforcement action. We are doing this for the safety of those in the closed lanes and because it’s illegal to enter the lane beyond a Red X, until such time that you pass a sign and signal cancelling the restriction
- We will continue to consider a national programme of retrofitting additional emergency areas on existing smart motorways where places to stop in an emergency are more than one mile apart. This review will be complete by April 2022.

**On smart motorways under construction:**

- We will ensure that every new smart motorway will have radar SVD technology in place when it opens.

**For smart motorways in the design phase:**

- SVD technology will be in place before any scheme opens
- Going forward, and as previously announced, drivers will reach places to stop in an emergency<sup>19</sup> every three-quarters of a mile where feasible, with a maximum spacing of one mile<sup>20</sup>.

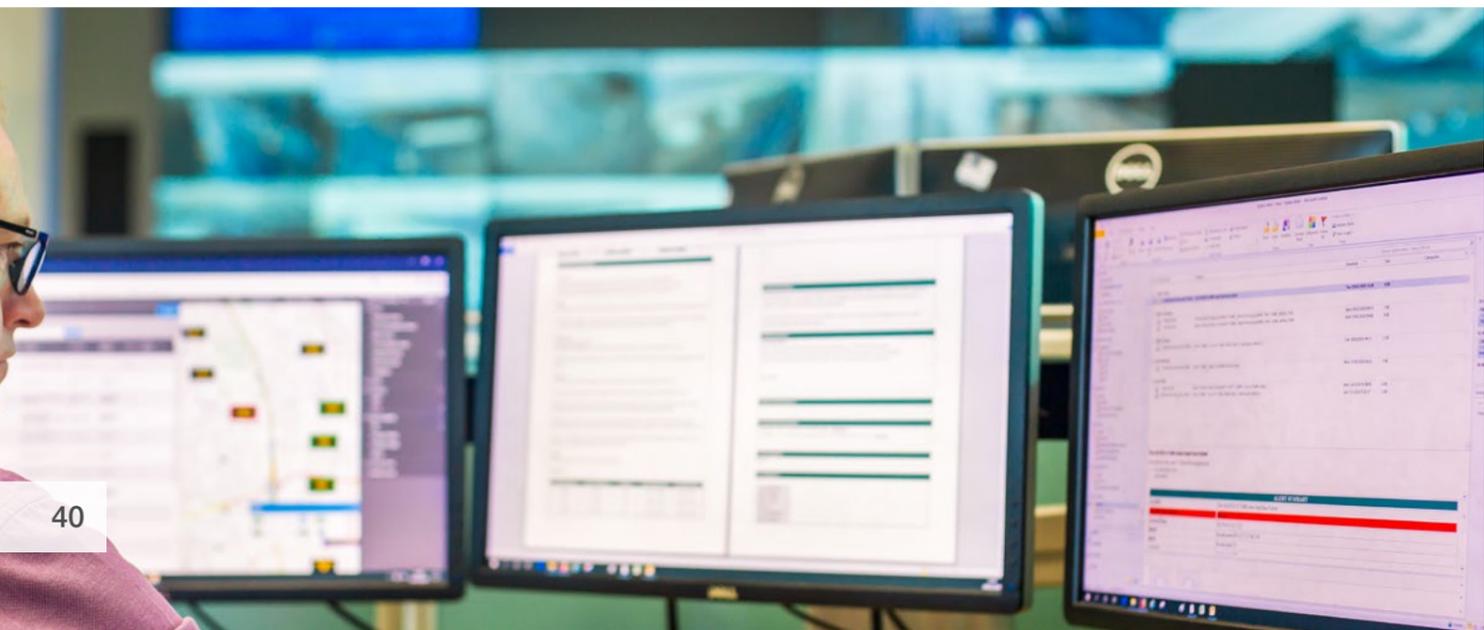
In addition, we will also work collaboratively with the ORR as they progress the Transport Secretary’s requirement for them to independently review the latest safety data to provide further analytical assurance and ensure that the conclusions arrived at are robust.

Smart motorways have greatly increased the capacity of the country’s most important roads, and therefore provide more space for drivers who would otherwise be on less safe roads. They reduce congestion, make journeys smoother and support the economy; doing so in a way that has a reduced impact on the environment.

But we want all drivers to both be safe and feel safe when driving on them. Through the commitments we are making to accelerate measures we are determined to further reduce the number of casualties on our high-speed road network, improve public confidence in our smart motorways, and to continue to build and operate one of the safest and best performing road networks in the world.

<sup>19</sup> places to stop in an emergency include motorway services, emergency areas and remaining sections of hard shoulder, such as on slip roads

<sup>20</sup> with some exceptions where not feasible to construct additional emergency areas, such as where junctions intersect or on bridges



**Annex A – Length and Traffic Data 2010-2019<sup>21</sup>**

Table 3

Road Class	Road Length (Miles)									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Conventional Motorway	1,778	1,755	1,700	1,697	1,651	1,657	1,617	1,583	1,576	1,564
Controlled Motorway	51	73	115	117	121	121	124	135	137	141
Dynamic Hard Running Shoulder	16	22	38	51	67	67	67	67	67	63
All Lane Running	-	-	-	-	29	29	62	105	123	141
All SRN 'A' Roads	2,570	2,582	2,583	2,571	2,574	2,570	2,563	2,578	2,611	2,608

Source: Highways England scheme information and DfT Road Length Statistics on the strategic road network in England from 2010-19.

Table 4

Road Class	Motor Vehicle Traffic (Billion Vehicle Miles)									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Conventional Motorway	51.3	50.8	49.1	48.4	47.8	48.1	47.6	47.0	45.2	45.1
Controlled Motorway	2.4	3.3	5.1	5.9	6.1	6.4	6.6	6.6	7.2	7.5
Dynamic Hard Running Shoulder	0.7	1.0	1.1	1.8	2.9	3.0	3.1	3.2	3.3	3.3
All Lane Running	-	-	-	-	0.6	1.4	2.7	3.9	5.1	6.2
All SRN 'A' Roads	29.1	29.3	29.4	29.3	30.0	30.8	32.2	33.4	34.0	34.7

Source: Highways England scheme information and DfT Road Traffic Statistics on the strategic road network in England from 2010-19.

<sup>21</sup> Data between 2010-2018 have followed the methodology adopted in the 2020 Stocktake Report. 2019 length and traffic figures have been calculated on a slightly different basis to account for strategic road network changes.

## Annex B – Strategic road network Casualty Data 2015-2019<sup>22</sup>

Table 5

Road Class	Number of Reported Slight Casualties				
	2015	2016	2017	2018	2019
Conventional Motorway	5,539	5,102	4,398	3,973	3,431
Controlled Motorway	947	1,052	921	871	858
Dynamic Hard Running Shoulder	521	459	461	413	339
All Lane Running	245	373	398	443	421
All SRN 'A' Roads	7,335	7,242	6,194	5,693	5,350

Source: STATS19, Highways England Statistics on motorway slight casualties in England from 2015-19 & STATS19, DfT Statistics on slight casualties on the strategic road network in England from 2015-19.

Table 6

Road Class	Number of Reported Serious Casualties				
	2015	2016	2017	2018	2019
Conventional Motorway	516	585	502	519	487
Controlled Motorway	63	68	73	108	79
Dynamic Hard Running Shoulder	44	34	45	23	28
All Lane Running	14	42	41	72	70
All SRN 'A' Roads	923	1,045	956	1,015	1,074

Source: STATS19, Highways England Statistics on motorway serious casualties in England from 2015-19 & STATS19, DfT Statistics on serious casualties on the strategic road network in England from 2015-19.

<sup>22</sup> This casualty data reflects injuries as recorded by police forces. Any comparison of casualty figures with earlier years should be interpreted with caution due to changes in systems for severity reporting by some police forces

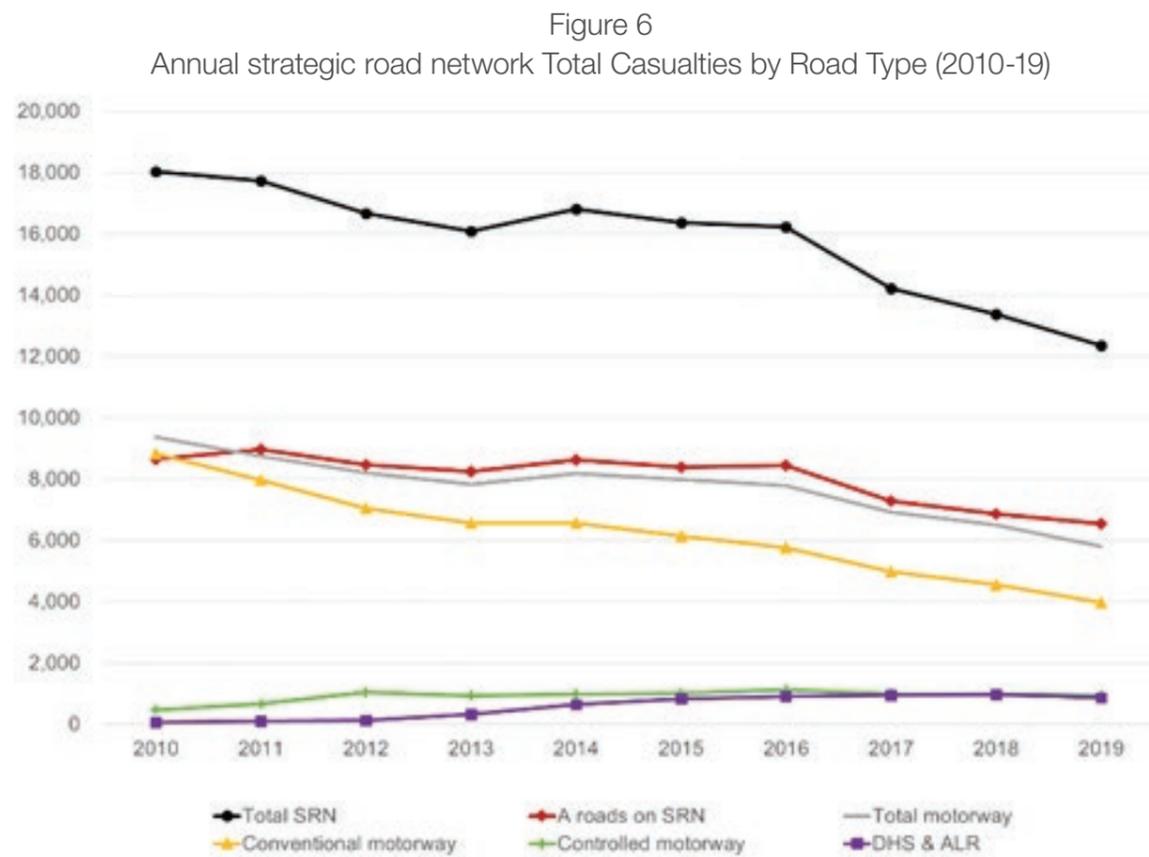
Table 7

Road Class	Number of Reported Fatal Casualties				
	2015	2016	2017	2018	2019
Conventional Motorway	81	72	83	67	65
Controlled Motorway	6	2	3	8	5
Dynamic Hard Running Shoulder	5	2	1	1	6
All Lane Running	0	1	4	10	9
All SRN 'A' Roads	132	154	145	165	125

Source: STATS19, Highways England Statistics on motorway fatal casualties in England from 2015-19 & STATS19, DfT Statistics on fatal casualties on the strategic road network in England from 2015-19.

### Annex C – Casualty Statistics 2010-2019<sup>23</sup>

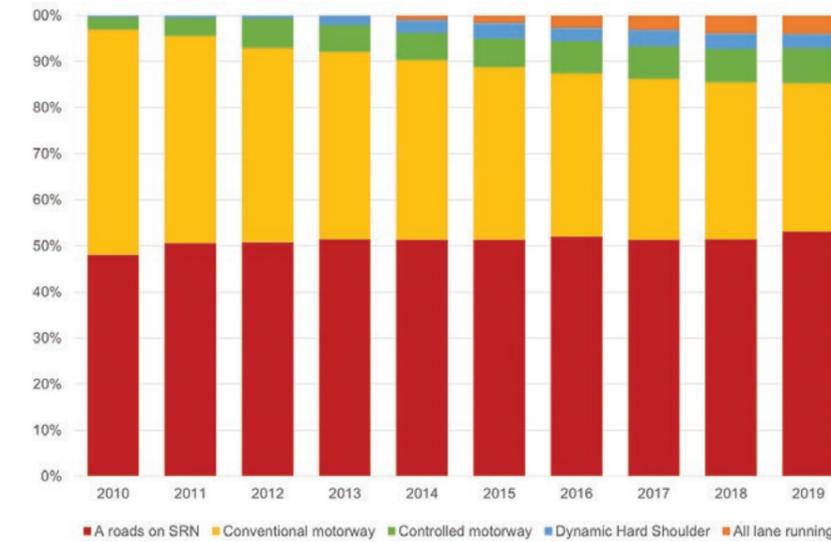
These statistics continue to indicate that total casualties per year across the strategic road network have generally been declining since the start of the decade, falling more than 30% over 2010-2019 (Figure 6). Within the strategic road network, around 40% of total casualties occur on the motorway network and 60% on A-Roads, both of which have shown a general decline since 2010. The total length of roads that have been converted to smart motorways between 2010-2019 has increased by more than five times. As conventional motorways are converted to smart motorways, there has been a decline in the total number of casualties recorded on the former.



Source: Data from Highways England based on STATS19.

23 This casualty data reflects injuries as recorded by police forces. Any comparison of casualty figures with earlier years should be interpreted with caution due to changes in systems for severity reporting by some police forces.

Figure 7  
Proportion of total casualties on the strategic road network, by road type (2010-19)



Source: Data from Highways England based on STATS19.

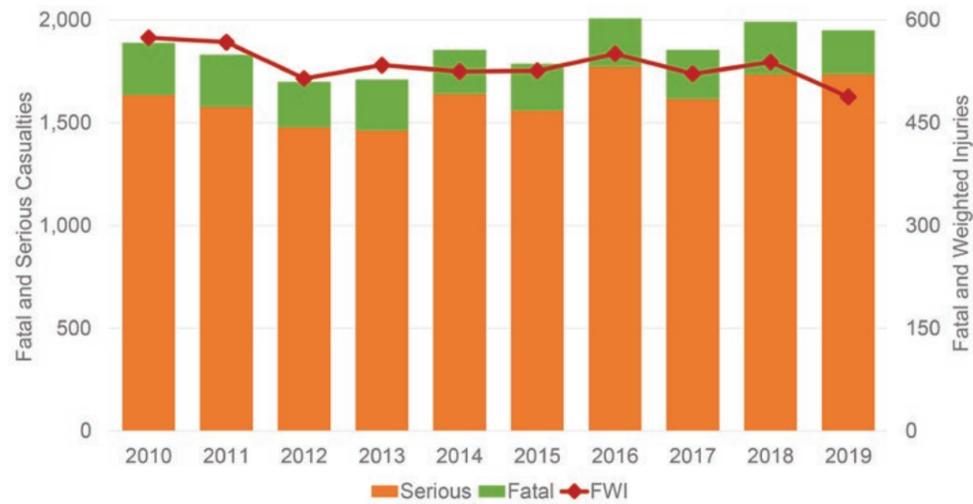
Figure 8 illustrates how total casualties across the strategic road network, broken down by severity, has changed since the start of the decade. The majority of the decrease in total casualties has been due to the fall in slight casualties. Figure 9 illustrates that FWIs have been largely stable since 2013, with a decline in 2019.

Figure 8  
Total SRN casualties split by severity and Fatal Weighted Injuries (2010-19)



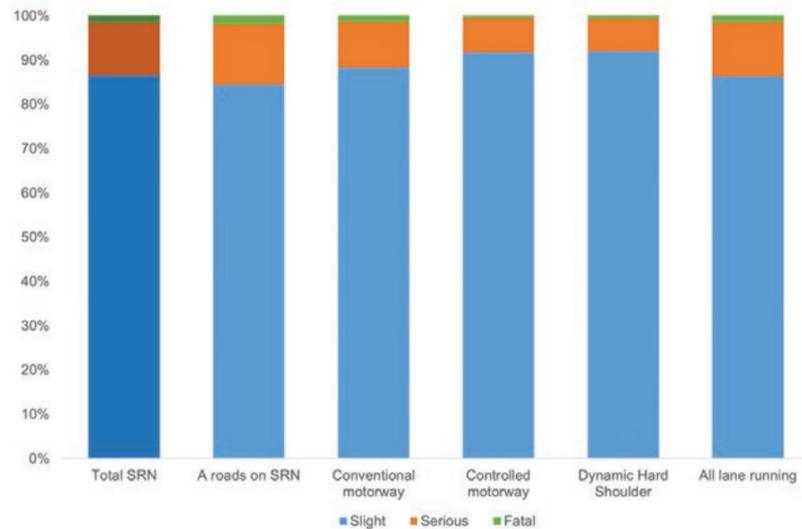
Source: Data from Highways England based on STATS19.

Figure 9  
Total strategic road network Fatal and Serious Casualties & Fatal and Weighted Injuries (2010-19)



Source: Data from Highways England based on STATS19.

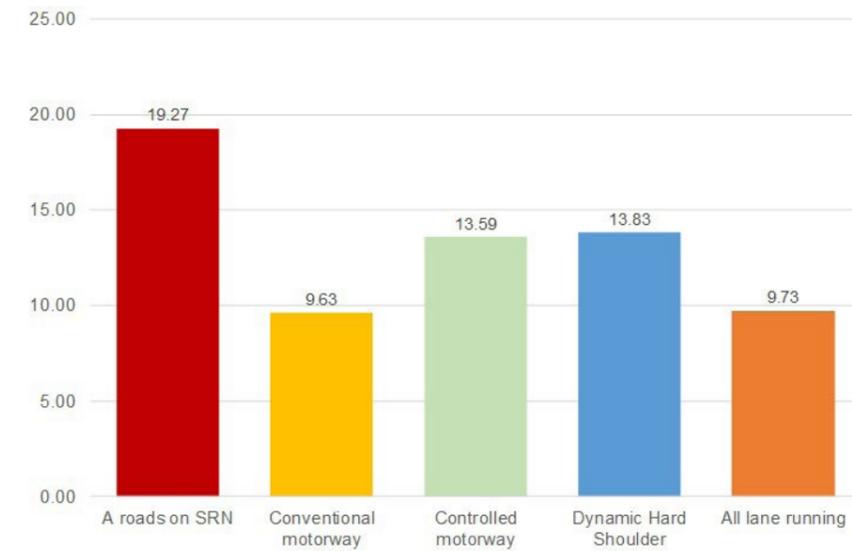
Figure 10  
Casualties split by severity, by type of road (2015-19 weighted average)



Source: Data from Highways England based on STATS19.

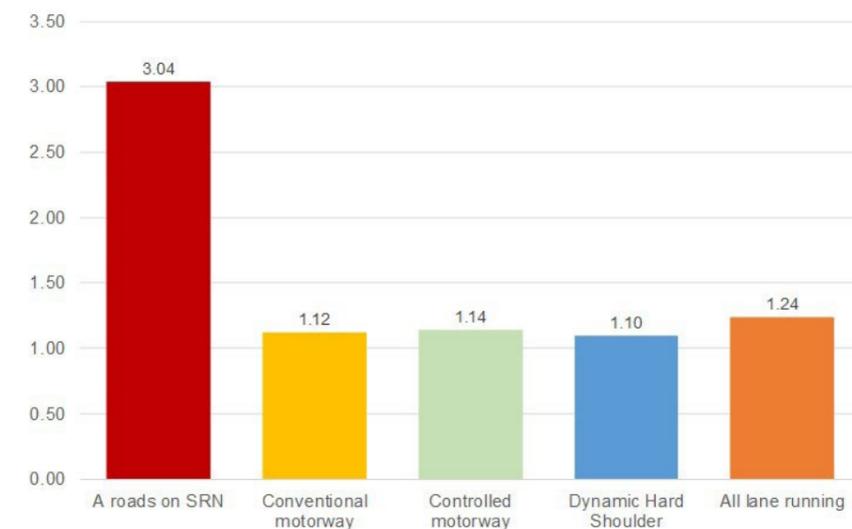
While high level statistics on total casualties are useful, they do not take account of the different road types and the differences in volumes of traffic. Such differences are reflected in the Figures on page 47.

Figure 11  
Annual average slight casualties per hundred million vehicle miles travelled, by strategic road network road type (2015-19 weighted average)



Source: Data from Highways England based on STATS19.

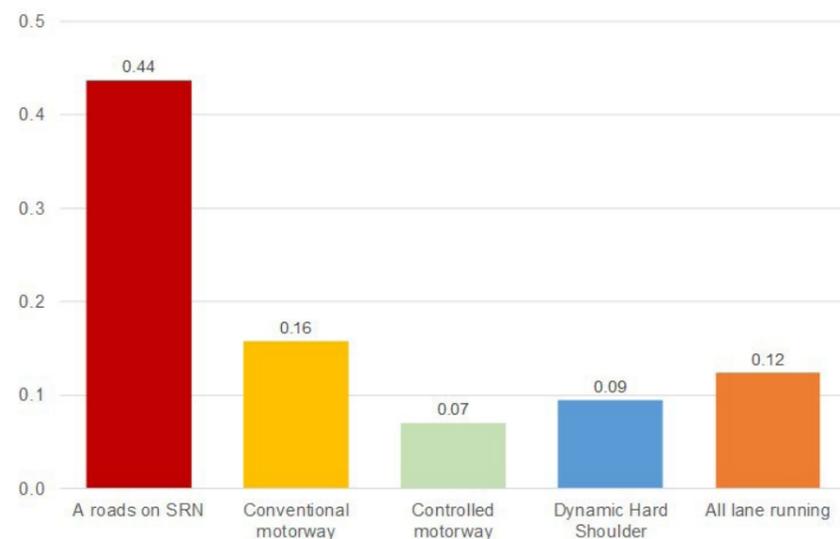
Figure 12  
Annual average serious casualties per hundred million vehicle miles travelled, by strategic road network road type (2015-19 weighted average)



Source: Data from Highways England based on STATS19.

Figure 13

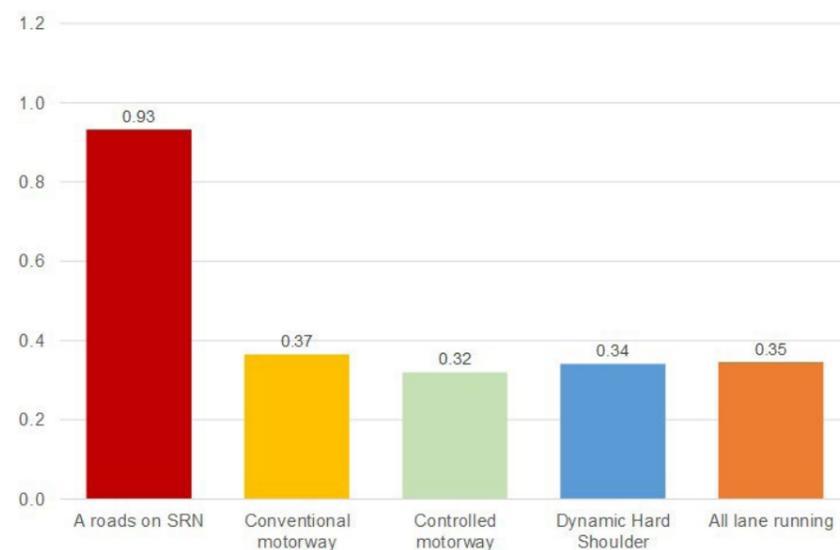
Annual average fatal casualties per hundred million vehicle miles travelled, by strategic road network road type (2015-19 weighted average)



Source: Data from Highways England based on STATS19.

Figure 14

Annual average FWI per hundred million vehicle miles travelled, by SRN road type 2015-19 weighted average)



Source: Data from Highways England based on STATS19.

These high-level statistics provide useful information on the safety performance of the network as it stands. To reliably consider the relative safety of converting a specific section of motorway from one type to another, it is necessary to also undertake monitoring and evaluation reports (such as Post Opening Project Evaluation (POPE) reports).

The 2020 Stocktake found that for the first nine ALR schemes, the overall casualty rate improved significantly, following the conversion to ALR, by 18% compared to what might have been expected without the conversion. Similarly, the FWI rate across ALR schemes fell by approximately 23% compared to the counterfactual.

Monitoring and evaluation reports are crucial to the safety evidence. Such reports will continue to be undertaken and published by Highways England. We will be publishing a series of POPE reports throughout 2021.



## Annex D – Glossary of terms

Term	Explanation
All Lane Running (ALR) motorways	All Lane Running (ALR) motorways apply the controlled motorway technology, permanently converts the hard shoulder as a running lane, and feature emergency areas. Emergency areas are places to stop in an emergency. They are approximately 100 metres long (the average length of a football pitch) by 4.6 metres wide and set back from the left-hand edge of the motorway. An emergency telephone from which to alert Highways England of an issue and call for help is provided in each emergency area and all of them have orange surfacing to make them more visible. Emergency areas are for when a driver has no alternative but to stop and it has not been possible to leave the motorway or reach a motorway service area. Other places to stop in an emergency include sections of remaining hard shoulder, such as on slip roads at junctions. The distance between places to stop in an emergency varies across the smart motorways, from 0.3 miles apart to 1.6 miles apart
bCall	bCall is a system that allows the driver to call for breakdown assistance direct from their vehicle.
Casualty rate	The casualty rate takes the number of casualties and controls for the volume of traffic on the road, more specifically it is defined as the number of casualties per hundred million vehicle miles travelled.
CCTV	Closed-circuit television.
Controlled Motorways (CM)	Controlled Motorways apply technology to a conventional motorway to control the speed of traffic retaining a permanent hard shoulder. Controlled Motorways add variable and mandatory speed limits to a conventional motorway to control the speed of traffic, while retaining a permanent hard shoulder. Overhead electronic signs display messages to drivers, such as warning of an incident ahead.
Dynamic Hard Shoulder Running (DHS) motorways	Dynamic Hard Shoulder Running (DHS) motorways apply the controlled motorway technology and temporarily increase capacity by utilising the hard shoulder, and feature emergency areas. The hard shoulder is some of the time, but not always, used as a live running lane, with electronic signs and signals to guide drivers when it is safe to use for live running. Emergency areas are installed as on ALR motorways.
eCall	eCall is a system that phones the emergency services automatically if the vehicle it's fitted to is involved in an incident.
Fatal and Weighted Injuries (FWI) measure	This gives a fatality 10 times the weight of a serious casualty, and a serious casualty 10 times the weight of a slight casualty. Specifically, it is calculated as: Fatal and Weighted Injuries = Fatal casualties + Serious Casualties * 0.1 + Slight Casualties * 0.01
Fatal and Weighted Injuries (FWI) rate	The FWI rate takes the FWI measure and controls for the volume of traffic on the road, more specifically it is defined as the number of casualties per hundred million vehicle miles travelled.

Term	Explanation
Fatal casualties	When a person has died from their injuries up to 30 days after the incident.
Live lane breakdown (LLB)	This reflects vehicles that are subject to a breakdown incident on a live lane due to a number of reasons – for example loss of power, engine or tyre issue.
Live lane stop	This reflects vehicles that are stationary or parked on a live lane due to a number of reasons – for example breakdown, collisions or medical episodes.
Places to stop in an emergency	Places to stop in an emergency include motorway services, emergency areas and remaining sections of hard shoulder, such as on slip roads.
POPE	Highways England produces Post Opening Project Evaluation (POPE) reports 'one year after' and 'five years after' following the opening of a road scheme.
Serious casualties	Injuries requiring hospitalisation, or any of the following injuries whether or not the individual went to hospital: fractures, concussion, internal injuries, crushing's, burns (excluding friction burns), severe cuts, severe general shock requiring medical treatment and injuries causing death 30 or more days after the incident.
Slight casualties	A minor injury such as a sprain (including neck whiplash), bruise or cut which are not judged to be severe, or slight shock requiring roadside attention. This definition includes injuries not requiring medical treatment.
Smart motorway	A smart motorway is a section of motorway that uses traffic management methods to increase capacity and reduce congestion in particularly busy areas. These methods include using the hard shoulder as a running lane, and using variable speed limits to control the flow of traffic.
STATS19	STATS19 database is a collection of all road traffic accidents that resulted in a personal injury and were reported to the police within 30 days of the accident. More information can be found at: <a href="https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data">https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data</a>
Stopped Vehicle Detection (SVD)	Stopped Vehicle Detection technology identifies stopped vehicles, typically within 20 seconds and provides an alert to our control rooms. Our operators can then close lanes with a Red X sign, display speed limits and deploy traffic officers.
Strategic road network (SRN)	In England, the strategic road network is made up of motorways and trunk roads (the most significant 'A' roads). They are administered by Highways England, a government-owned company.
Vehicle Miles	Traffic statistics are presented in units of vehicle miles (billion or hundred million vehicle miles – bvm or hmvm respectively), which combines the number of vehicles on the road and how far they drive. This is a standard way of presenting traffic volumes.

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