

Managing work-related road injury risk:

Ensuring decent work conditions for those who drive for work and protecting other road users



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Preface

Workers are vital to production and economic growth, but every worker has the right to work in a safe and secure environment. Road death and injury poses a significant threat to workers and other road users. About a third of road traffic crashes in high-income countries are work-related. Road death and injury also have a devastating effect on families and society.

Ensuring decent work conditions for those who drive for work, and protecting other road users from vehicles being driven for work purposes, is a life-saving activity in support of the Sustainable Development Goals.

Due to variability in collision data collation by governments, it is not possible to know precisely how many collisions, worldwide, involve a vehicle operated for work purposes. However, we know it is a significant number and that many vehicles on our roads of all kinds are operated for work purposes, inclusive of goods vehicles, buses, vans, cars and motorcycles. Some collisions involving at-work vehicles result in high numbers of deaths, particularly when they involve a large goods vehicle or a passenger carrying vehicle or happen where there are large numbers of people on foot or other vulnerable modes of transport.

Thanks to the guidance and experience provided by many, inclusive of governments, academics, organisations themselves and NGOs promoting fleet safety and fleet sustainability, there is much that can be achieved, and quickly. Government legislation and enforcement of the standards of at-work vehicles and their operation can make a significant difference in the battle to tackle the unnecessary daily disasters on our roads and the world's biggest killer of young people. There is also much that can be achieved by organisations responsible for movement of goods and passengers on roads, operated by both governments and private organisations, through the implementation of safe and sustainable policies and procedures within those organisations' fleets and the fleets of their supply chains.

I hope that this report will play a valuable contribution to strengthen action on work-related road safety. I urge governments and organisations to read it and implement urgent actions to save lives.

Etienne Krug

Director, Department for Social Departments of Health
World Health Organization

This report is written and produced by members of the Work-Related Road Safety Project Group of the United Nations Road Safety Collaboration (UNRSC), to coincide with the 3rd Ministerial Conference on Road Safety: Achieving Global Goals 2030, held in Stockholm, Sweden, on 19–20 February 2020, and to support the conference commitment to share successes and lessons from implementation of the Global Plan for the Decade of Action for Road Safety 2011–2020. The authors met through the UNRSC but acted independently in the production of this report.

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Executive summary

The need

- In most high-income countries, an estimated one-third of road traffic crashes involve someone at work. In developing countries it is likely to be higher.
- The road transport sector is essential strategically to economic development and ensures passenger and freight mobility across jurisdictions and countries. It makes an important contribution to economic growth and job creation.
- Work-related crashes affect workers in businesses of all sizes, in all industries, who drive all types of vehicles, regardless of whether driving is their main job task. These crashes also affect other road users who use the same roads as work vehicles. The human and financial costs to families, businesses, and the wider community are enormous.
- Managing the risks posed by work vehicles also encompasses managing the risks and costs posed by vehicle emissions, which contribute significantly to air pollution and climate change.

Managing work-related road injury risk (WRRR) encompasses:

- **Protecting workers** who operate motor vehicles in doing their jobs from the risk of crashes that lead to injury, disability and death through organisational policies; national and international regulations and standards; and the efforts of non-governmental partners
- **Protecting all other road users** (for example, pedestrians, cyclists, and car drivers) from the risk of crashes with work vehicles
- **Engaging the private and public sectors** in improving road safety for their workers and other road users, in pursuit of their own safety and sustainability goals and the global Sustainable Development Goals (SDGs)

Advancements in management of WRRR can advance the SDGs and national and organisational priorities by:

- Creating safe and decent working conditions and reducing crash-related deaths and injuries among professional drivers of commercial motor vehicles and other workers who drive for work
- Reducing crash-related deaths and injuries among vulnerable road users (VRUs) (for example, pedestrians, children, older people, and cyclists) who share the roads with heavy goods vehicles and other vehicles used for work
- Increasing private and public sector organisations' commitment to road safety and sustainability
- Increasing the number of vehicles with advanced safety features and greater fuel efficiency, by harnessing the purchasing power of corporations

In support of the aims of the 3rd Global Ministerial Conference on Road Safety, the following actions are recommended:

- 1) Expand awareness among policymakers that managing WRRR is a multi-sectoral concern encompassing the safety of:
 - professional drivers who operate commercial motor vehicles;
 - other persons who operate motor vehicles in doing their jobs and their passengers;
 - workers who operate a motor vehicle to travel between their home and work location; and
 - all other road users (pedestrians, cyclists and other drivers/riders) in our communities who use the same roads as work vehicles.

2) Expand and strengthen international, regional, and national legislation and standards on WRRR, addressing:

- training, testing, and licensing: to ensure that drivers are competent to operate commercial motor vehicles; and certifying the competency of companies to operate these vehicles;
- known contributors to crashes, injuries and fatalities (for example, not using a seat belt, impaired and distracted driving, driver fatigue, and long work hours);
- for all work vehicles, advanced safety features and improved protection of vehicle occupants in a crash; and
- environmental and sustainability impacts of work vehicles.

3) Improve national data systems for occupational health and safety (OHS) and road traffic injury to collect data that documents the burden of work-related crashes and identifies risk factors which can be addressed through evidence-based interventions.

4) Engage private and public sector organisations in road safety initiatives, which will aid in achieving their own safety and sustainability goals and advance the SDGs and the UN 2030 Agenda for Sustainable Development (Agenda 2030):

- Develop a strong case for the value of their involvement, and create messaging and tools to help them influence road safety through their supply chains and community engagement.
- Include road safety in organisations' sustainability reporting, which will: 1) show commitment to Agenda 2030; 2) show how road safety contributes to worker well-being, reduced economic and reputational costs, and reduced environmental impacts; and 3) raise the visibility of organisations' road safety commitment and accountability among shareholders and the public.
- Encourage public and private sector organisations to incorporate road safety requirements into policies that cover their own workforce; and to include the same requirements when procuring transport services and other services that require workers to drive motor vehicles.
- Encourage public and private sector organisations to procure vehicles which meet or exceed Global NCAP's (New Car Assessment Programme) fleet purchasing recommendations. As major vehicle purchasers of vehicles, especially in low- and middle-income countries, organisations can influence vehicle manufacturers to provide safer vehicles in all markets.



Abbreviations

ANSI	American National Standards Institute
ASSP	American Society of Safety Professionals
CoR	Chain of Responsibility
EASST	Eastern Alliance for Safe and Sustainable Transport
ETSC	European Transport Safety Council
ILO	International Labour Organization
ISO	International Organization for Standardization
LMIC	Low- and middle-income country
NCAP	New Car Assessment Programme
NETS	Network of Employers for Traffic Safety
NRSP	National Road Safety Partnership Programme
OHS	Occupational health and safety
PRAISE	Preventing Road Accidents and Injuries for the Safety of Employees
RTSS	Road Transport Safety Standardization Scheme
SDG	Sustainable Development Goal
UNGA	UN General Assembly
UNRSC	UN Road Safety Collaboration
VRU	Vulnerable road user
WRRR	Work-related road injury risk
WRRS	Work-related road safety
WRRSG	Work-Related Road Safety Group

What is work-related road injury risk (WRRR) and why is it a critical concern for private and public sector organisations, governments and civil society?

Work-related road safety (WRRS) bridges occupational safety – generally seen as a concern for employers and workers only – and road safety, a concern for all road users. It encompasses all **motor vehicle operations** performed on behalf of any public or private sector organisation (see box for further explanation).

Motor vehicle operations cover:

- Transportation of goods on behalf of an organisation using vehicles it owns, leases, or rents
- Transportation of goods on behalf of another organisation using vehicles it owns or leases, using its own employees, contractors, or owner-drivers
- Transportation of passengers
- Procurement of transport services from a third party or contractor for the purpose of transporting goods or passengers
- Travel to and from work locations in the course of performing job duties other than transportation of goods or passengers, using a vehicle provided by the organisation or the worker's own vehicle
- Commuting to or from work using the worker's own vehicle

In addition, the operation of vehicles by organisations affects sustainability and environmental quality by contributing to vehicle emissions, air pollution, fuel use, traffic congestion, and climate change.

Successful management of all elements of work-related road injury risk (WRRR) – worker safety, the safety of other road users, and environmental impacts – requires engagement and commitment of public and private sector organisations, governments, labour organisations, industry, non-governmental organisations and international organisations.

Work-related crashes lead to death, injury and disability for workers who operate vehicles in doing their jobs

In most high-income countries, an estimated one-third of road traffic crashes involve someone at work. It is likely that up to 40% of all road deaths in Europe occur when a driver is at work or on their way to work or returning home.¹ In the United States, work-related motor vehicle crashes involving vehicle occupants and pedestrians are the leading cause of workplace fatalities and the first or second leading cause in all major industry groups, accounting for 36% of all work-related deaths in 2017.²

Work-related crashes affect workers in businesses of all sizes, in all industries, who drive all types of vehicles, and regardless of whether driving is their main job task. The human and financial costs to families, businesses, and the wider community are enormous.

The road transport sector is essential strategically to economic development and ensures passenger and freight mobility across jurisdictions and countries. It makes an important contribution to economic growth and job creation. Therefore, the effect of these crashes on an economy is significant.

Good management of those who drive for work and ensuring decent work conditions has been shown to reduce risks and improve business outcomes.

Management of WRRR is an urgent road safety and sustainability concern for civil society

Vehicles operated on behalf of public and private sector organisations share the road with other road users. Operation of high-mass vehicles such as trucks and buses puts other road users at high risk of death or injury in a crash. Those who are killed or injured may be drivers or passengers in other vehicles, or they may be vulnerable road users (VRUs) such as children, the elderly, pedestrians, and cyclists. Throughout the world, many roads lack separate pedestrian or cycling facilities, putting VRUs at particular risk.

Crashes with multiple casualties often involve large vehicles such as trucks and buses which are operated by public and private sector organisations. These serious crashes disproportionately affect VRUs. In low- and middle-income countries (LMICs), where road infrastructure is poorer and a greater share of road users are VRUs, the impacts are even greater and the opportunities for medical treatment, compensation, rehabilitation, and return to work are fewer. Families may not recover economically from the loss of a wage-earner who is killed or no longer able to work.

The safety of vehicles operated on behalf of organisations is essential to a Safe System

Road traffic is a complex, interactive system. A Safe System requires that individuals, civil society, government, and the private sector each recognise their roles and responsibilities in keeping roads safe. It is guided by these principles:⁴

- People will inevitably make mistakes that lead to road crashes.
- The human body has a limited ability to tolerate crash forces before physical harm occurs.
- Individuals are responsible for behaving responsibly and following traffic laws. Those who design, build, manage, and use roads and vehicles share responsibility for preventing crashes that lead to serious injury or death.
- To multiply the positive effects, all parts of the system must be strong, so that road users are still protected if one part of the system fails.

Vehicles driven for work purposes are essential to a Safe System; corporations and organisations operating vehicles have a vital role in achieving a Safe System by managing road risk for workers. The concept of shared responsibility for safety is well-established in corporate culture, as is the value of managing risks posed by drivers, vehicles, and the road environment; this is all consistent with Safe System principles. There are organisations that have already adopted a goal of zero workplace deaths and serious injuries and extended this goal to include zero deaths, injuries and crashes from motor vehicle operations.

Supply chains for multi-national corporations account for more than 80% of trade and employ one in five workers globally.⁵ The reach of multi-national and other large organisations as employers, road users and procurers of vehicles and transport services is massive. If they demand high levels of road safety for all organisations in their supply chains, the positive effects will extend far beyond their own workforces.

Achieving a Safe System depends on engaging private sector organisations as active partners in improving road safety: for their own workforce; for organisations whose services they procure; and in communities where they do business. Multi-national corporations can also serve as road safety mentors and models for smaller organisations that have fewer resources.

Crashes that involve at-work vehicles carrying people can be catastrophic

At-work vehicles that carry people are some of the largest vehicles on our roads. When a large vehicle, such as a bus, is involved in a crash, its weight and size increase the risk of death or serious injury for passengers and other road users. In October 2018, a bus crash between Nairobi and Kisumu in Kenya killed at least 50 people. Several factors reportedly contributed: overloading, speeding, poor infrastructure, and night driving.³

Work-related road safety and private sector engagement are critical to progress toward the Sustainable Development Goals (SDGs)

The UN 2030 Agenda for Sustainable Development – Agenda 2030 – is a shared blueprint for achieving peace and prosperity through global partnership among all sectors of society. Agenda 2030 is based on 17 Sustainable Development Goals (SDGs), three of which are directly relevant to WRRS and public/private sector activity to improve road safety.⁶⁻⁷ (see figure below).

 <p>3 GOOD HEALTH AND WELL-BEING</p> <p>Target 3.6: Halve global deaths and injuries from road traffic accidents.</p>	 <p>8 DECENT WORK AND ECONOMIC GROWTH</p> <p>Target 8.5: Achieve full and productive employment and decent work for all women and men.</p> <p>Target 8.8: Protect labour rights and promote safe and secure working environments for all workers.</p>	 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p> <p>Target 11.2: Provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety.</p>
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Actions to improve WRRS can also contribute to other SDGs:

- SDG 10: Reduce Inequalities – through improved access to decent work (SDG 8) and safe public transport (SDG 11).
- SDG 13: Climate Action – by actions of vehicle fleet owners to reduce use of vehicles where possible, and procure fuel-efficient vehicles.

Given the substantial use of vehicles and roads by public and private sector organisations throughout the world, actions to manage WRRR will be instrumental in achieving all of these SDG targets. Further, organisations' sustainability reporting can be strengthened by linking explicitly to the SDGs, which offer a framework to demonstrate to shareholders and the public their commitment to globally-accepted road safety and environmental priorities.

Commonwealth Road Safety Initiative

The 53 Commonwealth countries work together in many areas and are well placed to help change the picture of road safety as it stands currently by bringing a focus on the issue and demanding greater action on this preventable trauma.

A report published by the Commonwealth Road Safety Initiative in 2019 highlights that the private sector is both a major provider and user of transport and, therefore, has the potential to significantly contribute to reducing levels of death and injury on the road.

www.commonwealthrsi.org

**COMMONWEALTH
ROAD SAFETY INITIATIVE**



Photo credit: Towards Zero Foundation

Work-related road safety is a critical worker safety concern for organisations and for governments

Historically, governments have been seen as primarily responsible for advancing road safety, with contributions from civil society and the private sector.⁸⁻⁹ For several reasons, these are logical conclusions:

- Governments should be invested in protecting the health, safety, and welfare of their people. This includes taking action to prevent motor vehicle crashes and promote sustainable transport for all.
- Governments have the power to: make and enforce laws and regulations; allocate funds to improve traffic enforcement, driver licensing, and road infrastructure; and reduce environmental impacts of road travel.
- Governments operate motor vehicles on their own behalf and procure a range of services from the private sector. Therefore, they are positioned to procure safe vehicles and set policies for safe vehicle operations and to demand that contractors do the same.

The actions of governments can be supported and enhanced by engagement with private sector organisations. Large and well-resourced organisations understand WRRR and have put management systems in place to address it.

There remains an urgent need to convince other organisations, many in LMICs, of their responsibility to protect their workers and others who share the roads with them. Governments are a vital partner in these efforts.

Organisations' road safety interests encompass worker safety and civil society

Responsibility for WRRS is shared among multiple sectors: public and private sector organisations, governments, labour organisations, industry, non-governmental organisations, and international organisations. It is important to note that public and private sector organisations have two types of road safety interests:

- **Work-related road safety**, where the goals are: 1) to prevent deaths, injuries and crashes involving workers who operate motor vehicles in the course of their work; and 2) in doing so, to avoid costs, liability, lost productivity, and loss of reputation in locations where they do business.
- **Community road safety**, where the goals are: 1) to demonstrate corporate social responsibility through public-private partnerships that improve road safety for all, as well as responsible stewardship of the environment and infrastructure; and 2) in doing so, to enhance the organisation's reputation with local communities, shareholders, and the public.

BHP Billiton's Sustainability Initiatives

BHP Billiton's Sustainability Report 2012 shows how the private sector can drive demand for safer vehicles:

We work actively with the road safety industry and key vehicle manufacturers to ensure the most relevant safety technologies are adopted globally. Our decision to move to the highest NCAP [New Car Assessment Programme] safety rating will, by 2016, improve the safety rating of an estimated 50,000 vehicles a year in Australia alone, resulting in broad community benefits as safer vehicles appear on the road.

CASE STUDY

Helmets for employees in Vietnam

Between 2005 and 2015, Unilever Vietnam distributed around 7,000 helmets to its employees as part of a programme to make sure its employees are safe on the road. The company required all employees to wear a qualified standard helmet, even before Vietnam's national helmet law went into effect in December 2007. Since 2016, Unilever has given employees vouchers that give a discount of 55,000 VND (approx. 2.5 US\$) toward the purchase of a Protec helmet. So far, Unilever has distributed 8,000 discount vouchers. Unilever Vietnam also runs programmes to raise employees' awareness about road safety and road rules, and makes its own road safety campaign videos to show in the company's common areas.

In total, since 2002 when Protec started production, around 700 companies and organisations (for example, ABB, Abbott, Castrol, Denso, German Embassy, Honda, Johnson & Johnson, Panasonic, Vietnam Airlines, and Yamaha) have given Protec helmets to their employees.



Photo credit: Brake

Work-related road safety is a matter of social justice and equality.¹⁰⁻¹¹

Workers have a right to decent work and working conditions. Workers who drive for work purposes are not adequately protected from road risk, especially in LMICs where labour and traffic laws are often weaker and poorly enforced.

Some transport-sector workers are covered by international, regional, and national regulations (see box), but these regulations do not cover the full range of occupational health and safety (OHS) risks for these workers. Changes in the transport sector – weakening social dialogue, decreasing bargaining power for workers, and the growing complexity of supply and contracting chains – mean that workers' ability to exercise their fundamental right to decent work and working conditions is being eroded.¹⁰

Further, a large amount of freight and passenger transport is provided by informal-sector drivers who contract their labour to transport companies, public agencies, or directly to consumers. Some of these drivers provide their own vehicles ('owner-drivers'), while others drive vehicles supplied by the contracting company. These workers are largely out of the reach of OHS regulations because they are self-employed and contract their services to multiple employers.

Many other workers outside the transport sector drive a motor vehicle to travel between work sites, call on clients and customers, and perform other kinds of work. Very few countries have national transport or OHS regulations that apply to all motor vehicle operations conducted by organisations, or to light-vehicle operations specifically (vehicles weighing less than 3.5 tonnes or 10,000 pounds). In many parts of the world, those who drive light vehicles for work are protected only by basic traffic laws, which are often inadequate.



Photo credit: Brake

**Standards and regulations
for the transport sector**

International and regional standards and regulations for the transport sector generally cover professional drivers,* including the European Agreement Concerning the Work of Crews of Vehicles Engaged in International Road Transport (AETR), which stipulates maximum driving and duty hours, rest breaks, and recording of hours of service for drivers of commercial motor vehicles.[¶]

In many countries, transport or occupational health and safety regulations limit hours of work or hours of driving for transport-sector workers, require training for drivers and enterprises, and set standards for equipment and maintenance.

* Professional driver: A person who obtains his/her main source of income from driving a commercial motor vehicle to transport goods or passenger and ancillary activities (e.g., loading and unloading). A professional driver has a specialised licence/permit issued by a Government entity for commercial purposes.

¶ Commercial motor vehicle: A large lorry (truck) or bus (weighing 3.5 tonnes or 10,000 pounds or more) used for inter-city transport of goods or passengers, generally covered by safety regulations regarding safety equipment, maintenance and other aspects of operation.

CASE STUDY

Puma Energy road transport standards

Puma Energy has implemented policies and standards to ensure that the transport companies they hire operate in accordance with international standards in all countries where they operate. Transport companies are audited against these on an ongoing basis. The key policies and standards cover safety standards of vehicles, driver standards, and journey management. Regardless of government regulations, all transport vehicles must meet standards such as specified in the European Agreement Concerning the International Carriage of Dangerous Goods by Road. Minimum driver recruitment and training requirements are aligned with international best practice. All drivers undergo defensive driving training. Working and driving hours are also strictly controlled to avoid driver fatigue. Puma Energy conducts risk assessments on all routes that are used for transporting their products, and all routes have approved journey management plans. Driver compliance and driving behaviour is monitored by means of in-vehicle monitoring systems (GPS/CCTV), and drivers receive corrective training on an ongoing basis.

CASE STUDY

Unitrans Botswana

Unitrans Botswana (PTY) Ltd supports a fleet of 284 vehicles and 610 employees to transport fuel and cement in Botswana. Given the combustible nature of the materials that Unitrans Botswana transports, it is vital that all vehicles are purchased and operated in accordance with the strictest safety criteria. Unitrans Botswana is an ISO 9001:2015 certified company and has advanced policies to address dangerous driver behaviours, including an intensive driver training programme. In 2019, Unitrans Botswana received the Global Fleet Champions Award for Company Driver Safety in recognition of its outstanding commitment to road safety. Judges praised the company's rigorous policies and procedures that champion safe driving behaviours, making it an exemplary role model for other operators working in Botswana and across sub-Saharan Africa.



Photo credit: Society of Road Safety Ambassadors

CASE STUDY

A world-class standard for bus safety

Transport for London's world-leading Bus Safety Standard (BSS) requires all fleets operating buses in the UK capital to meet safety standards much higher than required by national legislation. The BSS stipulates a package of measures to prevent death or serious injury from crashes involving buses, and places particular importance on the protection of people who walk or cycle. The London transport authority requires all new buses entering the London fleet as a phased approach in 2019, 2021 and 2024

to have advanced driver assistance systems (for example, intelligent speed assistance and advanced emergency braking); improved direct and indirect vision for drivers; and systems to prevent driver braking errors and runaway buses. It also requires measures such as audio and visual signalling to help other road users avoid collisions with buses and better protection for people inside and outside the bus in the event of a crash. The BSS is a fundamental part of the Mayor of London's Transport Strategy, which aims to achieve zero road collision deaths involving buses in London by 2030.



Photo credit: Transport for London

How has work-related road safety been addressed to date?

The past 15 to 20 years have seen substantial growth in international engagement on WRRS among public and private sector organisations, governments, labour organisations, industry, non-governmental organisations and international organisations.

Through UN General Assembly (UNGA) road safety resolutions

A 2008 UNGA resolution was the first to note the importance of WRRS to road safety globally by '[encouraging] organizations in both the private and the public sector with vehicle fleets, including agencies of the United Nations system, to develop and implement policies and practices that will reduce crash risks for vehicle occupants and other road users.'¹² Subsequent UNGA resolutions reinforced other aspects of WRRS:

- 2010: Encourages public and private sector organisations, among others, to take action to discourage distracted driving.⁹
- 2016: Encourages development of public policies to: 1) decrease work-related road traffic crashes, with the participation of employers and workers, emphasising improvement of professional drivers' working conditions; 2) provide early rehabilitation and social reintegration, including in the world of work, to persons with injuries and disabilities caused by road traffic crashes; and 3) continue to implement professional driver qualification frameworks based on internationally recognised standards, to address training, certification and licensing, restricted hours of driving, and driver distraction.¹¹
- 2018: Uses essentially the same language as the 2016 resolution, again focusing on professional drivers, and adds fatigue as a risk factor to be addressed.¹³

Through the Decade of Action for Road Safety 2011-2020 and Global Voluntary Targets and Indicators for Road Safety

The Decade of Action for Road Safety 2011-2020 rests on five pillars:

- 1) Road Safety Management
- 2) Safer Roads and Mobility
- 3) Safer Vehicles
- 4) Safer Road Users
- 5) Post-crash Response

The Global Plan⁸ for achieving the Decade's goal of halving road traffic deaths globally by 2020 specifies necessary activities under each of the five pillars. Many of the WRRS-related activities were contributed by the Work-Related Road Safety Project Group (WRRSG) of the UN Road Safety Collaboration (UNRSC).⁸ Decade of Action activities for multiple pillars are directly related to WRRS (see Appendix A).

In 2017, UN Member States finalised a comprehensive set of 12 voluntary global road safety targets¹⁴ to be achieved by 2030, encompassing the original five Decade of Action pillars. An informal consultation of Member States in 2018 added a set of global indicators covering processes and outcomes for each of the 12 targets. These targets and indicators are intended to guide action and ensure measurement of progress at the national and global levels.

Among the new voluntary targets and indicators, only Target 11 focuses on management of WRRR: By 2030, all countries are to enact regulation for driving time and rest periods for professional drivers, and/or accede to international/regional regulation in this area.

Most of the other targets address factors that contribute to WRRR (for example, mobile phone use and impaired driving), although none of the indicators accompanying these targets are specific to work-related driving. These omissions may in part be due to a lack of national data on WRRS processes and outcomes in many countries.

⁸ The UNRSC is an informal consultative mechanism coordinated by the World Health Organization which brings together representatives from UN Member States, international and non-governmental organisations, and the private sector.

Through international regulations, standards, and recommendations

- UN vehicle safety standards, which apply to all vehicles, also guide the purchase or leasing of vehicles used for business. UN resolutions encourage their adoption by Member States.^{11,13} Fleet safety purchasing recommendations from the Global New Car Assessment Programme (NCAP) (see box) also refer to these UN standards.¹⁵
- International Labour Organization (ILO) standards are developed through consultation among employers, workers, and government. ILO standards address the full range of challenges posed by globalisation, technological change, climate change, unfair employment practices, and increasing income inequality – all of which can be linked directly to the SDGs and Agenda 2030.¹⁶ The ILO also has labour standards for the transport sector on topics such as safe securing of cargo and hours of work.
- International Organization for Standardization (ISO) standards:
 - ISO 39001 – 2012:¹⁷ This standard specifies requirements for a road traffic safety management system, to enable any organisation that uses the road traffic system to reduce death and serious injuries from road traffic crashes.
 - ISO 39002:¹⁸ This standard, not yet finalised, focuses on reduction of deaths and serious injuries from road traffic crashes that occur during commuting to and from work.

Global NCAP fleet safety purchasing recommendations

call for all passenger cars purchased or leased for use on company business to comply with the latest version of UN standards (or equivalent national standards) for seat belts, brakes, frontal and side collision protection, pedestrian safety, and stability control. Global NCAP also specifies a minimum four-star crash rating for all company vehicles (five-star wherever possible) and highly recommends procuring vehicles with advanced emergency braking systems and pole impact protection.¹⁵

Taken together, the UN vehicle safety standards, Global NCAP purchasing recommendations, and ILO and ISO standards establish basic requirements to be followed in all world regions, thereby reinforcing the right of all workers to have access to safe vehicles, to drive on safe roads, and to have working conditions that promote safe driving and protect them from the risks of work-related crashes. If organisations follow these requirements, others with whom their employees and contractors share the roads will also benefit. In addition, recognising the significant toll of road traffic crashes on its own workforce, the UN has recently implemented road safety policies for its global operations, based on the pillars for the Decade of Action.¹⁹

CASE STUDY

Road safety at Johnson & Johnson (J&J)

As part of its Credo commitment to providing employees with working conditions that are clean, orderly and safe, J&J has had a fleet safety initiative known as 'SAFE FLEET' in place for 25 years. The objective of SAFE FLEET is to ensure that all their drivers return home safely to their loved ones at the end of each day. The company has over 34,000 company-owned, leased, and car allowance vehicles driven on company business and has extensive road safety policies that are audited every 3 to 4 years to ensure the safety of its fleet drivers. J&J's goal is Mission Zero, zero fatalities, zero injuries and zero crashes. Part of J&J's strategy to achieve this is providing 5-star rating preferred fleet selector vehicles with both minimum and advanced safety features, such as forward collision warning, autonomous emergency braking and lane departure warning.

J&J has recently expanded its many good road safety practices from its SAFE FLEET initiative to its general global employee population, and in doing so greatly expanded road safety awareness. J&J's road safety policies also include safety requirements for external ground transportation services suppliers such as licence checks, safety belt use requirements for drivers and all passengers, a complete ban on electronic devices while driving company personnel or guests, minimum vehicle safety feature requirements and fatigue management. Preference is given to those ground transport suppliers with industry awards/certifications such as ISO 39001.

J&J has also been actively engaged in global road safety community initiatives that help save young lives in LMICs. As an active UNRSC private sector partner, in Vietnam J&J has donated over 62,000 helmets to school children and teachers reaching 77 schools across seven provinces in partnership with the AIP Foundation. In South Africa, J&J has provided funding to ensure safer routes to school for children crossing very busy roads to get to and from school each day. The company also has a website (www.safetyallday.com) promoting "Safety All Day, Everyday," where visitors can learn about safety at home, on the road and at work.



Photo credit: Johnson & Johnson

Through regional and national legislation and standards

- In Australia, Chain of Responsibility (CoR) legislation recognises the complex supply chain associated with goods transport and holds all parties accountable (see box).
- The United Kingdom's Corporate Manslaughter and Corporate Homicide Act 2007 allows for companies and organisations to be found guilty of manslaughter due to serious management failures that result in gross breach of their duty of care.²⁰
- European Union (EU) vehicle safety standards effective in 2022²¹ set a high standard for safety, benefitting all road users. Many vehicle safety features (for example, intelligent speed assistance and drowsiness and attention detection) will be compulsory for cars, vans, trucks, and buses, protecting workers who drive for work purposes and other motor vehicle drivers and passengers on the road with them. Requirements for trucks and buses focus on the safety of VRUs: systems to warn the driver of VRUs at the front and side of the vehicle; and improved direct vision of VRUs from the driver's seat.
- Member States of the EU also have national laws and regulations for OHS that provide for a level of safety that meets or exceeds what is prescribed in EU directives. These apply primarily to the professional drivers who operate commercial motor vehicles and the companies that employ them.
- Nigeria's Road Transport Safety Standardization Scheme (RTSSS) was created through legislation in response to heavy use of roads to transport goods and increases in road traffic injuries and deaths (see box).
- Some countries have developed voluntary national standards for managing WRRR that complement international regulations or address safety issues not otherwise covered by regulations, for example, a voluntary American National Standard that covers any organisation that operates motor vehicles.²²

Nigeria's Road Transport Safety Standardization Scheme (RTSSS)

The RTSSS requires all transport operators in Nigeria to establish safety units. Its goals are to bring professionalism into the industry and to develop a safe, efficient, and convenient fleet transportation system in the country. RTSSS activities cover:

- Registration and certification of operators of transport fleets
- Improvements in the quality of driver training
- Collaborations among law makers, law enforcement agencies, and transport operators to improve safety
- Continuous inspection of transport operators and their activities
- Development and enforcement of a Model Safety Policy for transport operators
- Evaluation and reporting.

Chain of Responsibility Legislation: Australia

The Chain of Responsibility (CoR) legislation²³ that covers the operation of goods vehicles in Australia is intended to make sure that everyone in the supply chain – drivers, employers, schedulers, contractors, consignors, consignees, and loaders/unloaders – fulfils their responsibilities for complying with the Heavy Vehicle National Law. The CoR law recognises that multiple parties may be responsible for offences committed by the drivers and operators of heavy vehicles. Any of these parties may be held legally liable for their actions or inactions.

Organisations in Australia are supporting the CoR law. For example, Cement Concrete and Aggregates Australia has produced information about the CoR for customers and sales staff.²⁴ It advises that 'Everyone in the supply chain must take reasonable steps to prevent breaches' and that every 'relevant party' must take responsibility for ensuring that demands do not encourage offences (for example, exceeding permitted driving hours or speed limits, or carrying insecure loads).

Through public/private partnerships to promote road safety

Public and private sector organisations are working together at the international, regional, and national level to improve WRRS and engage organisations in activities to improve road safety for all.

- Brake project Global Fleet Champions is run by the UK-based charity and its NGO partners in other nations to promote WRRS globally: providing organisations with guidance on standards, policies and procedures; presenting organisations with awards for excellence in road risk management; and calling on governments to regulate and enforce fleet safety.
- Driving for Better Business is a Highways England programme to help private and public sector employers reduce WRRR, decrease the associated costs, and improve compliance with current legislation and guidance.
- Eastern Alliance for Safe and Sustainable Transport (EASST): EASST is a UK-based organisation that promotes safe and sustainable transport, with its focus being eastern Europe, Russia, and central Asia. Through the EASST Academy, EASST offers intensive online training for fleet safety managers.
- The Fleet Operator Recognition Scheme (FORS): FORS is a UK voluntary accreditation scheme for fleet operators which aims to raise the level of quality within fleet operations, and to demonstrate which operators are achieving exemplary levels of best practice in safety, efficiency, and environmental protection.
- National Road Safety Partnership Program (NRSPP): The NRSPP offers a collaborative network for Australian organisations to build and implement effective road safety strategies in the workplace. Organisations can choose the road safety resources that best fit their individual operations and, at the same time, improve business productivity through less time and money lost through crashes.
- Network of Employers for Traffic Safety (NETS): NETS promotes road safety on and off the job through benchmarking of members' WRRS data, research and demonstration projects, and development of educational materials for employers and their families. Although NETS is USA-based, its members include many multinational corporations and its interests are global.
- Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE): An initiative of the European Transport Safety Council (ETSC), PRAISE promotes WRRS in the region through education, case studies, awards, and information exchange.²⁵

Through research to establish scientific evidence for work-related road safety interventions

A growing body of research is confirming specific risk factors for work-related crashes and developing and evaluating interventions to reduce the risk of crashes and injuries. Historically, this research has focused on professional drivers and commercial motor vehicles, in support of actions by regulators and employers. However, in recent years, researchers have begun to focus on the safety of workers who drive light vehicles for work, workers for whom driving is not the main job duty, and drivers who are not employed in the transport sector. See Appendix B for representative examples of research on WRRS.

Safety regulations for school buses in Singapore

Since 31 December 2011, small buses that transport school children in Singapore are required to have forward-facing seats with three-point retractable seat belts. When this regulation was introduced in 2009, a baseline financial package of S\$4,000/ S\$3,000 was given to small-bus owners to retrofit their buses with seat belts or to replace their bus with a new one. Other new safety requirements are: 1) a reflective "Children Crossing" sign with red blinking LED lights placed at the rear of the bus, to be activated when the entrance or exit door is opened; and 2) hazard warning lights, to be automatically activated when the entrance or exit door is opened.

CASE STUDY

Royal Mail

Royal Mail is the UK's pre-eminent delivery company, handling around 13 billion letters and 1.3 billion parcels every year. The company has a large vehicle fleet and has introduced rigorous policies and procedures to reduce work-related road risk for employees and other road users, leading to a significant reduction in the number of collisions involving Royal Mail vehicles (reduced by 21% between 2016 and 2018). In 2018, Royal Mail banned the use of hands-free phones whilst driving, having identified that the risk created by hands-free use was just as significant as hand-held. Royal Mail works closely with Brake, the UK road safety charity, and the Global Fleet Champions campaign to share its knowledge and experience with other fleets.



Photo credit: Royal Mail

Recognising achievement and celebrating success

There are many organisations across the globe which show exceptional standards of good management of their people who drive for work, and their work has been recognised for their commitment through the Global Fleet Champions Awards and the Prince Michael International Road Safety Awards.

Global Fleet Champions Awards celebrate the achievements of organisations and individuals working to reduce crashes and prevent pollution caused by vehicles driven for work. Award winners include EasyCoach in Kenya and Unitrans Botswana (see case study on page 10).

Prince Michael International Road Safety Awards recognise outstanding achievement and innovations which will improve road safety. Award winners include: Fleet Forum, Johnson & Johnson (see case study on page 12), Michelin, NETS, Shell and the Nigerian Federal Road Safety Commission.

CASE STUDY

Shell

Whether it is transporting fuel to one of its customers, delivering equipment to construction projects or simply travelling to meetings, safe road transportation is integral to Shell's business. Its global road safety programme focuses on improving the safety of drivers – staff and contractors – and contributing to road safety in the communities where it operates.



Photo credit: Shell

Employees and contractors drive a combined distance of around 600 million kilometres each year in more than 60 countries, including in remote locations. Since introducing its first global driver safety programmes in 2008, there has been a significant decline in fatal road incidents across Shell.

The safety approach focuses on driver skills and behaviour, as well as the condition of the vehicle, road and local environment. It is supported by global road safety standards and includes routine audits of the road safety capabilities of contractors as well as a mandatory defensive driving training course. This course teaches safe driving techniques and behaviour, with an overall aim of reducing risks.

Employees and drivers are required to follow Shell's 'Life-Saving Rules'. These include following a prescribed route for road journeys, wearing a seat belt, not using mobile phones or any other devices while driving and adhering to speed limits.

Shell sets high requirements for vehicle safety. In-vehicle monitoring systems (IVMS) are in place in many vehicles. They provide information on driver behaviour across a range of areas such as speeding, harsh braking and seat belt compliance and are used to support drivers to drive safely. In some locations, cameras in heavy good vehicles and buses are used in conjunction with IVMS to coach drivers.

Shell wants drivers to be safe at all times, but also tries to reduce the need to use road transport in the first place: the safest journey is the one not taken. A number of large projects have successfully reduced the amount of road travel needed.

Shell shares its road safety experience and knowledge proactively with other companies, governments, non-governmental organisations and local communities.

CASE STUDY

NETS

NETS received a Prince Michael International Road Safety Award specifically for the development and distribution of 'The Comprehensive Guide to Road Safety™'. This document is designed to aid employers with fleets of any size at various stages of road safety programme development. This includes those who are preparing to initiate a programme, in the early stages of policy and programme development, or managing more mature road safety management systems and interventions. The guide is available free of charge, in 21 languages.²⁶

How can work-related road safety be advanced in the next decade? How can it contribute to Agenda 2030?

1. Expand awareness among policymakers that managing WRRR is a multi-sectoral concern that encompasses the safety of:
 - professional drivers who operate commercial motor vehicles;
 - other persons who operate motor vehicles in doing their jobs and their passengers;
 - workers who operate a motor vehicle to travel between their home and work location; and
 - all other people in our communities who use the same roads as work vehicles.
2. Expand and strengthen international, regional, and national legislation and standards on WRRR, addressing:
 - training, testing, and licensing to ensure that drivers are competent to operate commercial motor vehicles; certifying the competency of companies to operate these vehicles;
 - known contributors to crashes, injuries and fatalities (for example, not using a seat belt, impaired and distracted driving, driver fatigue, and long work hours);
 - for all work vehicles, advanced safety features and improved protection of vehicle occupants in a crash; and
 - environmental and sustainability impacts of work vehicles.
3. Improve national data systems for OHS and road traffic injury to collect data that documents the burden of work-related crashes and identifies contributing factors which can be addressed through evidence-based interventions.
4. Engage private and public sector organisations in road safety initiatives which will aid in achieving their own safety and sustainability goals and advance the SDGs and Agenda 2030:
 - Develop a strong case for the value of their involvement, and create messaging and tools to help them influence road safety through their supply chains and community engagement.
 - Include road safety in organisations' sustainability reporting, which will: 1) show commitment to Agenda 2030; 2) show how road safety contributes to worker well-being, reduced economic and reputational costs, and reduced environmental impacts; and 3) raise the visibility of organisations' road safety commitment and accountability among shareholders and the public.
 - Encourage public and private sector organisations to incorporate road safety requirements into policies and procedures that cover their own workforce, and to include the same requirements when procuring transport services and other services that require workers to drive motor vehicles.
 - Encourage public and private sector organisations to procure vehicles which meet or exceed Global NCAP's fleet purchasing recommendations. As major vehicle purchasers of vehicles, especially in LMICs, organisations can influence vehicle manufacturers to provide safer vehicles in all markets.

References

1. European Transport Safety Council. <https://etsc.eu/infographic-isnt-it-time-your-organisation-started-taking-road-safety-seriously/>.
2. U.S. Bureau of Labor Statistics (2019). Table A-2. Fatal occupational injuries resulting from transportation incidents and homicides, all United States, 2017. Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics, <https://stats.bls.gov/iif/oshwc/cfoi/cftb0296314.xlsxCdc-excel>. NOTE: The U.S. definition of a work-related crash omits crashes that occur while commuting to or from work.
3. BBC (2018). Kenya bus crash kills 50 on way to Kisumu. <https://www.bbc.com/news/world-africa-45807969>
4. International Transport Forum (ITF) (2016). Zero road deaths and serious injuries: Leading a paradigm shift to a safe system. Paris: OECD Publishing. <http://dx.doi.org/10.1787/9789282108055-en>
5. Thorlakson T, de Zegher JF, Lambin EF (2018). Companies' contribution to sustainability through global supply chains. Proceedings of the National Academy of Sciences 115(9): 2072-2077. <http://dx.doi.org/10.1073/pnas.1716695115>
6. UN General Assembly (2015). Transforming our World: The 2030 Agenda for Sustainable Development (A/RES/70/1).
7. UN (2019). Improving global road safety (A/74/304) [report to the Secretary-General].
8. World Health Organization (2011). Global plan for the Decade of Action for Road Safety 2011-2020. Geneva: World Health Organization. https://www.who.int/roadsafety/decade_of_action/plan/en/
9. UN General Assembly (2010). Improving global road safety (A/RES/64/255).
10. International Labour Office, Sectoral Policies Department (2019). Draft guidelines on the promotion of decent work and road safety in the transport sector (Meeting of Experts to Adopt Guidelines on the Promotion of Decent Work and Road Safety in the Transport Sector, Geneva, 23-27 September 2019). https://www.ilo.org/sector/activities/sectoral-meetings/WCMS_677774/lang--en/index.htm
11. UN General Assembly (2016). Improving global road safety (A/RES/70/260).
12. UN General Assembly (2008). Improving global road safety (A/RES/62/244).
13. UN General Assembly (2018). Improving global road safety (A/RES/72/271).
14. World Health Organization (2018). Developing global indicators for road safety targets. https://www.who.int/violence_injury_prevention/road_traffic/road-safety-targets-indicators/en/
15. Global NCAP (2019). Fleet Safety Guidelines and Safer Car Purchasing Policy 2018-2019. http://www.globalncap.org/wp-content/uploads/2018/11/Global-NCAP-Fleet-Safety-Guide-2018_2019_Passenger-Cars.pdf
16. International Labour Organization (2019). Rules of the game: An introduction to the standards-related work of the International Labour Organization. Geneva: International Labour Office. http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---normes/documents/publication/wcms_672549.pdf
17. ISO (2012). ISO 39001 – 2012: Road traffic safety (RTS) management systems — Requirements with guidance for use. Geneva: ISO. <https://www.iso.org/standard/44958.html>
18. ISO (2019). ISO 39002: Road traffic safety — Good practices for implementing commuting safety management [under development]. Geneva: ISO.
19. UN Department of Safety and Security (2018). Road Safety Strategy for the United Nations System and Its Personnel: A Partnership for Safer Journeys. <https://www.who.int/roadsafety/publications/UN-RoadSafetyStrategy-EN.pdf?ua=1>
20. Health and Safety Executive (2019). Corporate manslaughter. <http://www.hse.gov.uk/corpmanslaughter/index.htm>
21. Commission of the European Communities (2019). Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009, concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor, as amended by Commission Regulation (EU) 2019/543 of 3 April 2019 [Official Journal of the European Union L 95, 4.4.2019, 1-8]. <https://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=CELEX:02009R0661-20190424>
22. ANSI/ASSP (2017). Safe practices for motor vehicle operations (ANSI/ASSP Z15.1 – 2017). New York: ANSI. <https://www.assp.org/standards/standards-topics/fleet-motorvehicles-z15-1>
23. National Heavy Vehicle Regulator (2019). About Chain of Responsibility. <https://www.nhvr.gov.au/safety-accreditation-compliance/chain-of-responsibility/about>
24. National Road Safety Partnership Program (2013). Hanson – Handsome Return for Hanson's Proactive Safety Approach. <https://www.nrspp.org.au/resources/hanson-hand-some-return-for-hansons-proactive-safety-approach/>
25. European Transport Safety Council (2019). Preventing Road Accidents and Injuries for the Safety of Employees (PRAISE). <https://etsc.eu/projects/praise/>
26. NETS (2014). Comprehensive Guide to Road SafetyTM. Vienna, VA: NETS. <https://trafficsafety.org/road-safety-resources/public-resources/comprehensive-guide-to-road-safety/>

APPENDIX A

Elements in the Global Plan for the Decade Directly Relevant to Work-related road safety

Pillar 1: Road Safety Management

- Develop a national strategy (at a cabinet or ministerial level) coordinated by the lead agency, to include:
 - Promotion of road safety management initiatives such as the new ISO traffic safety management standard ISO 39001
 - Establishing and maintaining the data collection systems necessary to provide baseline data and monitor progress in reducing road traffic injuries and fatalities and other important indicators such as cost, etc.
- Encourage the creation of new regional instruments similar to the European Agreement concerning the Work of Crews of Vehicles engaged in International Road Transport (AETR).

Pillar 3: Safer Vehicles

- Encourage managers of governments and private sector fleets to purchase, operate and maintain vehicles that offer advanced safety technologies and high levels of occupant protection.

Pillar 4: Safer Road Users

- Set and seek compliance with transport, occupational health and safety laws, standards and rules for safe operation of commercial freight and transport vehicles, passenger road transport services and other public and private vehicle fleets to reduce crash injuries.
- Research, develop and promote comprehensive policies and practices to reduce work-related road traffic injuries in the public, private and informal sectors, in support of internationally recognized standards for road safety management systems and occupational health and safety.

APPENDIX B

Work-related road safety research: A selective bibliography

- Barger LK, Cade BE, Ayas NT, Cronin JW, Rosner B, Speizer FE, Czeisler CA (2005). Extended work shifts and the risk of motor vehicle crashes among interns. *New England Journal of Medicine* 352: 125-134.
- Bell JL, Taylor MA, Chen G-X, Kirk RD, Leatherman ER (2017). Evaluation of an in-vehicle monitoring system (IVMS) to reduce risky driving behaviors in commercial drivers: Comparison of in-cab warning lights and supervisory coaching with videos of driving behavior. *Journal of Safety Research* 60: 125-136.
- Blanco M, Hanowski RJ, Olson RL, Morgan JF, Soccolich SA, Wu S-C, Guo F (2011). The impact of driving, non-driving work, and rest breaks on driving performance in commercial motor vehicle operations (FMCSA-RRR-11-017). Blacksburg, VA: Virginia Tech Transportation Institute.
- Byler C, Kesly L, Richardson S, Pratt SG, Rodríguez-Acosta RL (2016). Work-related fatal motor vehicle traffic crashes: Matching of 2010 data from the Census of Fatal Occupational Injuries and the Fatality Analysis Reporting System. *Accident Analysis & Prevention* 92: 97-106.
- Darby P, Murray W, Raeside R (2009). Applying online fleet driver assessment to help identify, target and reduce occupational road safety risks. *Safety Science* 47(3): 436-442. <https://doi.org/10.1016/j.ssci.2008.05.004>
- Davey J, Wishart D, Freeman J, Watson B (2007). An application of the Driver Behaviour Questionnaire in an Australian organisational fleet setting. *Transportation Research Part F* 10: 11-21.
- Di Milia L, Rogers NL, Åkerstedt T (2012). Sleepiness, long distance commuting and night work as predictors of driving performance. *PLoS ONE* 7: e45856.
- Fort E, Gadegbeku B, Gat E, Pellissier C, Hours M, Charbotel B (2019). Working conditions and risk exposure of employees whose occupations require driving on public roads – Factorial analysis and classification. *Accident Analysis & Prevention* 131: 254-267.
- Gander PH, Marshall NS, Bolger W, Girdling I (2005). An evaluation of driver training as a fatigue countermeasure. *Transportation Research Part F: Traffic Psychology and Behaviour* 8(1): 47-58. <https://doi.org/10.1016/j.trf.2005.01.001>
- Giroto E, de Andrade SM, González AD, Mesas AE (2016). Professional experience and traffic accidents/near-miss accidents among truck drivers. *Accident Analysis & Prevention* 95 (Part A): 299-304.
- Gregersen NP, Brehmer B, Morén B (1996). Road safety improvement in large companies. An experimental comparison of different measures. *Accident Analysis & Prevention* 28(3): 297-306. [https://doi.org/10.1016/0001-4575\(95\)00060-7](https://doi.org/10.1016/0001-4575(95)00060-7)
- Hickman JS, Hanowski RJ (2011). Use of a video monitoring approach to reduce at-risk driving behaviors in commercial vehicle operations. *Transportation Research Part F: Traffic Psychology and Behaviour* 14: 189-198.
- Hickman JS, Hanowski RJ (2012). An assessment of commercial motor vehicle driver distraction using naturalistic driving data. *Traffic Injury Prevention* 13: 612-619.
- Lerman SE, Eskin E, Flower DJ, George EC, Gerson BM, Hartenbaum N, Hursh SR, Moore-Ede M (2012). Fatigue risk management in the workplace. *Journal of Occupational & Environmental Medicine* 54: 231-258.
- Meuleners L, Fraser ML, Govorko MH, Stevenson MR (2015). Obstructive sleep apnea, health-related factors, and long distance heavy vehicle crashes in Western Australia: A case control study. *Journal of Clinical Sleep Medicine* 11: 413-418.
- Mitchell RJ, Bambach MR, Friswell R (2014). Work and non-work-related vehicle crashes: The contribution of risky driving practices. *Safety Science* 68: 65-72.
- Mitchell R, Friswell R, Moore L (2012). Initial development of a practical safety audit tool to assess fleet safety management practices. *Accident Analysis & Prevention* 47: 102-118. <https://doi.org/10.1016/j.aap.2012.01.021>
- Mooren L, Grzebieta R, Williamson A, Olivier J, Friswell R (2014). Safety management for heavy vehicle transport: a review of the literature. *Safety Science* 62: 79-89. <https://doi.org/10.1016/j.ssci.2013.08.001>
- Murray W, White J, Ison S (2012). Work-related road safety: a case study of Roche Australia. *Safety Science* 50(1): 129-137. <https://doi.org/10.1016/j.ssci.2011.07.012>
- Muscant O (2011). A report on the measurement of company car drivers' aberrant behaviors, safety attitudes, and safety climate perceptions. *Transportation Research Record* 2248: 21.
- Nævestad T-O, Phillips RO, Elvebak B (2015). Traffic accidents triggered by drivers at work – A survey and analysis of contributing factors. *Transportation Research Part F: Traffic Psychology and Behaviour* 34: 94-107.
- Newnam S, Griffin MA, Mason C (2008). Safety in work vehicles: A multilevel study linking safety values and individual predictors to work-related driving crashes. *Journal of Applied Psychology* 93: 633-644.
- Newnam S, Lewis I, Watson B (2012). Occupational driver safety: Conceptualising a leadership-based intervention to improve safe driving performance. *Accident Analysis & Prevention* 45: 29-38. <https://doi.org/10.1016/j.aap.2011.11.003>

Newnam S, Oxley J (2016). A program in safety management for the occupational driver: Conceptual development and implementation case study. *Safety Science* 84: 238-244.

Newnam S, Watson B (2011). Work-related driving safety in light vehicle fleets: A review of past research and the development of an intervention framework. *Safety Science* 49: 369-381.

Öz B, Özkan T, Lajunen T (2010). An investigation of the relationship between organizational climate and professional drivers' driver behaviours. *Safety Science* 48: 1484-1489.

Retzer KD, Hill RD, Pratt SG (2013). Motor vehicle fatalities among oil and gas extraction workers. *Accident Analysis & Prevention* 51: 168-174. <https://doi.org/10.1016/j.aap.2012.11.005>.

Salminen S (2008). Two interventions for the prevention of work-related road accidents. *Safety Science* 46: 545-550. <https://doi.org/10.1016/j.ssci.2007.05.007>

Sieber WK, Robinson CF, Birdsey J, Chen G-X, Hitchcock EM, Lincoln JE, Nakata A, Sweeney MH (2014). Obesity and other risk factors: The National Survey of U.S. Long-Haul Truck Driver Health and Injury. *American Journal of Industrial Medicine* 57: 615-626.

Stuckey R, Glass DC, LaMontagne AD, Wolfe R, Sim MR (2010). Risk factors for worker injury and death from occupational light vehicles crashes in New South Wales (Australia). *American Journal of Industrial Medicine* 53: 931-939.

Vivoda JM, Pratt SG, Gillies SJ (2019). The relationships among roadway safety management practices, collision rates, and injury rates within company fleets. *Safety Science* 120: 598-602. <https://doi.org/10.1016/j.ssci.2019.07.033>

Wallington D, Murray W, Darby P, Raeside R, Ison S (2014). Work-related road safety: case study of British Telecommunications (BT). *Transp. Policy* 32: 194-202. <https://doi.org/10.1016/j.tranpol.2014.01.002>

Warmerdam A, Newnam S, Sheppard D, Griffin M, Stevenson M (2017). Workplace road safety risk management: an investigation into Australian practices. *Accident Analysis & Prevention* 98: 64-73. <https://doi.org/10.1016/j.aap.2016.09.014>

Williamson AM, Feyer A-M, Friswell R (1996). The impact of work practices on fatigue in long distance truck drivers. *Accident Analysis & Prevention* 28: 709-719.



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