Using Telematics in Professional Vehicle Fleets

About PRAISE

Using the roads is a necessary part of our working lives. But it's an ordinary activity that leads to an incredibly high level of injury and death. ETSC's PRAISE (Preventing Road Accidents and Injuries for the Safety of Employees) project addresses the safety aspects of driving at work and driving to work. Its aim is to promote best practice in order to help employers secure high road safety standards for their employees.

The project is co-ordinated by the ETSC secretariat with the support of Fundación MAPFRE, the German Road safety Council (DVR), the Dräger Foundation and MiX Telematics.

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Executive Summary

25,250 people lost their lives on EU roads in 2017 and an estimated 135,000 suffered serious injuries. A large proportion of these were victims of work-related road collisions. Even though the exact number is unknown, it is likely that up to 40% of all road deaths are work-related.

A range of measures have been introduced to try and tackle this problem. Governments have updated legislation, clarifying the obligations of employers concerning the safety and well-being of their employees and ensuring that road safety is an integral part of this. Health and safety authorities have issued improved guidance for organisations, to help them abide by their legal responsibilities but also encouraging them to go beyond these requirements and be proactive in managing road safety for their workers.

Finally, organisations have taken up the mantle of road safety themselves. A plethora of road safety schemes, initiatives and programmes have been implemented with the aim of enhancing the safety of employees, but also reducing costs and improving efficiency. These include driver training, group discussions, incentives, publicity campaigns and improved management of road safety across the organisation.

Recently, there has been a growth in the use of in-vehicle data recorders, also known as telematics systems, to monitor and collect data on an individual's driving. Some are used to capture data in the period immediately preceding a collision, but increasingly they are being used to continually monitor driving behaviour. The detailed data that is collected can then be used for a number of purposes, such as feedback sessions, future driver training, the calculation of incentives, and the identification of potential fleet-wide issues.

Research has been undertaken into the effectiveness of IVDRs as a measure to improve road safety. However, weaknesses in research methods combined with an overall *lack* of research means that there is not yet a consensus that they have a proven effect on road safety. Nevertheless, existing research findings do indicate some positive trends as well as noting the utility of telematics as a means for undertaking future research.

As with many work-related road safety interventions, there are numerous case studies which highlight the positive effects of telematics in fleets and seek to promote 'best', or at least 'good', practice. While case studies are no substitute for proper research, collectively they do demonstrate the possibilities of what can be achieved by bringing about changes in road safety management, including the use of telematics.

As with road safety in general, the growth of technological solutions to work-related road safety problems has led to a mixture of clear advantages and disadvantages. Similarly, the debate surrounding the potential

role of technologies ranges from enthusiasm to suspicion.

In the work-related road safety context, it is clear that there is significant potential to be gained from the effective use of technology. The extant research and the experience of many organisations points to the usefulness of telematics as a tool to manage work-related road risk. The task now should be to study this intervention more closely in order to properly understand it and to maximise the potential benefits, while minimising any risk.

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N.B. This report focuses primarily on the use of telematics in driving for work, although references are made to other uses of telematics.

1. Introduction: Road Safety and Work-Related Road Safety in Europe today

1.1 Road safety in Europe

25,250 people lost their lives on EU roads in 2017, representing a 2% reduction on the 2016 figure. This number has fallen by only 3% in the last four years.

There has been progress over a longer period but it is not enough to meet the EU's target to halve road deaths between 2010 and 2020. Since 2010, the average annual progress in reducing the number of road deaths in the EU has been 3.1%, equivalent to a 20% reduction between 2010 and 2017 (Fig. 1). A 6.7% year-to-year reduction was needed over the 2010-2020 period to reach the 2020 target through consistent annual progress. As a consequence of the slow progress between 2014 and 2017, for the EU to reach the 2020 target, road deaths need to be reduced by around 14.5% annually in the upcoming three years – an almost impossible task.[1]

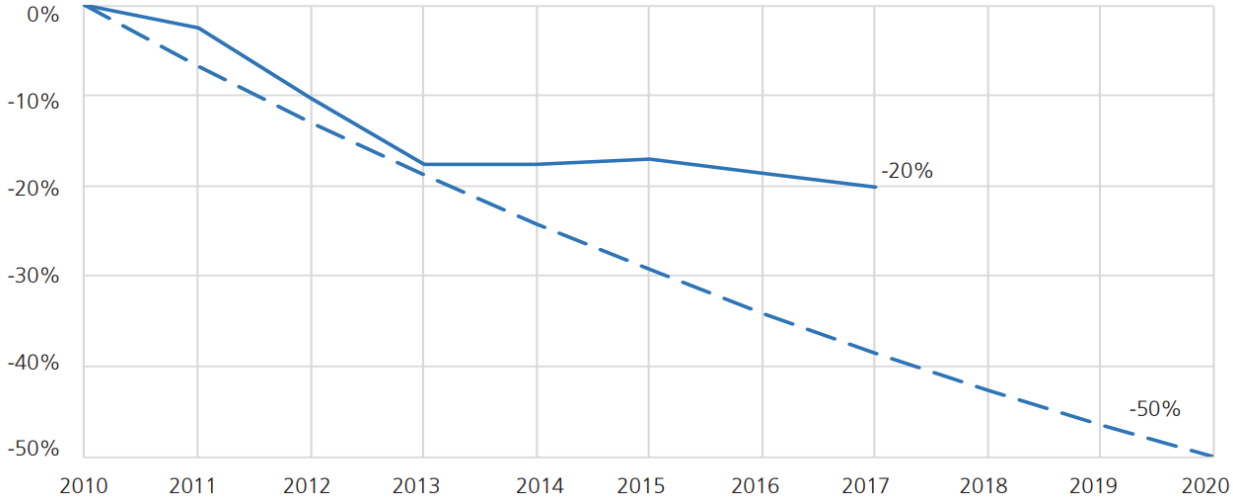

Fig. 1 – Reduction in the number of road deaths since 2010 (solid blue line) plotted against the EU target for 2020 (dotted blue line).[2]

Similarly, there has been little progress in reducing serious road traffic injuries since 2010. The European Commission estimates that more than 135,000 suffer serious injuries each year.[3]

Road collisions give rise to huge societal costs; a recent study estimated the value to society of preventing all reported collision in the EU to be about 270 billion EUR in 2015 (nearly twice as large as the annual EU budget).[4] The monetary value (for 2017), of the human losses avoided by preventing one road death are calculated to be 2.11 million EUR at factor cost.[5]

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[1] ETSC 2018, 12th Road Safety Performance Index Report, p6.
[2] ETSC 2018, 12th Road Safety Performance Index Report, p15.
[3] ETSC 2018, 12th Road Safety Performance Index Report, p20.
[4] ETSC 2018, Briefing: 5th EU Road Safety Action Programme 2020-2030, p9.
[5] ETSC 2018, 12th Road Safety Performance Index Report, p16.

The total value of the reductions in road deaths in the EU28 for 2017 compared to 2010 is thus estimated at approximately € 13 billion, and the value of the reductions in the years 2011-2017 taken together compared with five years at the 2010 rate is about € 70 billion.

If the EU had moved towards the 2020 road safety target through constant progress of 6.7%, the greater reductions in road deaths in the years 2011-2017 would have increased the valuation of the benefit to society by about € 40 billion to about € 110 billion over those years.

Given the financial constraints that many EU countries face, the value to society of improving road safety should be taken into account in the policy and budgetary planning processes, expressing in monetary terms the imperative of reducing road risk.

The high value of societal costs avoided during 2011-2017 shows once more that the saving potential offered by sustained road safety improvements is considerable, making clear to policy-makers the potential for road safety policies to provide a sound investment.

Unfortunately, following pressure to reduce public spending, the number of police officers on the roads enforcing driving laws has dropped in several countries, as well as budgets for road maintenance.

It is important that wherever possible, other sectors and actors, are encouraged to contribute to improving safety on the roads.

1.2 Work-related road safety

Millions of people across Europe use the roads every day for their work. Using the roads is a necessary part of our working lives. However, it's an everyday activity that leads to a high risk of injury and death. Data from the UK show that business travel makes up about 30% of all travel, rising to 50% if commuting is included.[6]

Of the 25,250 lives lost on the road in the European Union in 2017 a large proportion were victims of work-related road (WRR) collisions. Even though the exact number is unknown, it is likely that up to 40% of all road deaths are work-related.[7] Gaining a full and detailed picture of WRR collisions in the EU is very challenging due to differing definitions, the variety of data sources and a lack of linkages between data sources and underreporting.

According to Eurostat data, based on the European Statistics of Accidents at Work (ESAW) definition, around 3,790 work-related deaths occurred in the EU on average each year over the period 2012-2014.

Around 60% of these work-related deaths happened in transport, including road, rail, water and aviation. One of the limitations of the Eurostat data is that there is no figure for the exact numbers of work-related transport deaths that occurred only on the road.

Travel survey data from the UK Department of Transport show that people who drive for work are up to 40% more likely than other drivers to be involved in a collision, accounting for up to one in three road collisions in the UK.[8]

[6] Murray, W., 2011, "The Work-Related road safety business case: Societal, business, legal and cost factors".
[7] ETSC 2017, PIN Flash Report 33: Tapping the Potential for Reducing Work-Related Road Deaths and Injuries, p6
[8] UK Department for Transport, 2013, Reported Road Casualties Great Britain 2012.

Using the road for business is the leading cause of work-related deaths and injuries.[9] It is estimated that 6 out of 10 work accidents resulting in death are road collisions.[10] These types of collisions account for 39% of work-related deaths in the European Union.[11]

1.3 What constitutes a work-related road death?

Work-related road safety (WRRS) is both a road safety and an occupational safety and health (OSH) matter and should therefore, be addressed as both. From a road safety perspective road users are held accountable for their behaviour while, from an OSH perspective, it is a shared responsibility between the employer and the employee.

In developed countries, work-related road deaths are increasingly being understood and categorised as an occupational safety and health issue. As general, and work-related, traffic levels increase, this is a growing area of concern for those working in road safety, public health, occupational health and regulatory authorities. It's also of relevance to the general public, as the effects of work-related road safety are by no means limited to professionals.[12]

Employers are responsible for providing the framework for work-related risk management within which employees can work safely and this extends to work-related road use. While the EU definition of a work-related road (WRR) death is present in the OSH field, there is no common EU definition of a WRR death in the road safety area.

A WRR death is defined in European Statistics of Accidents at Work (ESAW) as a death of a victim that occurred within one year of the collision. It covers all accidents that happened in the course of work, including road traffic collisions, but excluding commuting. Data reporting on the deaths of self-employed people is voluntary.[13]

1.4 How does road safety affect the workplace?

For employers in organisations of all types, using the road for work, or to get to work, is probably the most risky activity to which they are exposing their employees. Consequently, ensuring their safety should be a priority.

Work-related road safety (WRRS) should also be a priority for organisations for legal, societal, reputational, financial and efficiency reasons. From a reputational and business perspective, being involved in a fatal or serious collision can have a significant impact on organisations and their leaders. It should go without saying that the impact on the person driving the vehicle at the time, and their family can be catastrophic.

[9] European Commission/European Road Safety Observatory (2009), SafetyNet: Work-related Road Safety
[10] EU-OSHA, 2010, A review of accidents and injuries to road transport drivers, p7.
[11] European Commission, 2005, "Causes and circumstances of accidents at work in the EU".
[12] IOSH - Fatal Collisions on the road and safety and health, June 2016
[13] Eurostat, Accidents at Work (ESAW, 2008 onwards), https://goo.gl/tzh5yH

	Total Incidents which resulted in days off	% of which on the Road	Total Incidents which resulted in fatalities	Total Incidents which resulted in fatalities
2008	703,976	11.2%	956	48.6%
2009	651,453	11.9%	894	44.5%
2010	658,847	11.8%	888	45.5%
2011	669,914	11.5%	945	49.3%
2012	640,891	11.6%	881	43.8%

Fig. 2: Share of incidents resulting in days off and deaths, which occurred on the road in France, 2008-2012.[14]

Effectively managing road safety provides an opportunity to reduce costs in several ways:

- Reduced running costs, such as fuel consumption and vehicle maintenance through better driving standards;
- Fewer working days lost to injury/absenteeism and a reduction in the long-term associated costs;
- Reduced risk of work-related ill health;
- Reduced stress and improved morale/job satisfaction;
- Less need for investigation and paperwork;
- Less time lost to work rescheduling;
- Fewer vehicles off the road for repair;
- Fewer missed orders and business opportunities, reduced risk of losing the goodwill of customers;
- Less chance of key employees being banned from driving;
- Reduced insurance premiums and costs associated with insurance claims (e.g. excesses/deductibles).

In the case of a collision, there are many administrative duties that can weigh on an employer such as filling out forms and claims, dealing with insurance companies and allocating time to put the business back on track.[15]

This can be especially cumbersome for smaller organisations, which can even be put out of business as a consequence of a serious collision. This is one of the key reasons why SMEs, as well as large organisations, should be looking to manage road risk proactively. Reducing injuries of any kind reduces workers' compensation claim expenses, reduces or eliminates health and safety fines, reduces lost time from work and improves profitability.

From a managerial perspective, and aside from reduced business costs, there is also the achievement of creating a safer workplace and the fulfilment that comes from making great strides in worker safety.

[14] ETSC, 2014, The Business Case for Managing Work-Related Road Safety, p8.
[15] Eurogip, 2013, Statistical review of occupational injuries – France.

Working safely simply is good business.[16] Having a work-related road safety management programme in place can also boost morale and reduce turnover of staff/drivers. Research shows that investment in 'Workplace Health Promotion' yields a return on investment of one to 2.5–4.8 in reduced absenteeism costs.[17]

In an economy where organisations are looking to stand out from the rest, approaching road safety in a proactive way can keep organisations ahead of the competition and in line with regulatory and legal requirements. This can give employers a level of competitive advantage, compared to more 'reactive' market competitors.[18]

If SMEs can demonstrate that they are managing road risk, they may also benefit their contract tendering and business development processes. This is especially relevant for organisations bidding for sub-contracts where road safety is one of the factors in the tendering process. When road safety procedures are included in other management areas (such as quality certification and marketing promotions), a commercial benefit can be attained in this way.[19]

Incentives to include safety criteria in contracts should also be included in public procurement. Liability responsibility for work-related road safety and appropriate risk management and preventative measures must be extended throughout supply chains.

Trust and a good reputation are important assets that attract clients and investors. The reputation of a company is hard to make and easy to lose. One high-profile collision involving a company-owned vehicle bearing a company logo can have a long lasting negative impact on a company's image.[20]

On the other hand, being recognised externally for performing well in fleet safety can be an effective marketing tool. Similarly, road safety is rarely offered as an example of good CSR practice. This is a missed opportunity, as it also serves to set a good example and encourage other organisations, companies and individuals to commit to improving road safety in their own workplace.

A work-related risk management scheme can help in achieving environmental goals and motivate organisations to manage their carbon footprint as carbon emissions are one of the main external costs of transportation.

1.5 How can organisations reduce their road risk?

Organisations should start by ensuring they are fully compliant with the relevant legal requirements. Governments continue to update legislation, clarifying the obligations of employers concerning the safety and well-being of their employees and ensuring that road safety is an integral part of this. Health and safety authorities issue regular guidance for organisations, to help them abide by their legal responsibilities but also encouraging them to go beyond these requirements and be proactive in managing

[16] Eurogip, 2013, Statistical review of occupational injuries – France
[17] ETSC, 2012, Fitness to Drive, p3.
[18] ETSC, 2012, Work Related Road Safety Management Programmes, p7.
[19] European Agency for Safety and Health at Work, 2001, Factsheet on Preventing Road Accidents involving Heavy Goods Vehicles.
[20] CSR Film from Asda available from Business Case for Road safety ETSC.

road safety for their employees. The international standard ISO 39001 also serves to guide organisations in how to improve road safety in the work place.[21]

Internally, organisations have attempted to tackle work-related road risk in their fleets through a range of interventions and policies. Some of these aim to improve general driving standards, whereas others target elements of road safety that are particular to the professional environment, or the situation of a particular organisation. They can focus on the organisation as a whole, safe drivers, safe vehicles and safe journeys.

Safer organisations

For many years, road safety interventions aimed to change the behaviour of individual employees. Recently, there has been a shift towards more holistic approaches across an entire organisation. For example, many organisations now conduct work-related road safety risk management schemes, ensuring that road safety is a key part of occupational safety and health and not simply an add-on.

Organisations can work to develop a 'safety culture', through safety policies and procedures issued by a senior management that is committed and willing to invest in safety, and implemented by a line management and workforce that is willing to comply.[22]

Safer drivers

Driver training has long been the primary, and often only, approach used by organisations (although it is a contentious topic in the wider field of road safety). It is used to instruct fleet drivers in how to improve their overall driving behaviour but also how to respond to individual hazards and situations on the road.[23] It can also be used as a means to instil greater general responsibility on the road, as well as a positive attitude and interest in safety issues and further measures.[24]

Group sessions can also be used, in which employees collectively discuss safety issues to try and bring about behavioural change. Unlike day-to-day road use, in the professional fleet environment it is also possible to reward good driving behaviour and low collision rates through the use of incentive schemes.

Campaigns and publicity drives can be used to focus on specific safety issues that have arisen in an organisation or those linked to different seasons or types of work.

Safer vehicles

The vehicles used in the workplace and by the workforce vary between organisations: some primarily use cars, whereas others will use larger, more specialised vehicles. However, regardless of the types used, by introducing vehicles into the fleet with higher levels of crashworthiness and which feature in-vehicle technologies, organisations can help avoid collisions and mitigate their severity if they do occur.[25]

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[21] Health and Safety Executive (UK) 2014, Driving at Work: Managing Work-Related Road Safety, pp.1-2 / ISO 39001:2012 https://www.iso.org/standard/44958.html

[22] ETSC, 2012 ,Work Related Road Safety Management Programmes, p10.

[23] IOSH, 2011, Work-related road safety: A systematic review of the literature on the effectiveness of interventions, Grayson, G. B., and Helman S., TRL, p6

[24] ETSC, 2010, Fit for Road safety: From Risk Assessment to Training, p2.

[25] ETSC, 2009, How Can In-vehicle Safety Equipment Improve Road Safety at Work?

New advanced driver assistance technologies, such as Intelligent Speed Assistance, Autonomous Emergency Braking and alcohol interlocks, can help address a range of key road safety issues like speeding and drink driving.

Safer journeys

Journey organisation and route planning play an important role in an organisation's approach to road risk and can affect key risk factors such as fatigue and stress. In many organisations employees spend long hours on the road. As workloads increase and drivers face escalating pressures to deliver faster and more cheaply (often using 'just-in-time management' systems), drivers can become over-worked and over-stressed by the demands place on them.

Organisations can help avoid risk by ensuring that drivers are only taking journeys that are necessary. If a journey is deemed necessary, then there are steps they can take to reduce journey risk as much as possible, such as changing schedules, distances and plans to allow sufficient time for drivers to complete their journeys safely (including delivery stops, rest breaks and foreseeable weather and traffic conditions).[26]

2. Vehicle telematics: What are they and how do they work?

2.1 Types of telematics

The term vehicle telematics refers to a range of technologies that can be used to monitor the driving of a vehicle. By combining a positioning system with a vehicle's on-board diagnostics it is possible to follow, and record, the vehicle's position, speed and manoeuvres.

Usually, telematics are used to monitor the elements and types of driving behaviour that are linked to collisions. However, they can also be used to monitor general driving behaviour and its impact on fuel consumption and vehicle wear and tear.

The most common elements of driving that telematics monitor are:

- Journey start and end times;
- Vehicle speed;
- Vehicle location;
- Acceleration;
- Braking;
- Cornering;
- Seatbelt use;
- Fuel consumption.[27]

More advanced systems can also map driving conditions such as night-time driving, heavy congestion and bad weather.[28]

[26] ETSC, 2014, Managing the Road Risk of Van Fleets, pp. 26-27.

[27] RoSPA, 2013, Road Safety and In-vehicle Monitoring (Black Box) Technology, p7.

'Vehicle telematics' remains a broad term, and covers a variety of products and systems, but they can be narrowed down into two categories – Event Data Recorders (EDRs) and Journey Data Recorders (JDRs).

Event Data Recorders (also known as crash data recorders or accident data recorders) monitor driving throughout a journey but only record data for several seconds before, during and after an 'event'. This can be triggered by a collision (e.g. deployment of the airbag) or when an event exceeds certain pre-set parameters (e.g. position of the accelerator/angle of the steering wheel).

These data are then available for later analysis and can be made available to the driver, the organisation and/or a third party. Some versions provide immediate, real-time alerts (visual and/or audible) to the driver throughout the journey.

Journey Data Recorders work in a similar way, except they monitor and record driving throughout an entire journey, providing larger amounts of data for later analysis and retroactive feedback. Again, some versions also provide real-time alerts to the driver.[29] In most cases, the term 'telematics' refers to this style of continual monitoring.

Since the mid-1990s data recorders have been introduced to professionally used vehicle fleets (HGVs and buses and coaches) throughout Europe.[30] Initially the focus was on Event Data Recorders but, as technology has improved, more fleets are using Journey Data Recorders to continuously monitor driving. Telematics use has even been expanded to private vehicles (usually cars and vans) used for work – the 'grey fleet'.

Telematics are also used by private drivers, in particular young and novice drivers. As in fleets, the systems record information about high-risk behaviours and the information is then used to advise the driver, via a website/app or by a specialist. Many insurance companies in the UK are employing telematics systems as a tool to support and positively influence young drivers, helping them to reduce claims expenditure.[31] Telematics technology has the potential to be a useful tool for other road user groups too, such as older drivers and offenders.[32]

There are other forms of telematics, such as tachographs. A tachograph is a recording device, fitted to commercial vehicles which stores details of vehicle movement and of certain work periods of their drivers. The recording of the driver's individual duty periods is mandatory in some commercial vehicles in EU countries for enforcement of driving-time regulations.[33]

Compliance with the provisions of Regulation 561/2006/EC[34] is dependent on regular monitoring and controls, which are carried out at the national and international level by checking tachograph records at the road side and at special tachograph check premises.[35]

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[28] RoSPA 2014, Young Drivers at Work (Scotland): Black Box Pilot, p7.

[29] RoSPA 2017, Driving for Work: Using Telematics, p2.

[30] ETSC, 2009, How Can In-vehicle Safety Equipment Improve Road Safety at Work?, p9.

[31] ETSC, 2016, Reducing Casualties Involving Young Drivers and Riders in Europe, pp.33-34.

[32] RoSPA, 2013, Road Safety and In-vehicle Monitoring (Black Box) Technology, p4.

[33] ETSC, PRAISE (2011), Tackling Fatigue: EU Social Rules and heavy goods vehicle drivers, p8.

[34] Regulation (EC) No 561/2006 of the European Parliament and of the Council of March 2006 on the harmonization of certain legislation relating to road transport and amending Council Regulations (EEC) No 3821/85 and (EC) No 2135/98 and repealing Council Regulation (EEC) No 3820/85, https://goo.gl/fyImRV

New vehicle technologies are continuing to emerge, both in the form of already available advanced driver assistance systems (such as Intelligent Speed Assistance) and the coming changes brought about by automation. There is considerable crossover between these technologies and those used by telematics systems. Similarly, the research into the effectiveness of telematics systems (feedback and incentives), may help contribute to the debate on the effectiveness of new vehicle technologies.[36]

2.2 Fitting telematics: options and costs

Telematics can be installed in a number of ways: there are pro and cons to all systems and it is for the organisation to decide which is most appropriate for their needs.

Traditionally, in-vehicle monitoring required the installation of a 'black box', or was part of software embedded in another device, such as a satnav. These are retro fitted into the vehicle, and incur some costs for the black box, the installation and the ongoing data communication (which varies depending on the provider). Such systems may also require future maintenance.

Recently, other telematics options have become available, such as the use of smartphone technology and an associated app. While these systems are more convenient and less expensive, they can be problematic given the possibility of tampering and the distractive potential of mobile phones.[37,38] If used, organisations may need to consider taking steps to actively discourage or block mobile phone use.[39]

An emerging and more reliable method of installing telematics technology is to have it built-in to the vehicle, as part of the original vehicle equipment. Vehicle manufacturers can do this voluntarily (as they do with other technologies), or it could be made mandatory in the relevant jurisdiction. The European Union has recently proposed the mandatory installation of EDRs in cars and vans.[40]

Telematics systems can also be linked to a video camera, in order to provide a "driver's eye" view or a view of the inside of the vehicle. This can help provide more information on the context in which incidents take place, or the reasons for certain types of driver behaviour (e.g. seatbelt use, in-vehicle distractions such as mobile phones or other passengers).

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Once installed, the telematics system provides data and feedback to a manager and/or the driver, usually via a dedicated programme or website/app. Some will only download the data at the end of each day, but

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[35] European Commission, Driving time and rest periods, https://goo.gl/uEstKl Regulation (EU) No 165/2014 of the European Parliament and of the Council of 4 February 2014 on tachographs in road transport on the harmonisation of certain social legislation relating to road transport Text with EEA relevance, https://goo.gl/9mj046

[36] TRL 2015, Report 755: Provision of Telematics Research, Tong, S., Lloyd, L., Durrell, L., McRae-McKee, K., Husband, P., Delmonte E., Parry, I., Buttress, S., pp. 41-42.

[37] TRL 2015, Report 755: Provision of Telematics Research, Tong, S., Lloyd, L., Durrell, L., McRae-McKee, K., Husband, P., Delmonte E., Parry, I., Buttress, S., p43.

[38] ETSC, 2010, Driving for Work: Minimising In-Vehicle Distraction, p2.

[39] RoSPA, 2013, Road Safety and In-vehicle Monitoring (Black Box) Technology, p2

[40] ETSC, 2018, Briefing: EU Mobility Package III including new vehicle safety standards, https://etsc.eu/briefing-eu-mobility-package-iii-including-new-vehicle-safety-standards/

others feature real-time monitoring. Data can be collected for a certain period without feedback in order to generate a baseline against which future progress can be compared.

Each organisation will have to decide which safety performance metrics to establish in order to monitor progress, or regression. These can include factors such as injury and collision frequency, the number of collisions per miles driven, number of collisions per vehicle or the number of deviations from a specific policy.[41]

The cost of a telematics system (device, installation, maintenance and feedback provision) is naturally an issue that organisations must consider, and studies show it can deter some from choosing to use telematics. However, it is more than likely that the reductions in other costs (insurance premiums, fuel, damage), would compensate for the initial start-up costs.[42]

A European Commission study of vehicle technologies found the use of Event Data Recorders alone to have a positive benefit-cost ratio. EDRs were ranked one of the most cost-effective technologies in the study.[43]

Typically, the system will generate risk-ratings for individual drivers, based on calculations made using the data collected from the vehicle. These ratings can then be used for a range of purposes: to identify risks and behavioural trends, develop and prioritise driver training, make changes to fleet management (e.g. schedules and routes) and if necessary for disciplinary purposes. These are discussed more in section 3.3 below.

This final stage in the process is crucial, as it is only by using the data produced by the telematics system to inform and develop policies to manage road risk that change can come about.[44] Therefore, managers and staff need to understand how the telematics work and what the feedback means.

It is important to note that there will always be elements of driving that telematics cannot capture. They are not a panacea for road risk and must only be used as part of a comprehensive work-related road risk management programme.

[41] Together for Safer Roads 2016, Advancing Road Safety Best Practices for Companies and Their Fleets: Guidelines for developing and managing transportation programs, p15.
[42] RoSPA, 2013, Road Safety and In-vehicle Monitoring (Black Box) Technology, p34.
[43] European Commission, 2006, Cost-benefit assessment and prioritisation of vehicle technologies, p145/p22.
[44] RoSPA – Driving for Work: Using Telematics (2017), p2.

3. Using Telematics: Identifying and Managing Risk

Reducing risk doesn't mean only developing a work-related road risk policy, but managing the risk proactively and uniformly through collective and individual measures across the organisation. [45] Telematics can help identify and address key road safety issues, issues specific to individual drivers and also issues specific to the organisation.

It is important to note that recorded incidents may increase sharply at the start as collisions and behaviours that were not reported previously start to get reported.[46]

3.1 Addressing key road safety issues

Some road safety issues affect all drivers, both private and professional, regardless of the type of vehicle they are in.

Speed is one such example. Inappropriate speed is responsible for up to 30% of all fatal road crashes.[47] Even when respecting speed limits, drivers can drive at inappropriate speeds or have an inappropriate driving style.[48] Certain types of professional vehicle, such as HGVs, have speed limiters but can still breach lower speed limits.

Therefore, a primary goal for organisations should be to prevent speeding and its consequences. [49] Telematics can provide real-time monitoring and recording of speeding incidences and their location, allowing managers to identify speeding offences that may go undetected by national enforcers.[50] They can also help companies to link and compare data sets on issues such as speeding, risk assessment and fuel consumption.[51]

> Example – Iron Mountain's Speed by Speed Zone
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> In 2009, Iron Mountain began the implementation of a risk assessment programme for all its commercial vehicle drivers. Part of this was a 'speed by speed zone' daily report for all of its UK and Ireland vehicles, which reports any violation of more than 4 miles per hour above any posted limit. They have worked with drivers to reduce the number of violations and within six months reduced them by 80%.[1]

Some telematics systems can provide insight into the use of in-vehicle technology systems. For example, when linked to the braking system on commercial trailers, the brake system automatically intervenes when the trailer tends to rollover, (a functionality called RSS, "Rollover Stability Support") or the ESC activates. Such telematics systems can send an alert to the dispatcher of the fleet each time such an

[45] ETSC, 2011, Driving for Work: Managing Speed, p19.
[46] ETSC, 2011, Driving for Work: Managing Speed, p31./ ETSC, 2009, How Can In-vehicle Safety Equipment Improve Road Safety at Work?, p9.
[47] OECD, 2018 - https://etsc.eu/oecd-study-says-inappropriate-speed-responsible-for-up-to-30-of-all-fatal-crashes/
[48] ETSC, 2011, Driving for Work: Managing Speed, p31.
[49] ETSC, 2011, Driving for Work: Managing Speed, p19.
[50] ETSC, 2014, Managing the Road Risk of Van Fleets, p34.
[51] ETSC, 2011, Driving for Work: Managing Speed, p31.

intervention happens, which allows the fleet owner to review the event with the driver, provide further training if necessary or take other actions.[52]

Telematics can assist in the identification of issues that are difficult to enforce by regular enforcement authorities. Distracted driving is a common phenomenon, especially concerning mobile phone usage. And it is difficult to enforce. Organisations can address phone usage in fleets by using mobile phone records and/or devices that monitor phone usage, in conjunction with telematics data to identify occasions when employees were using their phone. By juxtaposing the two, they can also examine whether phone usage was associated with inappropriate behaviour.[53] There is also evidence to suggest that seatbelt wearing can be improved through the use of telematics.[54]

Driver fatigue is another safety issue that organisations can do a lot to manage. Fatigue affects all road users but is especially prevalent amongst professional fleets, in particular those drivers involved in road haulage. Analysis and comparison of individual driving styles and data for the entire fleet makes it possible to identify how and when fatigue occurs and how to reduce it.[55]

It is worth noting the contribution that telematics data can make to road safety at all levels. The circumstances that surround road collisions help inform local, national and international approaches to road safety. Telematics systems record detailed, objective data about vehicle collisions, in particular the pre-crash phase, which are often of a higher quality than are currently available.[56]

This data can then be analysed by police, collision investigators, insurance companies, vehicle manufacturers and researchers, helping them to better understand the causes of collisions and the effectiveness of new safety technologies.[57] Other applications include the provision of objective data for legal proceedings (in particular when supporting witness statements, detailed information for vehicle manufacturers to ensure that vehicle systems are operating correctly and the possibility for consumers to know if a vehicle has previously been involved in an accident.[58]

3.2 Addressing driver specific issues

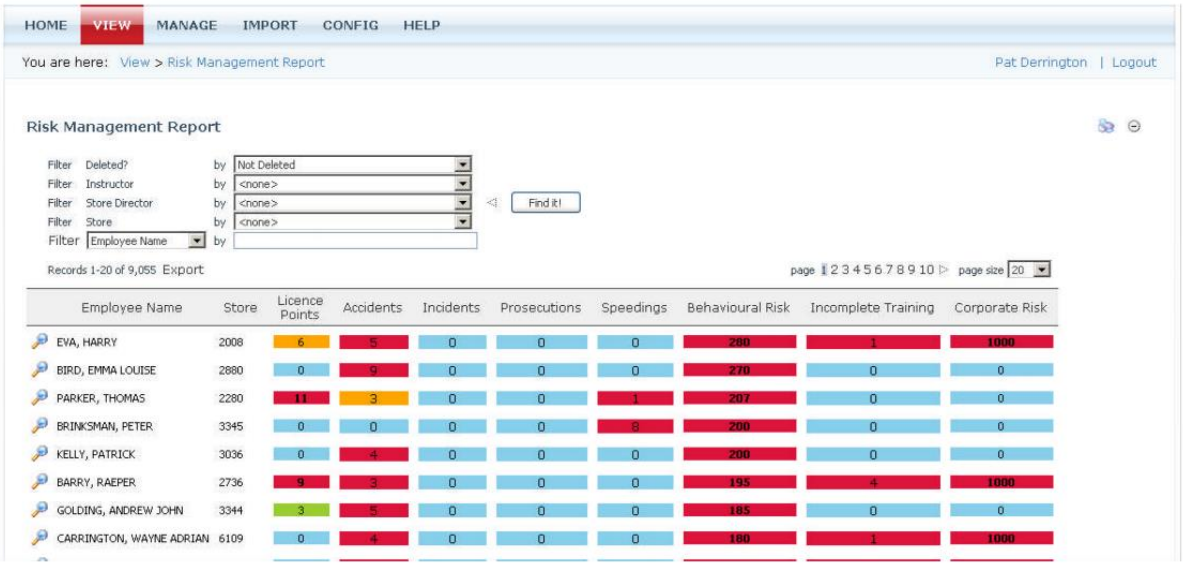
By collecting and analysing telematics information about employees' driving behaviour, strengths, weaknesses and areas of concern can be identified. Employers can monitor driving in real-time and provide immediate feedback to drivers if, for example, their speed becomes inappropriate. Data on drivers can later be used to create personalised feedback and training for individual drivers in the long-term.[59]

[52] ETSC, 2011, Driving for Work: Managing Speed, 31.
[53] ETSC, 2010, Driving for Work: Minimising In-Vehicle Distraction, p9.
[54] Cranfield University, 2018, Sullman, M. J. M., Reducing risk amongst those driving during work, p
[55] ETSC, 2011, Tackling Fatigue: EU Social Rules and Heavy Goods Vehicle Drivers, p35.
[56] Hynd, D., McCharty, M. 2014, Study on the benefits resulting from the installation of Event Data Recorders, Transport Research Laboratory, p97.
[57] ETSC, 2015, Young Drivers at Work, p20
[58] Hynd, D., McCharty, M. 2014, Study on the benefits resulting from the installation of Event Data Recorders, Transport Research Laboratory, p16.
[59] ETSC, 2010, Fit for Road safety: From Risk Assessment to Training, p6.

Telematics data can even be linked to the general health and well-being of staff, an important issue for safety in the workplace[60] For example, a Swiss company organised consultations with eye doctors for employees who demonstrated poor driving performance.[61]

As the amount of lone worker legislation increases, and with the onus put squarely on employers to protect both their employees and those they come into contact with, it is imperative to be able to identify any potential risks. [62]

Data can be fed into risk-rating systems which combine sources of information (e.g. on-the-road incidents, driving licence points), to create an overall risk-rating for individual drivers.[63]



A risk rating example from Tesco Dotcom[64]

In general, devices are put in all fleet vehicles, although increasingly more detailed analysis can be used to target attention to the 5-15% of drivers that are responsible for a disproportionate number of collisions and violations in most organisations.[65]

Many risk management systems include an element of driver self-improvement and reflection. They provide immediate in-vehicle feedback for drivers following any high-risk or aggressive manoeuvres (e.g. cornering, changing lanes abruptly and accelerating suddenly). By analysing different types of manoeuvre and identifying whether they have been performed correctly and safely, the system can encourage drivers to manage their own safety on-the-go.[66]

[60] ETSC, 2010, Fitness to Drive.
[61] ETSC, 2009, How Can In-vehicle Safety Equipment Improve Road Safety at Work?, p10.
[62] ETSC, 2012, Work Related Road Safety Management Programmes, p19.
[63] ETSC, 2014, Managing the Road Risk of Van Fleets, p34.
[64] ETSC, 2011, Driving for Work: Managing Speed, p31.
[65] ETSC, 2011, Driving for Work: Managing Speed, p31.
[66] ETSC, 2009, How Can In-vehicle Safety Equipment Improve Road Safety at Work?, p9

Drivers often overestimate their own abilities or may not realise they were doing something wrong. Feedback from telematics can help draw attention to unknown issues and calibrate their perceived performance with their actual performance.[67]

Risk-rating systems, underpinned by detailed telematics data, can be used to organise reward schemes. As a behaviour modification tool, rewarding good behaviour is at least as powerful as punishing bad behaviour.[68] However, at the national level, road safety tends (understandably) to be centred on punishing bad driving behaviour. Similarly, there are few options available for rewarding private drivers.

In the fleet environment it is possible to reward good driving. Compliance (and improved compliance) with safety policies can be encouraged through monetary incentives.[69] Furthermore, unlike other forms of driver monitoring, the data from telematics allow managers to explain clearly why and how rewards are calculated.[70]

However, it is important to consider the costs of running such a scheme.[71] Similarly, organisations should take care to consider how best to use such a system. For example, rewarding only good driving can act as a disincentive to those drivers that are not yet at that level. Instead, reward schemes should focus on progress and improvement rather than simply the best.

In many organisations, drivers use their own vehicles (usually cars) for work business – known as the 'grey fleet'.[72] It is possible to include these drivers in a telematics system, however it may require additional processes (such as getting staff agreement), and discussions with insurers and vehicle leasing companies.[73]

3.3 Addressing company-wide/specific issues

Drivers often overestimate their own abilities or may not realise they were doing something wrong. Feedback from telematics can help draw attention to unknown issues and calibrate their perceived performance with their actual performance.[74]

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In the fleet environment it is possible to reward good driving. Compliance (and improved compliance) with safety policies can be encouraged through monetary incentives.[76] Furthermore, unlike other forms of

[67] RoSPA, 2017, Driving for Work: Using Telematics, p7.
[68] ETSC, 2012, Work Related Road Safety Management Programmes, p26.
[69] ETSC, 2011, Driving for Work: Managing Speed, p18.
[70] ETSC, 2011, Driving for Work: Managing Speed, p18.
[71] ETSC, 2012, Work Related Road Safety Management Programmes, p26.
[72] ETSC, 2016, Managing Grey Fleet Safety
[73] RoSPA, 2017, Driving for Work: Using Telematics, p5.
[74] RoSPA, 2017, Driving for Work: Using Telematics, p7.
[75] ETSC, 2012, Work Related Road Safety Management Programmes, p26.
[76] ETSC, 2011, Driving for Work: Managing Speed, p18.

driver monitoring, the data from telematics allow managers to explain clearly why and how rewards are calculated.[77]

However, it is important to consider the costs of running such a scheme.[78] Similarly, organisations should take care to consider how best to use such a system. For example, rewarding only good driving can act as a disincentive to those drivers that are not yet at that level. Instead, reward schemes should focus on progress and improvement rather than simply the best.

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As outlined above in Section 1.4, there are significant financial benefits to managing work-related road risk. The costs associated with days lost due to injury and long term absenteeism can be prohibitive, especially for smaller organisations operating within tighter budgets.

Similarly, the costs of continual vehicle repairs and maintenance due to collisions and poor and/or aggressive driving can mount quickly, especially in large vehicle fleets that are being continually used.

Improvement of overall safety levels in an organisation can help reduce insurance costs. Insurers can incentivise the use of telematics by linking their use to their premiums.[81] This is already becoming common in some insurance markets for young drivers.[82] Some insurers, such as Zurich, have become very proactive in offering these types of services to commercial fleets.[83]

An added insurance benefit of telematics is the information they provide on the circumstances surrounding a crash and for the authentication of an incident for insurance claims, or equally importantly for the rejection of insurance claims (e.g. drivers involved in a collision because of allegedly inappropriate speed).[84] Incidents are recorded automatically, and rely less heavily on staff and witness reports. Investigations are often quicker, easier and cheaper, with more accurate conclusions.[85]

The driving techniques and style that make drivers safer are exactly the same as those that make drivers more fuel efficient.[86] Adopting telematics systems can therefore help deliver environmental benefits and improvements in fuel economy. These added benefits can also help in securing buy-in within an organisation.

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[77] ETSC, 2011, Driving for Work: Managing Speed, p18.
[78] ETSC, 2012, Work Related Road Safety Management Programmes, p26.
[79] ETSC, 2016, Managing Grey Fleet Safety
[80] RoSPA, 2017, Driving for Work: Using Telematics, p5.
[81] ETSC, 2014, Managing the Road Risk of Van Fleets, p34.
[82] ETSC 2016, Reducing Casualties Involving Young Drivers and Riders in Europe, p34.
[83] Zurich Fleet Intelligence https://www.zurichna.com/-/media/project/zwp/zna/docs/kh/const/zfi.pdf
[84] ETSC, 2009, How Can In-vehicle Safety Equipment Improve Road Safety at Work?, p8.
[85] RoSPA, 2016. Driving for work: Incident Reporting and Investigation, p9.
[86] ETSC, 2011, Driving for Work: Managing Speed, p25.

4. Making the most of telematics data

4.1 Feedback: collecting and *using* the data

Typically, organisations have taken a reactive approach to road safety, responding to increases in collisions demonstrated by their insurance data or collision reporting systems.[87] Telematics can help organisations to be proactive by forming part of a wider monitoring system (combined with insurance data, licence data, management ride-alongs, public feedback etc) that aims to identify trends and key risks before they lead to collisions and harm. In this way, they can be a central part of an organisation's approach to fleet safety.[88]

However, the collection of telematics data alone does not necessarily lead to any positive change in an organisation's road risk or fleet management. While it is possible to identify some improvements due to the simple presence of telematics devices in a vehicle (i.e., a Hawthorne effect), more tangible, long term change requires the proper exploitation of that data into something useful.[89,90]

The most immediate way of doing this is through **'real-time' feedback** while the driver is in the vehicle. This has the advantage of alerting a driver to an issue and giving them the chance to change their driving on a specific journey. **Retrospective feedback**, after a journey, can be delivered straight to the driver, or via a third party such as a manager.

Care should be taken to ensure that the information used in feedback is relevant, and also easy to understand. Similarly, the feedback system used (especially if feedback is given directly to drivers, without an intermediary) should be clear and straightforward.[91]

Routine systematic monitoring should be part of the day-to-day operation of any organisation whose work includes driving. In the long term the continuous analysis of data helps to develop appropriate policies and can then be used to evaluate them.[92] Without continued monitoring, the benefits of telematics can begin to decrease.[93] Likewise, continued feedback is required; without it the impact on driver behaviour is reduced.

4.2 Telematics as part of a work-related road risk management programme

As telematics and monitoring systems become more sophisticated, the sheer quantity of data recorded has the potential to be overwhelming. Therefore, it is important for an organisation to have a work-related road risk management programme in place to help focus attention on the most important safety issues.

Reducing work-related risk requires the development of safety policies, but it also needs proactive and uniform management of the risks across the organisation, through a combination of collective and individual measures.

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[87] ETSC, 2010, Fit for Road safety: From Risk Assessment to Training, p3.
[88] Haddon Matrix, featured in ETSC, 2010, Fit for Road safety: From Risk Assessment to Training, p3.
[89] Driving for Better Business, 2018, How the latest technology can reduce your fuel spend, https://www.drivingforbetterbusiness.com/how-the-latest-technology-can-reduce-your-fuel-spend/
[90] RoSPA, 2013, Road Safety and In-vehicle Monitoring (Black Box) Technology, p7, p32.
[91] RoSPA 2014, Young Drivers at Work (Scotland): Black Box Pilot, p20/p26.
[92] ETSC, 2010, Driving for Work: Minimising In-Vehicle Distraction, p9.
[93] ETSC, 2009, How Can In-vehicle Safety Equipment Improve Road Safety at Work?, p9.

To gain maximum benefits from telematics, they should be integrated into an existing work-related road safety management programme which includes clear policies on key road safety issues (such as speeding, drink-driving, fatigue etc.). These policies will help to inform the way in which telematics are used. Similarly, they should always be used in cooperation with key stakeholders across the organisation.[94]

4.3 Handling data

It is important when handling and using the data gathered from telematics devices that organisations take care to abide by the data protection rules that apply in their jurisdiction.[95] They should also be sure to give staff a proper explanation of how the technology works, how they plan to use the data, and who will have access to the data.[96]

Employees may initially have concerns about elements of telematics, like real-time tracking, personal privacy and the potential ramifications of bad training. Organisations should be transparent about the reasons for using telematics and make sure that drivers have the option to challenge and discuss any conclusions drawn from the data.[97]

Care must be taken to ensure that data is assigned to the correct drivers, especially for those who work with pool vehicles. If the right data are not linked to the right driver, it will be rendered largely meaningless. This may require the use of additional data sources, like logbooks or driver identification technology.[98]

4.4 Leadership and buy-In

Leadership, consultation with and buy-in from staff are essential to developing any work-related road safety policy, but especially one that involves telematics.[99] Staff and/or representative bodies (such as trade unions/staff associations) need to be involved in the process and have an awareness of the joint responsibility for operational success.[100] It is in the interest of both employers and employees and reduces the potential for distrust and tension between the two.[101]

Organisations should consider introducing a 'telematics policy', in addition to, or as part of their driving for work policy that explains what is expected of both employers and employees.[102]

[94] ETSC, 2010, Driving for Work: Minimising In-Vehicle Distraction, p9.
[95] ETSC, 2011, Driving for Work: Managing Speed, p31.
[96] RoSPA, 2017, Driving for Work: Using Telematics, p7.
[97] RoSPA, 2017, Driving for Work: Using Telematics, p3.
[98] RoSPA, 2017, Driving for Work: Using Telematics, p5.
[99] ETSC, 2012, Work Related Road Safety Management Programmes, p19.
[100] RoSPA 2014, Young Drivers at Work (Scotland): Black Box Pilot, p31.
[101] ETSC, 2009, How Can In-vehicle Safety Equipment Improve Road Safety at Work?, p9.
[102] RoSPA, 2017, Driving for Work: Using Telematics, p9.

5. What evidence is there for the effectiveness of telematics?

5.1 Academic research/literature review

Unlike general road safety, work-related road safety suffers from a notable lack of research. As a result, there is only a small amount of work that looks at the fields of telematics. Similarly, in many cases telematics are studied as part of a group of measures, and not in isolation. Consequently, it can be difficult to assess their effects.

A systematic review of the literature on work-related road safety (63 studies), carried out for the Institute of Occupational Safety and Health in 2011, examined six intervention areas: driver training, group discussions, incentive schemes, publicity, organisational approaches and in-vehicle data recorders.[103] Only four of the intervention areas were found in studies of a scientifically acceptable standard that showed statistically meaningful reductions in crash risk.

One of these was the installation of in-vehicle data recorders, or telematics. A major 2000 study, conducted by Wouters & Bos, was able to demonstrate that the installation of data recorders could reduce collision involvement among fleet drivers.[104] The study covered a number of fleets in Belgium and the Netherlands and drivers were made aware that the data being recorded could be used when assessing collision responsibility.[105]

Another area that was found to be effective was the use of incentives, in the form of a bonus. A study of multiple measures conducted in Sweden recorded a 23% reduction in the accident rate for the bonus group.[106]

> *"It is unfortunate that there has been so little evaluation of an intervention that has such potential for research"*

The main conclusion of the project was that there is a "pressing need" for more and better-controlled evaluation work in order to gain a better understanding of work-related road safety issues.[107] In particular, it is unfortunate that there has been so little evaluation of an intervention that has such potential for research, given its capacity for the collection and use of real-time data in real-world situations.[108]

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[103] IOSH, 2011, Work-related road safety: A systematic review of the literature on the effectiveness of interventions, Grayson, G. B., and Helman S., TRL.
[104] Wouters P and Bos J M. Traffic accident reduction by monitoring driver behaviour with in-car data recorders. Accident Analysis & Prevention 2000; 32: 643–650.
[105] IOSH, 2011, Work-related road safety: A systematic review of the literature on the effectiveness of interventions, Grayson, G. B., and Helman S., TRL, p7.
[106] IOSH, 2011, Work-related road safety: A systematic review of the literature on the effectiveness of interventions, Grayson, G. B., and Helman S., TRL., p7.
[107] IOSH, 2011, Work-related road safety: A systematic review of the literature on the effectiveness of interventions, Grayson, G. B., and Helman S., TRL., p5.
[108] IOSH, 2011, Work-related road safety: A systematic review of the literature on the effectiveness of interventions, Grayson, G. B., and Helman S., TRL., p7.

Earlier studies also point to a positive safety effect of telematics on commercial fleet safety. A Dutch study examining police vehicle collisions noted a crash reduction in EDR-equipped fleets of 20%.[109] Similarly, a UK study of police vehicles fitted with EDRs saw a reduction of 20-25%[110].

In 2014, a study of young drivers at work in Scotland with telematics installed in their vehicles demonstrated an improvement in driving scores for 75% of the drivers involved.[111]

A 2015 report stated that studies of fleet telematics noted overall average reductions in collisions of between 0-30%, when comparing drivers monitored by telematics systems with those who were not. The evidence deemed most reliable indicated a reduction of 20%, although given the nature of the study this cannot be taken as an expected assessment of potential collision reduction.[112]

A number of studies note that that the positive impact of telematics on driver behaviour is heavily influenced by the associated feedback and incentives, however there is often little detail about the content and nature of this feedback.[113] Furthermore, these studies also suggest that driver behaviour is manipulated to adapt to the incentives and feedback, rather than instigating sustained behaviour changes that last after the incentives and feedback are withdrawn.[114]

A 2018 telematics study investigated whether feedback formulated and delivered using insights from behavioural science would lead to a reduction in risky driving behaviour.[115] The research showed that this led to a statistically significant reduction in risky driving behaviour, as well as a significant increase in seatbelt use. It also found that feedback is more effective when delivered close in time to the actual driving behaviour being discussed.[116]

Many of the studies into telematics have their limitations, in the form of short-term evaluations, issues with control groups, self-selection and the disaggregation of fleet data to provide data on an individual.[117] The fact that many organisations use combinations of multiple interventions makes it difficult to distinguish the impact of an individual intervention.[118] It is also important to note that there is a range of effects in the literature given the technological differences between different telematics systems used in the various trials.[119]

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[109] SWOV (1997) in Hynd, D., McCharty, M., (2014) Study on the benefits resulting from the installation of Event Data Recorders, Transport Research Laboratory.
[110] (Charlton 2005) in Hynd, D., McCharty, M., (2014) Study on the benefits resulting from the installation of Event Data Recorders, Transport Research Laboratory, p38.
[111] RoSPA 2014, Young Drivers at Work (Scotland): Black Box Pilot, p32.
[112] TRL 2015, Report 755: Provision of Telematics Research, Tong, S., Lloyd, L., Durrell, L., McRae-McKee, K., Husband, P., Delmonte E., Parry, I., Buttress, S., p6.
[113] RoSPA 2013, Road Safety and In-vehicle Monitoring (Black Box) Technology, p4.
[114] TRL 2015, Report 755: Provision of Telematics Research, Tong, S., Lloyd, L., Durrell, L., McRae-McKee, K., Husband, P., Delmonte E., Parry, I., Buttress, S., p46.
[115] Cranfield University, 2018, Sullman, M. J. M., Reducing risk amongst those driving during work.
[116] Cranfield University, 2018, Sullman, M. J. M., Reducing risk amongst those driving during work, pp. XX-XX.
[117] TRL 2015, Report 755: Provision of Telematics Research, Tong, S., Lloyd, L., Durrell, L., McRae-McKee, K., Husband, P., Delmonte E., Parry, I., Buttress, S., pp. 13-17.
[118] IOSH, 2011, Work-related road safety: A systematic review of the literature on the effectiveness of interventions, Grayson, G. B., and Helman S., TRL, p8.
[119] Hynd, D., McCharty, M., (2014) Study on the benefits resulting from the installation of Event Data Recorders, Transport Research Laboratory, p36.

There are also likely to be many telematics studies conducted by commercial operations and insurance companies that have not been publicly released.[120] However, when taken as a whole, the general trend in published literature suggests that telematics should offer some reduction in risk.[121]

5.2 Case studies

There has been a notable rise recently in the number of case studies, detailing the successes that organisations have encountered when tackling work-related road risk.[122] Many of these outline how organisations have utilised telematics to help achieve this.

While case studies are often helpful explanations of how an organisation has managed to reduce the risk of their fleet, it is important to note that they focus heavily on successful, positive outcomes. Similarly, the experience of one organisation cannot necessarily be transferred to another. Case studies showing less favourable stories may not be published.

As interesting examples of 'good practice', case studies certainly have a role as examples of the improvements that can be made in reducing road risk, but they should not be equated with scientifically rigorous research, when it comes to demonstrating the effectiveness of individual interventions.

[120] TRL 2015, Report 755: Provision of Telematics Research, Tong, S., Lloyd, L., Durrell, L., McRae-McKee, K., Husband, P., Delmonte E., Parry, I., Buttress, S., p34.
[121] TRL 2015, Report 755: Provision of Telematics Research, Tong, S., Lloyd, L., Durrell, L., McRae-McKee, K., Husband, P., Delmonte E., Parry, I., Buttress, S., p46.
[122] IOSH, 2011, Work-related road safety: A systematic review of the literature on the effectiveness of interventions, Grayson, G. B., and Helman S., TRL, p8.

6. Recommendations

For employers:

- Consider the possibility of employing fleet telematics as part of a comprehensive work-related road risk management system that includes clear policies on key road safety issues.
- Organisations should also consider introducing a 'telematics policy' that outlines what is expected of employers and employees.

For employers using telematics, ensure that:

- Staff are given a proper explanation of how the technology works.
- Feedback systems are clear and straightforward and the information given is relevant and easy to understand.
- Data gathered from telematics devices is handled carefully and in accordance with the data protection rules that apply in their jurisdiction.
- Care is taken that driving data is assigned to the correct drivers.
- Staff are informed of how they plan to use the data and who will have access to the data.
- Employees have the option to challenge and discuss conclusions/actions drawn from the telematics data.
- Key stakeholders (e.g. employers, employees, management bodies, trade unions/staff associations) are involved in the process and aware of each other's responsibilities.

For further research:

- Conduct further research into the benefits of telematics for reducing road risk in professional fleets, including:
    - The establishment, management and driver acceptance of the technology.
    - The identification of the most effective feedback methods.
- Explore the potential benefits of telematics for other road user groups.

Appendix: Case studies

Martin Browder

UK-based Martin Browder operates a dedicated supply chain for the restaurants of a major fast food chain. Following a commitment to achieve environmental objectives, the company was keen to further reduce carbon emissions.

This led to the implementation of a fleet management solution with the aim of reducing carbon emissions and optimising the utilisation of its fleet. It would also allow them to further improve the safety of drivers and others in the community.

A trial was conducted that included both new drivers and drivers that had been driving for many years. Following the trial it was realised that older drivers in particular would benefit from re-education and training to help them get the best from modern-day vehicles.

By monitoring, recording and comparing the driving styles of staff, the telematics system used by Martin Browder was employed alongside a targeted driving training programme. This led to substantial reductions in fuel consumption and fuel savings of approximately 10%. The system has allowed fleet managers to identify issues such as over-revving and harsh acceleration and braking.

Driver performance is reported using monthly 'league tables' posted on notice boards, helping to develop a competitive element amongst drivers. Driver buy-in is further encouraged through the running of a bonus scheme.

Drivers are rewarded whenever they keep below an acceptable number of driver errors over a period. At first, Martin Browder's drivers were recording an average of 1 error every 12 minutes. Two years later, drivers were travelling for an average of 200 minutes between errors.[123]

Reading Buses

Reading Buses, owned by Reading Borough Council in the UK, wanted to improve overall fuel consumption and reduce the amount spent on fuel. They opted for a combination of telematics tools, including a fleet management system, an in-cab driving aid and a mobile app which allows drivers direct access to their data. Implementation began in January 2015 and following a two-month benchmarking period in February and March, the system went live in April 2015.

Reading Buses uses a colour coded system called RAG reporting. This is used to identify at-risk drivers

[123] MiX Telematics, 2009, Martin Browder Case Study

and coach them accordingly. Incidences of over-revving, excessive idling, harsh braking and speeding are categories with red for poor (R), amber for neutral (A) and green for good (G). By studying these RAG reports, at-risk drivers can be easily identified.

After 9 months Reading Buses reported a 27% reduction in harsh braking and a 44% reduction in harsh acceleration across their fleet. Fuel consumption also fell and there was a 35% increase in drivers meeting "green" driving standards.[124]

National Vehicle Distribution

National Vehicle Distribution (NVD) is a family-owned Irish company providing outbound automotive logistics services to car manufacturers and fleet operators. NVD use telematics monitoring in their fleet, with a focus on safety, the environment and fuel efficiency. Driver scores obtained from the monitoring data are then analysed and reported on a weekly basis.

The target score is 90% for 85% of all drivers, and this target increases year on year based on achieved improvements. Scores are reviewed weekly and sent to all drivers. Driver supervisors follow-up to address any concerning trends, and consistently high-performing drivers are acknowledged and can be rewarded.

Analysis of individual driver scores allow the company to be proactive and take preventive action on any specific issues. NVD also monitor compliance with Driver Hours rules, with a target of 100% compliance. Drivers must download their information on a weekly basis so that any infringements can be examined and addressed quickly.

In 2017, NVD launched a new driver bonus linked to driver safety. A driver who has had no accidents or incidents, no damage and a minimum driving score of 90% over a 12 month period can apply for an annual bonus of 400 EUR. Driver scores are also used to inform incident investigation, by correlating historical scores with any investigations.

Between 2014-2017 NVD's Average Driver Performance score, produced using the telematics systems, has increased from 86% in 2014 to 94% in 2017. NVD's efforts to manage road risk, including the telematics system, led to a reduction in driver churn from 51% in 2014 to 6% in 2017 and a drop in transport-related collisions that resulted in time off from 12 in 2015 to just 2 in 2017.[125]

[124] MiX Telematics, 2016, Reading Buses Case Study
[125] ETSC, 2018, National Vehicle Distribution PRAISE Case Study

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