Road Safety Scotland Annual Seminar
EICC: 26 March 2024

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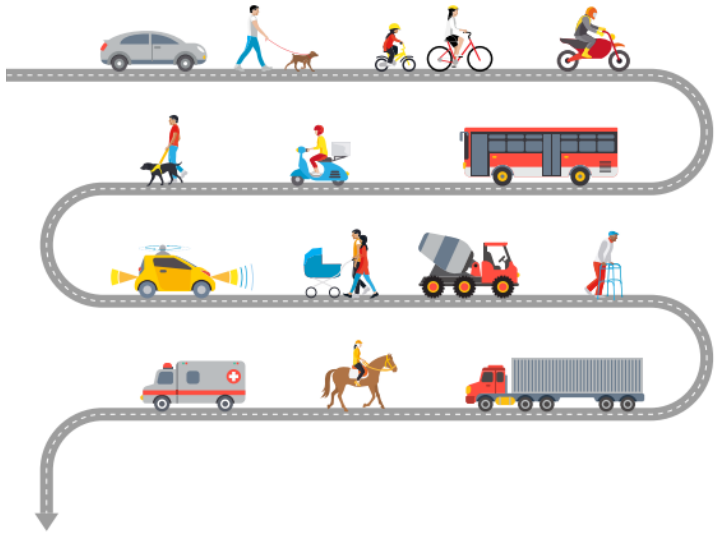
CÒMHDHAIL ALBA

Scotland's Road Safety Framework to 2030

Together, making Scotland's roads safer



Scotland to have the best road safety performance in the world

transport.gov.scot

Road Safety SCOTLAND

In-Depth Roads Fatalities Study 2015-2020

Fiona McKinlay, Analyst Coordinator, Police Scotland
Christopher McColl, Higher Analyst, Police Scotland
26 March 2024

Overview/Background

- Since 2000 there has been a long-term downward trend in fatalities on Scotland's Roads
- In 2022, this trend was reversed with a 20% increase compared to the previous year
- RSF2023 vision to have the best road safety performance in the world
- Collaboration between Police Scotland and Transport Scotland to provide analysis of fatal collisions on Scotland's roads

“You have to know the past to understand the present”

- Carl Sagan

Aims of the Report

- Establish the scale and nature of road fatalities in Scotland
- Identify the contributory factors
- Identify Countermeasures for prevention and severity reduction
- Explore target populations for specific countermeasures
- Make recommendations to mitigate risk

Methodology/Data Sources

- Experienced Roads Policing officers reviewed every fatal collision, quality assured by a senior Road Policing supervisor
- Recruitment of an experienced analyst, dedicated to the project
- Establish an enhanced dataset
  - CRaSH
  - Collision Investigation Reports
  - Police Scotland internal reports
  - STATS 19
  - Criminal History System
- Aligned to the five Safe System Pillars

Benefits of the Fatalities Project

- Introduction of new data sources to provide a richer picture
- Dedicated resources to investigate and analyse the data
- Capitalises on professional expertise within the organisations
- Provides evidence to inform / direct strategy and resourcing
- Publically available, clear and transparent report
- Creation of enhanced data for future analytical work

Key Findings

40,124 Road Traffic Collisions recorded in Scotland in 2015-2020

903 fatal collisions

963 fatalities

1,516 vehicles involved

736 vehicle occupants (Drivers, riders and passengers of any vehicle)

432 Vulnerable Road Users

162 passengers

574 driver/riders

227 pedestrians

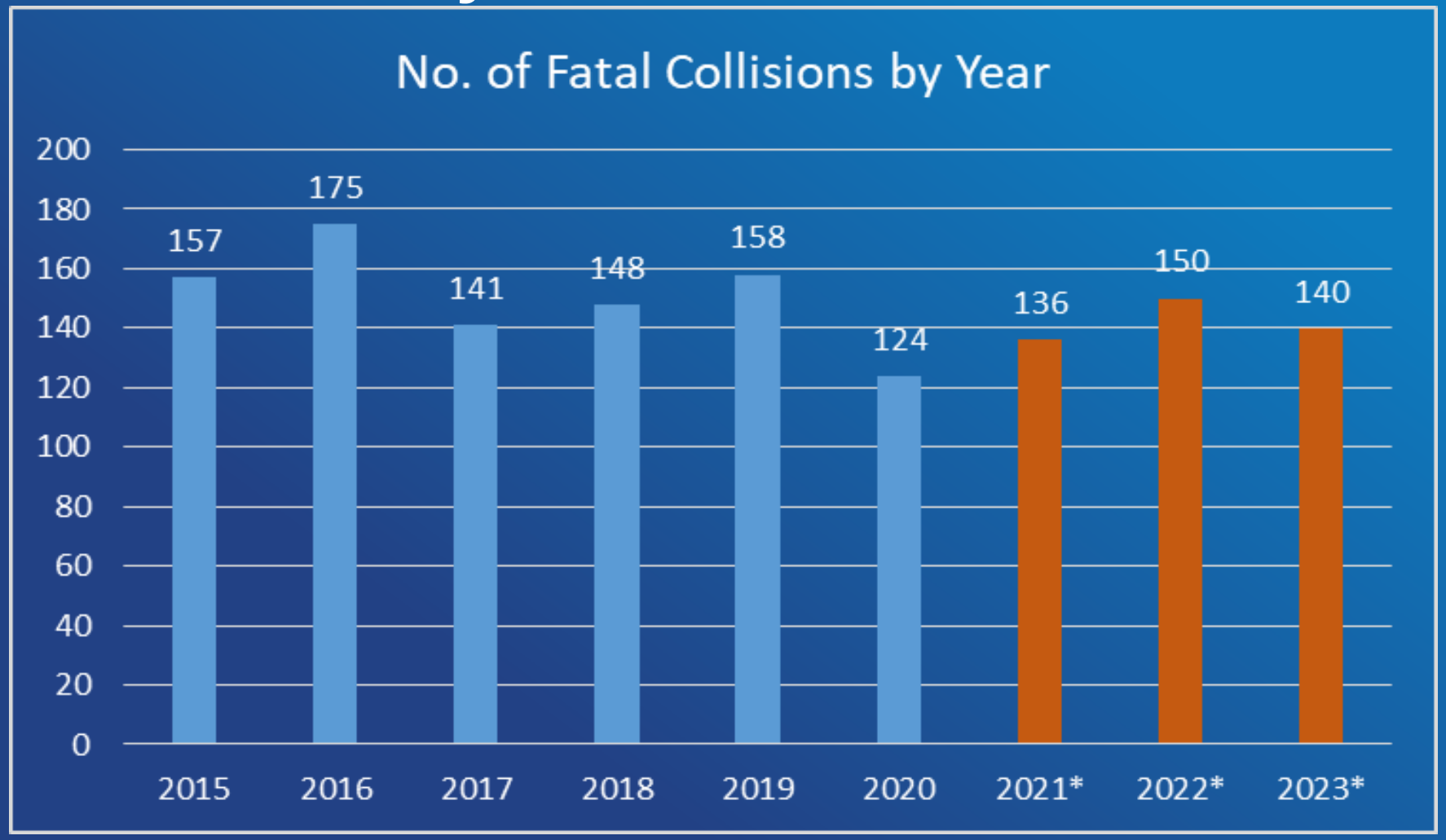
161 motorcyclists

44 pedal cyclists

6% (n=50) of fatal collisions resulted in multiple fatalities

78% (n=704) of fatal collisions involved multiple road users

Fatal Collisions by Year



*2021 data onwards extracted 01/01/2024

Locations

Fatal Collisions

Locations

Motorcyclist and Pillion Passenger Fatalities

Locations

Pedestrian Fatalities

Locations

Pedal Cyclist Fatalities

Key Findings

- The main contributory factors which influenced fatal collisions were people being careless, reckless or in a hurry, failing to look properly and losing control of their vehicle.

- Link between social deprivation and driving behaviour- those from more deprived areas more commonly linked to drink and drug driving, as well as risk taking behaviour such as speeding, aggressive driving, racing and using a vehicle in the course of crime

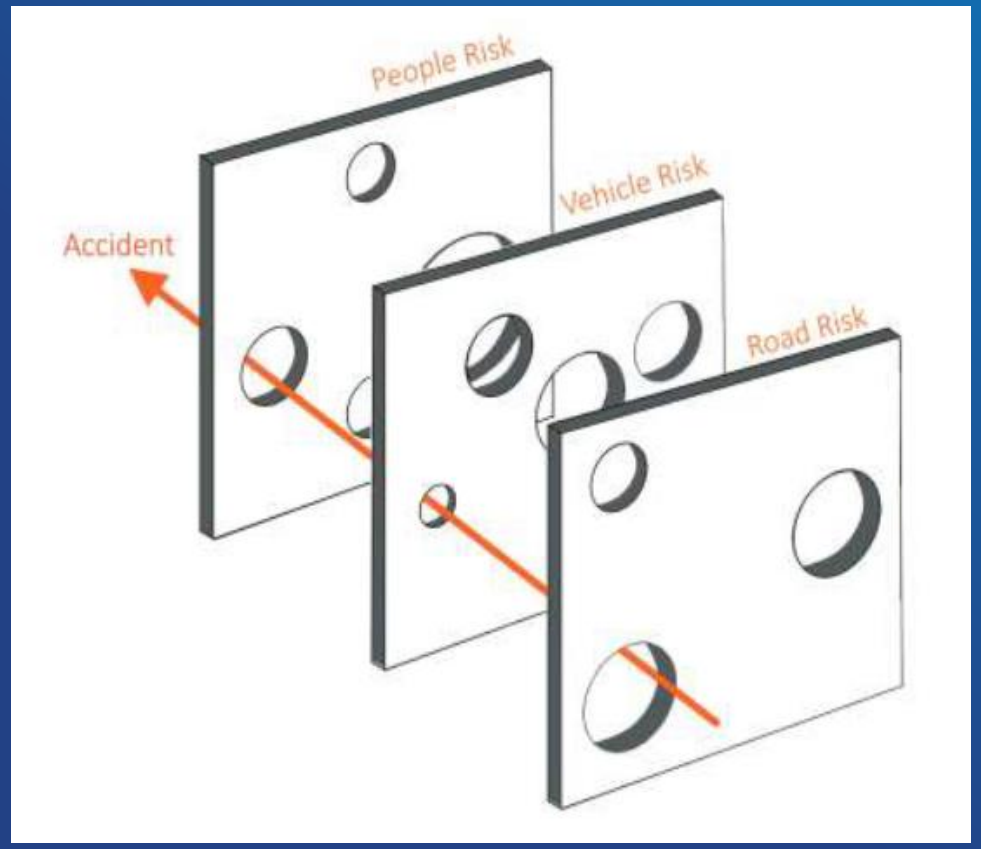
- A large number of drivers/riders at fault had previous convictions for driving related offences including dangerous driving, careless driving, drink driving and speeding

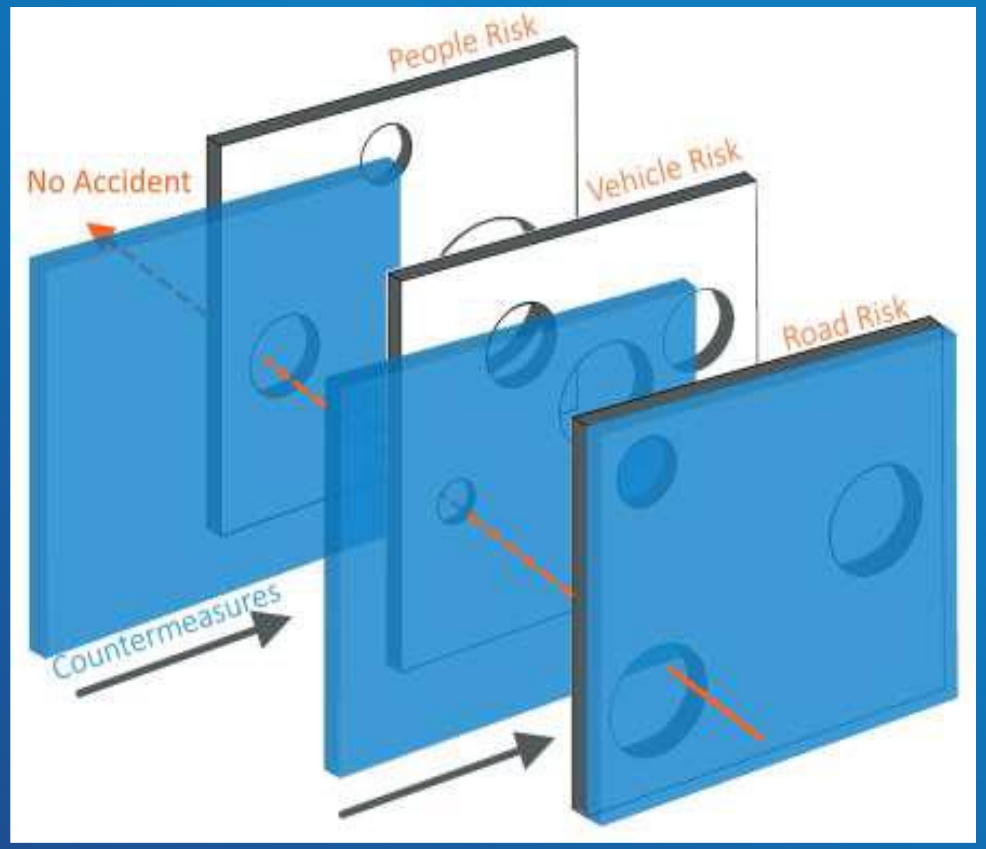
Key Findings

- A large number of young drivers (390 drivers aged between 16 and 35) were found to be at fault for the fatal collisions and were also more frequently killed as passengers when being driven by peers around the same age. They often displayed risky behaviour, travelling too fast, getting distracted, drink-driving and not wearing a seatbelt.

- Contributory factors were commonly identified relating to health and eyesight issues and delayed reaction times for older drivers.

Countermeasures





- Countermeasures were identified that if implemented at any stage of the collision (pre, post or during), were assessed to have an impact on the outcome: either stopping the collision from occurring at all or reducing the severity of injuries sustained.

Countermeasures

- The majority of collisions involved contributory factors relating solely to ‘People’, such as
  - Failure to look
  - Speeding
  - Distraction in or outside of vehicle.

- However, analysis of Countermeasures found that less than 1% of collisions would have been prevented or had injury severity reduced by solely ‘People’ countermeasures.

- The majority (79%) of collisions may have been influenced by a combination of all three CMs, ‘People’, ‘Vehicle’ and ‘Road’.

Countermeasures – Collision Avoidance

- People Countermeasures
  - Enhanced training of road users relating to hazard perception/avoidance
  - Improved visibility of vulnerable road users
  - Alternative licensing process – graduated driving licence / medical checks

- Vehicle Countermeasures
  - Enhanced vehicle technology
  - Telematics insurance

- Road Countermeasures
  - Reduce speed limits / speed cameras
  - Additional street furniture (barriers, lighting, crossings)

Countermeasures – Severity Reduction

- People Countermeasures
  - Use of seatbelt
  - Use of protective equipment/clothing

- Vehicle Countermeasures
  - Enhanced vehicle technology
  - Enhanced vehicle secondary safety measures

- Road Countermeasures
  - Reduce speed limit / add speed camera
  - Add appropriate barrier / vehicle restraint system
  - Remove hazard

Recommendations

Contributory Factors, Counter Measures and identified trends have informed the 99 recommendations.

These have been aligned to the Safe System Pillars and then structured under:

- Education and Awareness
- Action
- Funding/Grants Projects
- Legislation
- Further Analysis

The recommendations vary between quickly achievable and at minimal cost, those that require multi-agency partnership working to deliver, and strategic, long-term goals which require legislative change and a whole-system approach to deliver on.

Recommendations

- Funding for Safety Schemes
  - Cyclist safety helmets and child car seats (grant projects/financial incentive program)

- Review of Legislation and Penalties
  - Endorsable offence of non-use of seatbelt
  - Mandatory installation of Alco-lock for new drivers/drink drivers
  - National Speed Awareness Course for those caught speeding
  - Increased penalties for speeding offences
  - Increased penalties or disqualification for repeat offenders of speeding/careless and dangerous driving – graduated endorsement scheme

Recommendations

- Establish a Young Driver Focus Group
  - Engagement with young drivers to empower them to assist in developing effective preventative measures, and identify more effective methods to engage with this demographic. Establish a Young Driver Focus Group

- Graduated Licencing System
  - Restrictions on driving time/number or passengers/zero tolerance on alcohol for new drivers
  - Minimum period of learning for Motorcyclists, and requirement to demonstrate experience in different driving conditions
  - Mandatory tyre and vehicle maintenance training for learner drivers

Recommendations

- Fitness to Drive

  Multi-Agency review and consideration of:
  - Current processes regarding licence revocation and subsequent enforcement
  - DVLA medical assessments
  - Mandatory reporting requirements for medical professionals
  - Mandatory eyesight tests for older drivers
  - Cognitive assessment for licence renewal for older drivers
  - Alternative fit-for-purpose public transport and cycling infrastructure

Next Steps

- Strategic Partnership Board will review recommendations and action through the Operational Partnership Group Meeting
- Used by Road Safety Governance Board to inform strategy and direct resources in Roads Policing
- Recruitment of dedicated Partnership Analyst to work with Police Scotland officers for the length of Scotland's Road Safety Framework 2030
- Use of the enhanced dataset to inform bespoke analytical products relating to high risk roads, vulnerable road user groups, the Fatal 5, areas of social deprivation, 'near misses', and results analysis of campaigns.

Thanks for listening

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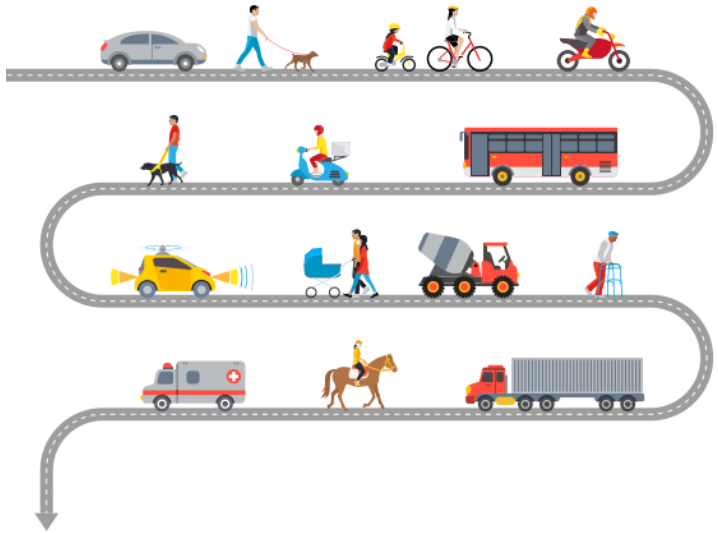
Together, making Scotland's roads safer



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Road Safety Summit

George Henry
National Operations Manager for Road Safety Policy & Education

Why A Road Safety Summit

- Reported Road Casualties Scotland 2022 highlighted 173 fatalities on, an increase of 23% on 2021, a return to figures not seen since 2016 .
- Discussed at SPB, it was agreed it needed addressed as a matter of urgency
- We need to fully understand this rise and explore what more could be done.
- Hold a Road Safety Summit to forensically look at the casualty data and what more could be done
- Summit was held on 28th February in Edinburgh City Chambers

Presentations

- Scotland's Safe System – Dan Campsall, Agilysis
- Post Pandemic Casualty Data – Katrina Caldwell, Transport Scotland
- In Depth Fatality Research – Fiona McKinlay, Police Scotland
- Road Policing in Scotland – Hilary Sloan, Police Scotland
- Road Safety at Local Level – Ewan Wallace, SCOTS
- How we Manage Speed – Stuart Wilson, Transport Scotland
- Why Education Remains Key – Michael McDonnell, Road Safety Scotland
- Road Casualties – Public Health Perspective – Margaret Douglas, Public Health Scotland

What more can we do?

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LEGISLATION

- Decrim Moving Traffic Offences
- Ask UKG for GSL & GSR
- HGV Speed Limits
- Incentive large vehicles for safety and operation

DATA

- Further our access to data from ABI, NHS & PHS – damage only & personal travel data
- Research on impacts of spending cuts on LA Roads

ENGINEERING

- More segregation to enable safer travel for vulnerable road users.
- Multi-year road safety funding, allowing local areas to better plan ahead.

ENFORCEMENT

- Roll out nationally of Police Scotland initiatives such as Rider Refinement, Diversionary courses (speed awareness) and a Dashcam portal.
- The use of speed/safety camera technology should be expanded

EDUCATION

- Increased awareness of upcoming campaigns to allow local areas to help share the message.

GOVERNANCE

- Formation of Key Priority Groups on the delivery responsibilities of each of the partner agencies involved.
- Enhance engagement with partners in the Criminal Justice System .

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No Such Thing As A Free Lunch

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What More Can We Do?

Next Steps

The national transport agency for Scotland

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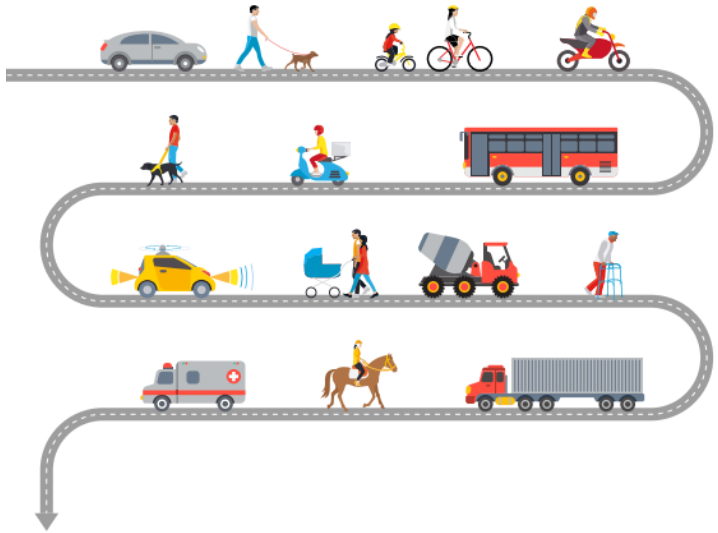

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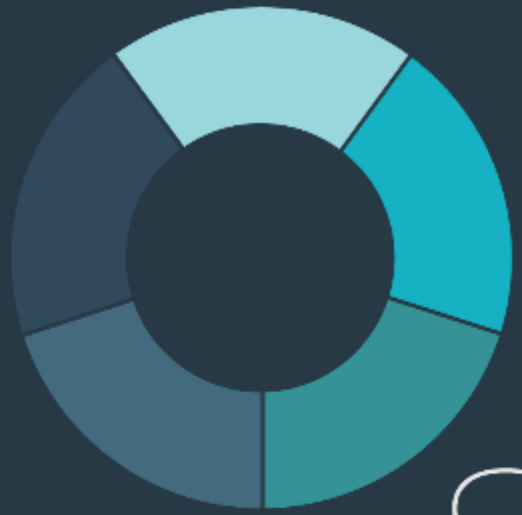


Implementing the

SAFE SYSTEM

Working on...

agilysis

SAFE, SMART & SUSTAINABLE MOBILITY

- Safe System strategy, culture, training & capacity building
- Data management, analytics, visualisation, dashboarding and data science.
- Research, evaluation and innovative investigation

Working with...

ADB

THE WORLD BANK

IRF INTERNATIONAL ROAD FEDERATION

Transport for London

World Health Organization

αiRAP

national highways

TRANSPORT SCOTLAND COMHDHAIL ALBA

easst Eastern Alliance for Safe and Sustainable Transport

Department for Transport

European Bank for Reconstruction and Development

Highways AWARDS — WINNER MENTAL HEALTH & WELLBEING AWARD

FIRST CAR YOUNG DRIVER ROAD SAFETY AWARDS — DRIVESTART BEST PARTNERSHIP SCHEME

CIHT AWARDS 2010 — MAST ONLINE

CIHT AWARDS 2011 — MAST ONLINE

CIHT AWARDS 2018 — DRIVESTART

CIHT AWARDS 2020 — RIDEFREE

CIHT AWARDS 2022 — TEAM LFEMUR

FIRST CAR YOUNG DRIVER ROAD SAFETY AWARDS — BLAZED & WASTED BEST VOLUNTARY DRIVER CAMPAIGN

Road Safety GB AWARDS — 2022 CORPORATE AWARD WINNER

Brake FLEET SAFETY Awards 2015 — Winner Richard Owen — OUTSTANDING COMMITMENT TO ROAD SAFETY

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS — 2010 MAST ONLINE

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS — 2010 HAVE A KIP

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS — 2013 CRASHMAP

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS — 2014 SAFER ROADS, BERKSHIRE

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS — 2017 DRIVESTART

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS — 2019 RIDEFREE

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS — 2020 SUPPORTING UK ROAD SAFETY

Prince Michael INTERNATIONAL ROAD SAFETY AWARDS — 2022 DATA COLLECTION FOR RRSOs

Brake FLEET SAFETY Awards 2018 — Highly Commended — ROAD SAFETY IN THE COMMUNITY

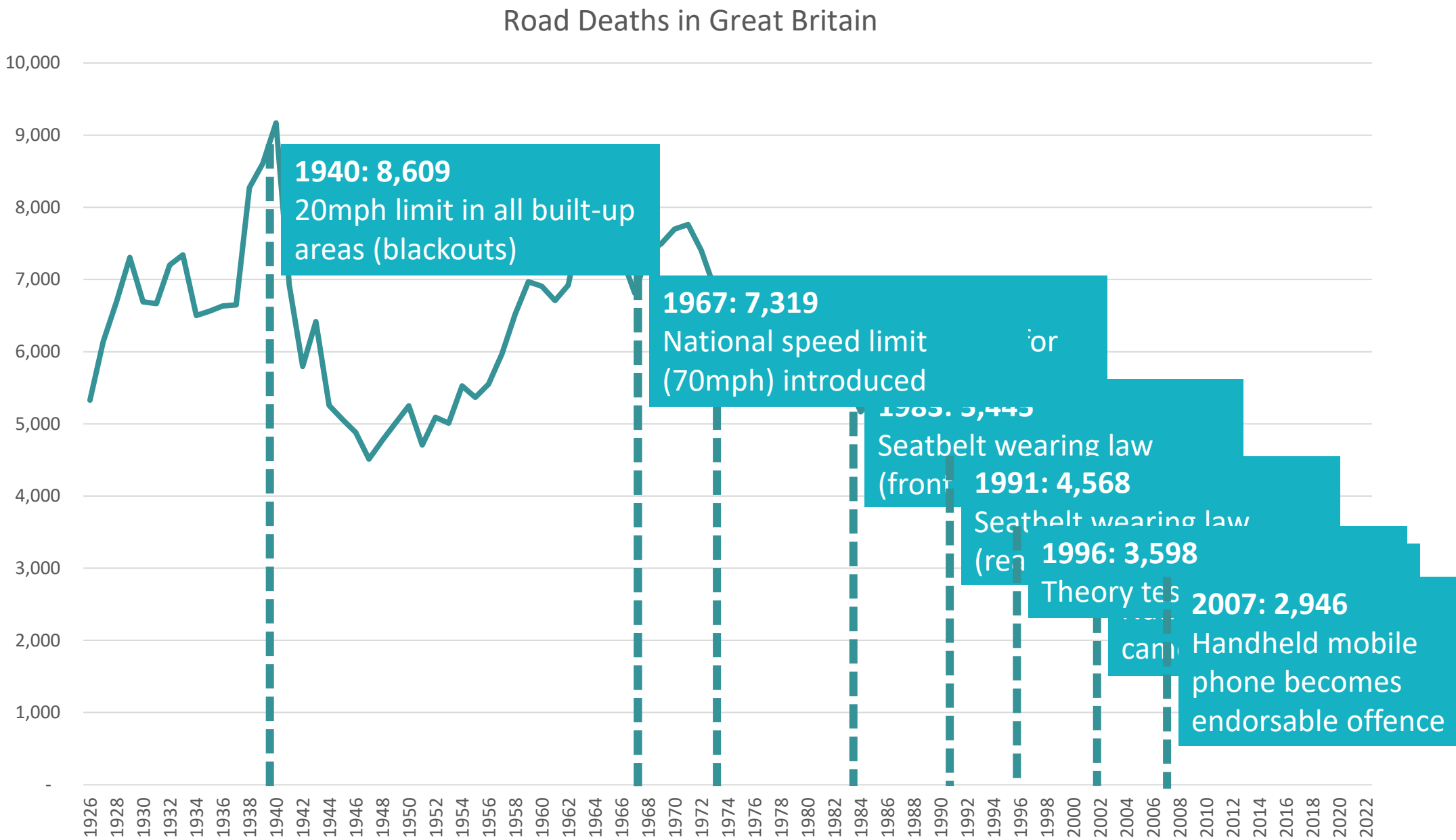
Implementing the Safe System

- Part 01: Why Does It Matter?
- Part 02: Ambition for a Safe System
- Part 03: Fragile Bodies & Fallible Minds
- Part 04: Taking a Systems Approach

- Part 05: So, What Should We Do?
- Part 06: The Implementation Gap

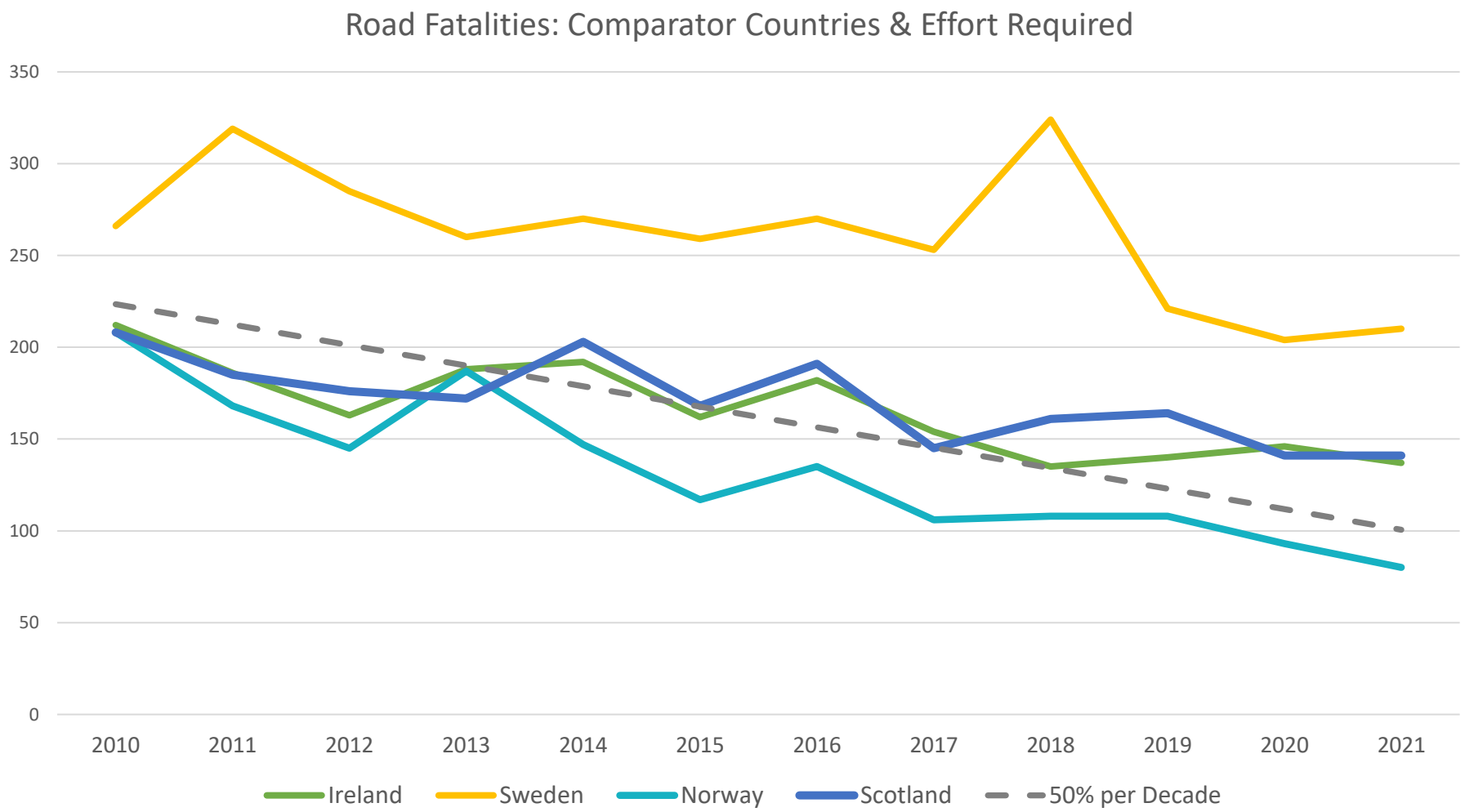
Why does it matter?

PART ONE


Road Deaths in Great Britain
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
-
1926 1928 1930 1932 1934 1936 1938 1940 1942 1944 1946 1948 1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2022
1940: 8,609
20mph limit in all built-up areas (blackouts)
1967: 7,319
National speed limit
(70mph) introduced
Seatbelt wearing law
1991: 4,568
1996: 3,598
Theory tes
2007: 2,946
Handheld mobile phone becomes endorsable offence

Current System Performance

A wider problem?



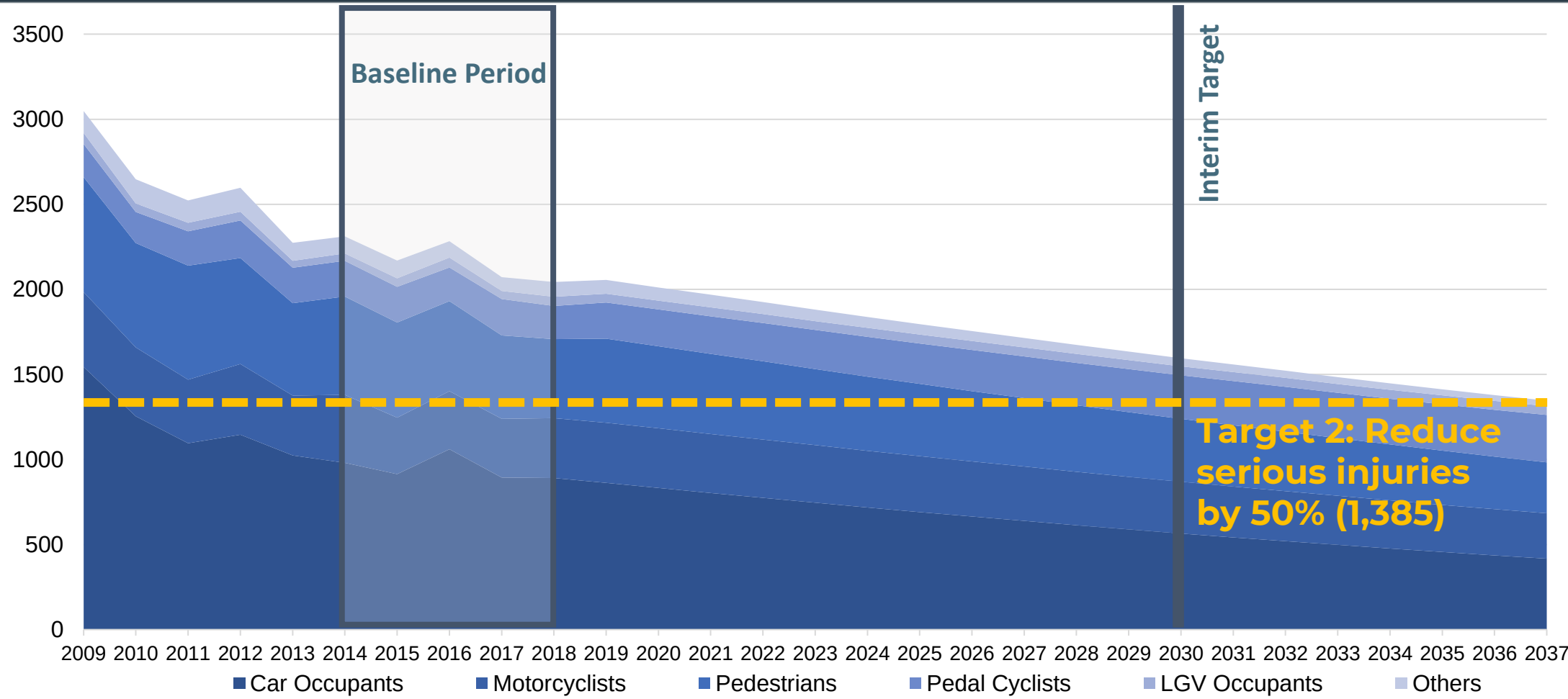

Dunblane

Interim Targets

	Baseline Figure – 2014-18 avg	Latest Pre-Covid Figure (2019)	Current Figure (2022)	Target in 2030	Reduction achieved so far
50% reduction in people killed	173.6	164	**173**	87	0%
50% reduction in people seriously injured	2770.8	2,400.7	**1,776**	1,385.4	36%
60% reduction in children (aged 16<) killed	5.6	2	**3**	2	17%*
60% reduction in children (aged 16<) seriously injured	263.8	237.7	**176**	105.5	33%

* 3 year average

Casualty Forecast (Regression Model)



Primary flow scenario for KSI casualties to 2037, Agilysis (2019)

Is it possible?

- **Norway** (Elvik & Nævestad, 2023)
  - Fatalities declined by 77% between 2000 and 2021
  - Traffic volume increased by 35%
  - Lowest number of traffic fatalities per million inhabitants of any highly motorised country (2015-2022)

Ambition for a Safe System?

PART TWO

DECADE OF ACTION FOR ROAD SAFETY
2021 - 2030

World Report — 04

1st Ministerial — 09

1st Decade of Action — 11

SDGs — 15

Voluntary Targets — 18

3rd Ministerial — 20

2nd Decade of Action — 21

SUSTAINABLE DEVELOPMENT GOALS

3RD GLOBAL MINISTERIAL CONFERENCE ON ROAD SAFETY
ACHIEVING GLOBAL GOALS 2030

GLOBAL PLAN

DECADE OF ACTION FOR ROAD SAFETY 2021–2030

UN General Assembly Resolution 74/299 declared a **Decade of Action for Road Safety 2021-2030**, with the target to reduce road traffic deaths & injuries

BY AT LEAST 50% during that period

The Global Plan describes what is needed to achieve that target, and calls on governments & partners to implement an integrated

SAFE SYSTEM APPROACH

VISION

agilysis

Number of road fatalities in Sweden

VISION ZERO
TOGETHER WE SAVE LIVES

A long tradition of systematic traffic safety work

1997
- Vision Zero adopted by the Swedish Parliament
- In-depth accident investigation
- Euro NCAP

1998
First 2+1 road

591 Road fatalities

2005
- Alco lock in buses due to procurement demands
- Mandatory bicycle helmet for children

2006
Increased penalty for speeding

2007
Traffic Safety Cameras

2008
- Management by objectives with safety performance indicators
- Volvo Cars set a vision of no serious injuries or deaths in a Volvo car by the year 2020
- New driver training with focus on "Risk"
- New set of speed limits

2011
ISA and Alco lock in road-authorities' vehicles

2012
ISO 39001

2013
- Rating of major roads
- Hövding, new type of bicycle helmet

2016
Renewed commitment to Vision Zero

2018
Geofencing

2019
Call on Sustainable speeds of large transport buyers

2020
UN resolution, The Stockholm Declaration

2021
Global Plan

227 Road fatalities

2022
High-level Meeting of the UN General Assembly on Global Road Safety

2023
International Vision Zero Conference – Taking road safety to the next level

Interim target 2030
a maximum of 133 road fatalities

Vision Zero (Zero road fatalities in Sweden)

VISION

"It is unacceptable and unethical that anyone is killed or seriously injured on our roads"

"This framework identifies the part every one of us has to play in ensuring our long-term aspiration for Vision Zero to become a reality."

"The explicit, longer-term goal of the Safe System is for a road traffic system which becomes free from death and serious injury"

Can it work?

- **Norway** (Elvik & Nævestad, 2023)
  - Fatalities declined by 77% between 2000 and 2021
  - Traffic volume increased by 35%
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Fragile Bodies & Fallible Minds

PART THREE

Biomechanical Tolerance

The great contribution by Stapp was to show that the primary forces acting in the majority of car collisions are entirely survivable if the packaging of the human frame is satisfactory.

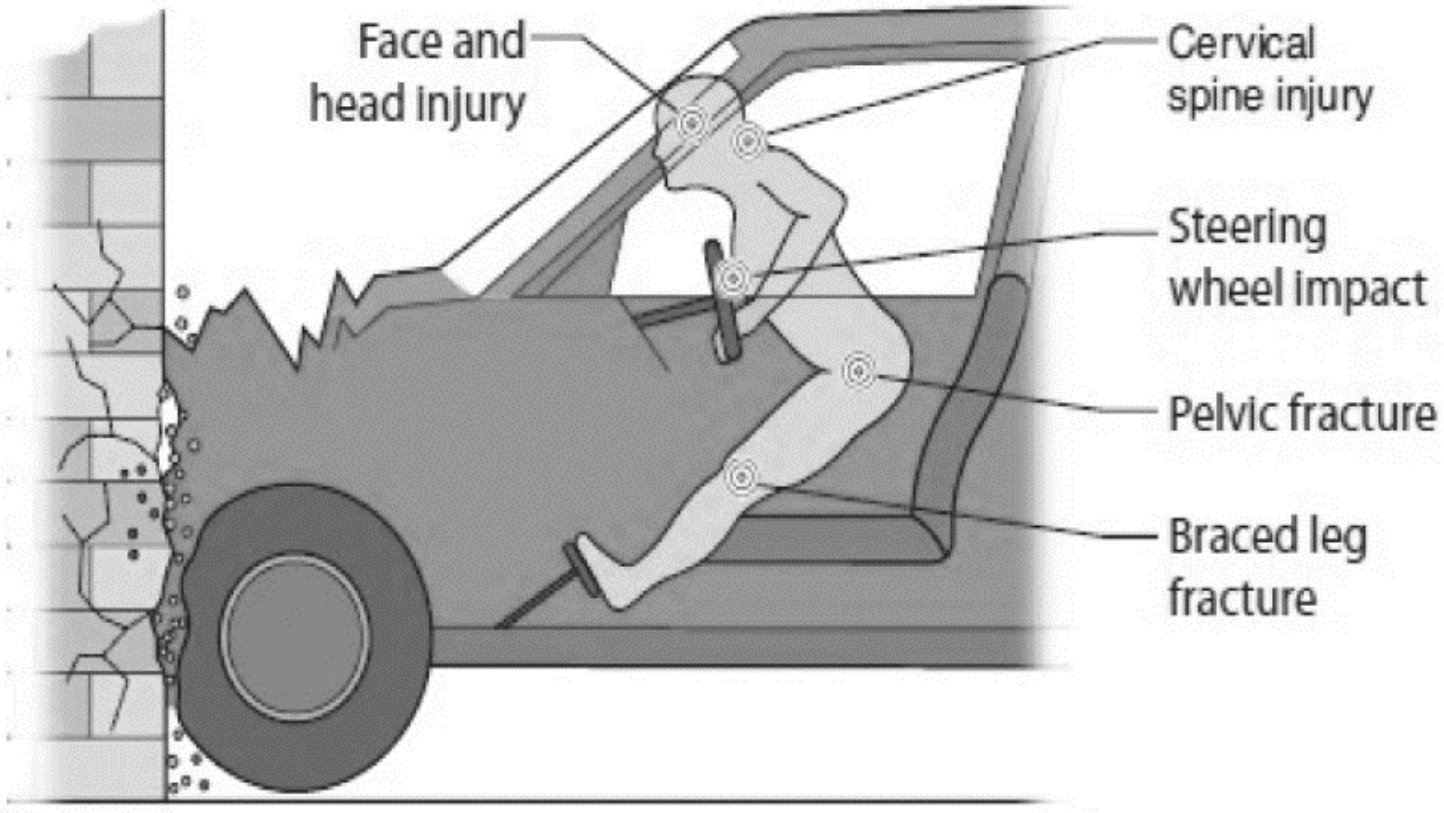
He showed that accelerations of 30g for up to 0.5 seconds were entirely tolerable with only reversible soft tissue injuries.

Murray Mackay, Biomechanics of Injury, 1992

Unrestrained Driver

Impact Forces:

- Head to Windscreen at 30mph – average deceleration of 60g (peak value of 90g)
- Head to windscreen frame ≈ 500g (Mackay, 1992)



Knight's Forensic Pathology, Chapter 9, Transport Injuries, Figure 9.1

Physics Question

2 cars of the same mass are travelling along an urban road, Car A is at 20mph, Car B is at 30mph. What difference, if any, is there between the kinetic energy carried by each vehicle?

At 20mph a car of 1MT possesses
39.97kJ of kinetic energy
At 30mph a car of 1MT possesses
89.93kJ of kinetic energy

2.25x as much energy

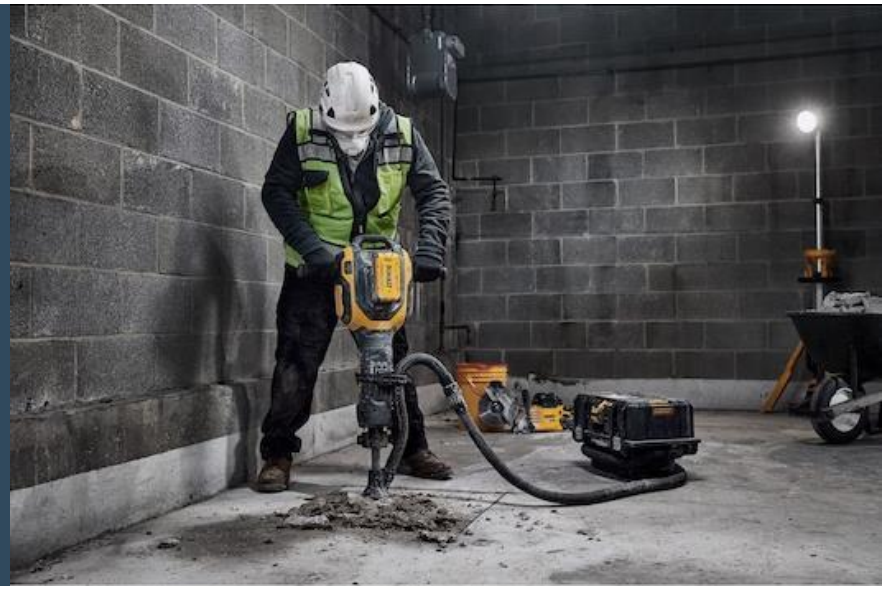
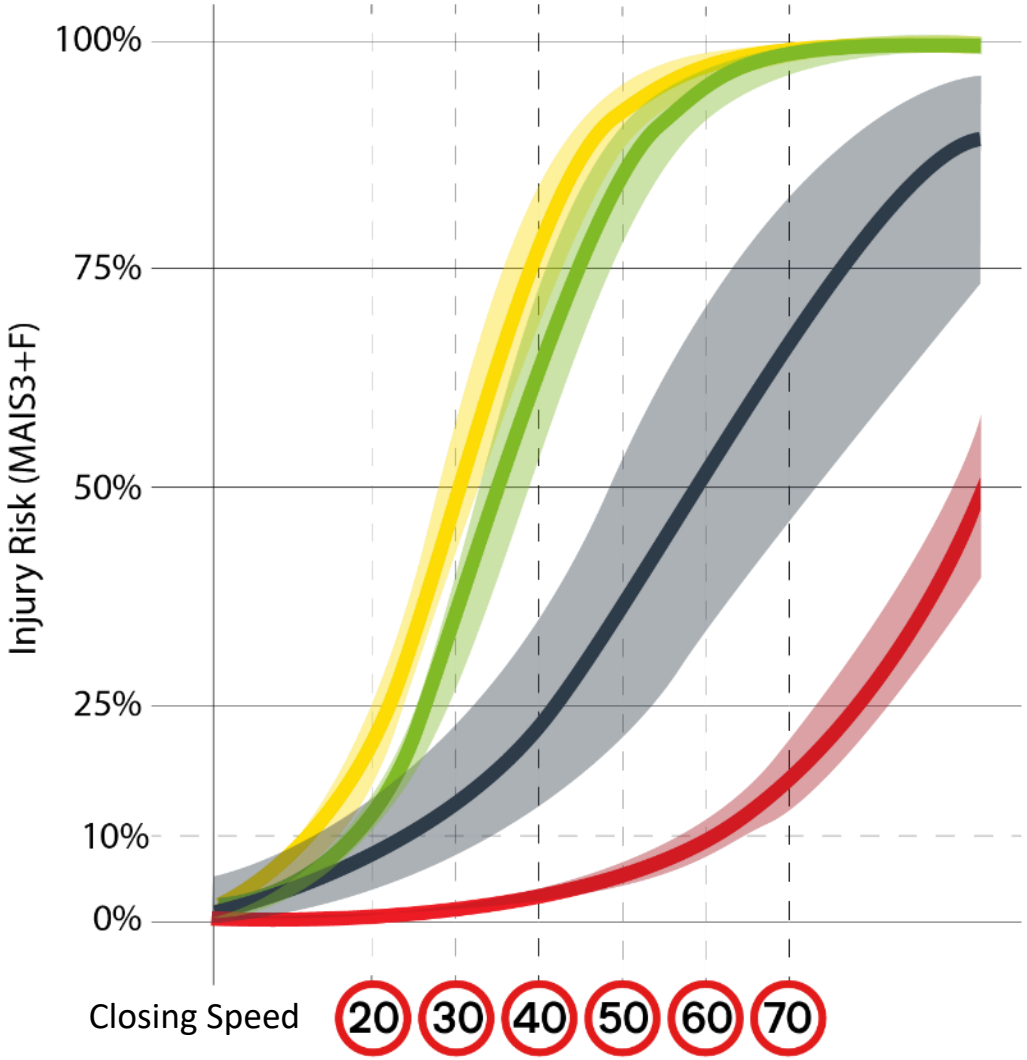


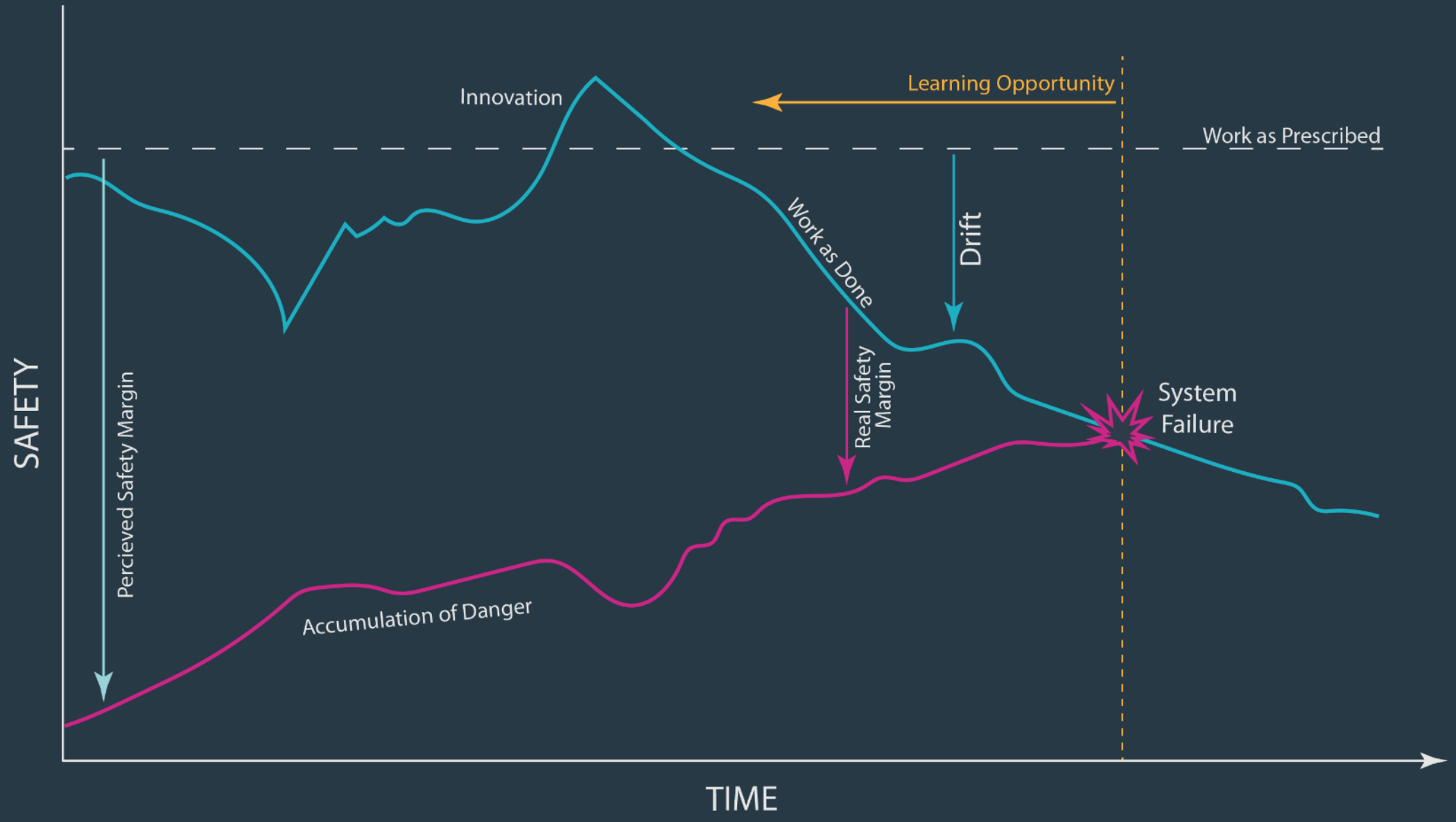
Image courtesy of Dewalt

Rapid Increase in Injury Risk

- Pedestrians
- Cyclists
- Motorcyclists
- Drivers



https://tsr.international/TSR/article/view/23823/21217



Adapted from Drekker, S. (2007) - The Field Guide to Understanding Human Error

It's All About Energy!

Taking a Systems Approach

PART FOUR

Haddon's Phase-Factor Matrix

Phase	Host (Human)	Agent (Vehicle)	Environment – Physical	Environment – Social
Pre-Event	Driver age, gender, driving experience, substance use, sensory deficits, fatigue, risk taking behaviours, medications, comorbidities	Vehicle size, speed, brakes, tyre condition, dynamics, visibility (e.g. colour, running lights)	Road design, traffic flow, road conditions, traffic density, traffic controls (e.g. Lights, signals), visibility, time of day	Seat belt restrictions, impaired driving laws, licensing restrictions, road rage, speed restrictions, working hours, economic pressure
Event	Age, comorbidities, restraint use, distraction	Vehicle speed, size, crash worthiness, type of restraints, additional safety systems, interior surface hazards, loads	Guardrails, median barriers, roadside hazards, deformable furniture	Enforcement of speed limits
Post-Event	Age, comorbidities, specific injuries	Integrity of fuel system, extrication issues	Distance to EMS, proximity to trauma centre, extrication issues	EMS planning & delivery, bystander assistance, quality of trauma care, rehabilitation services, compensation practices, justice system, social support

William Haddon, 1970

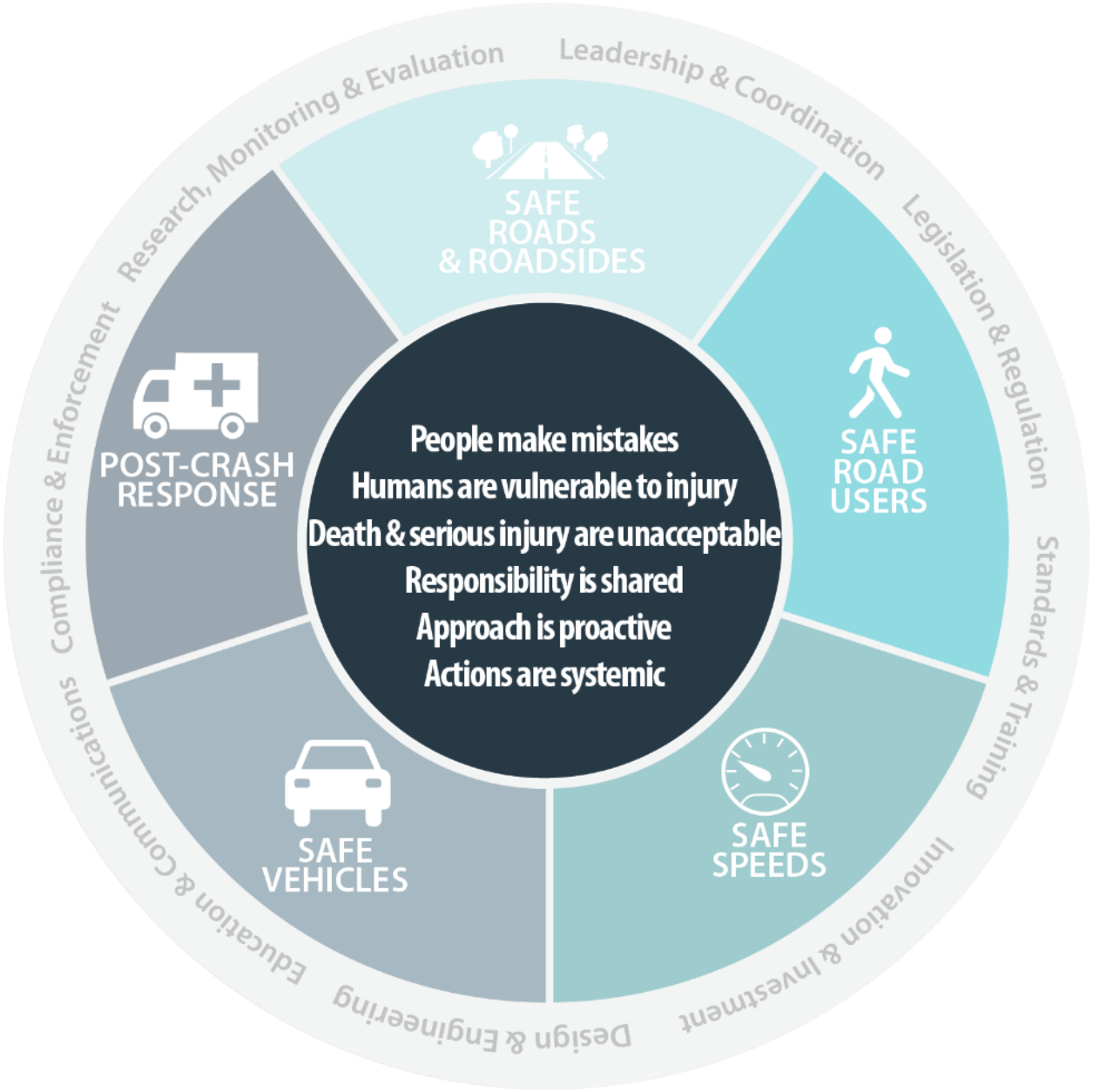
Defining the Safe System

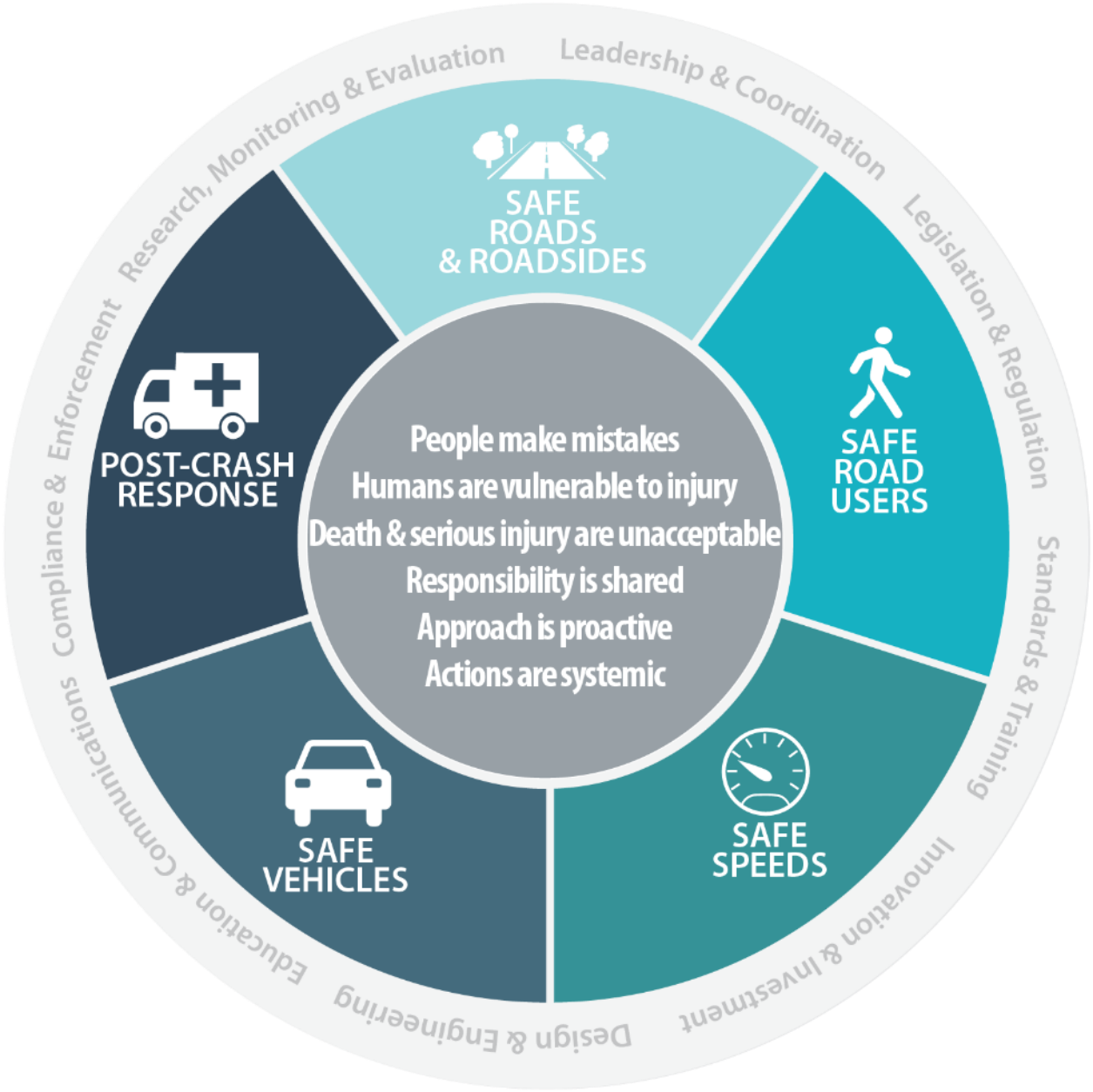
A **safe system** is a **holistic approach** to road safety, managed so the elements of the road transport system **combine and interact** to guide users to act safely and to prevent crashes – and **when crashes occur**, ensure that the **impact forces do not exceed the limits** that result in **serious injury or death**.

If one part of the system fails, the other components act to **prevent serious harm** occurring when a crash occurs by keeping the **transfer of kinetic energy** into the human below levels known to cause serious physical harm.

Zero Road Deaths and Serious Injuries

Leading a Paradigm Shift to a Safe System


Leadership & Coordination
Legislation & Regulation
Standards & Training
Innovation & Investment
Design & Engineering
Education & Communications
Compliance & Enforcement
Research, Monitoring & Evaluation
SAFE ROADS & ROADSIDES
SAFE ROAD USERS
SAFE SPEEDS
SAFE VEHICLES
POST-CRASH RESPONSE
People make mistakes
Humans are vulnerable to injury
Death & serious injury are unacceptable
Responsibility is shared
Approach is proactive
Actions are systemic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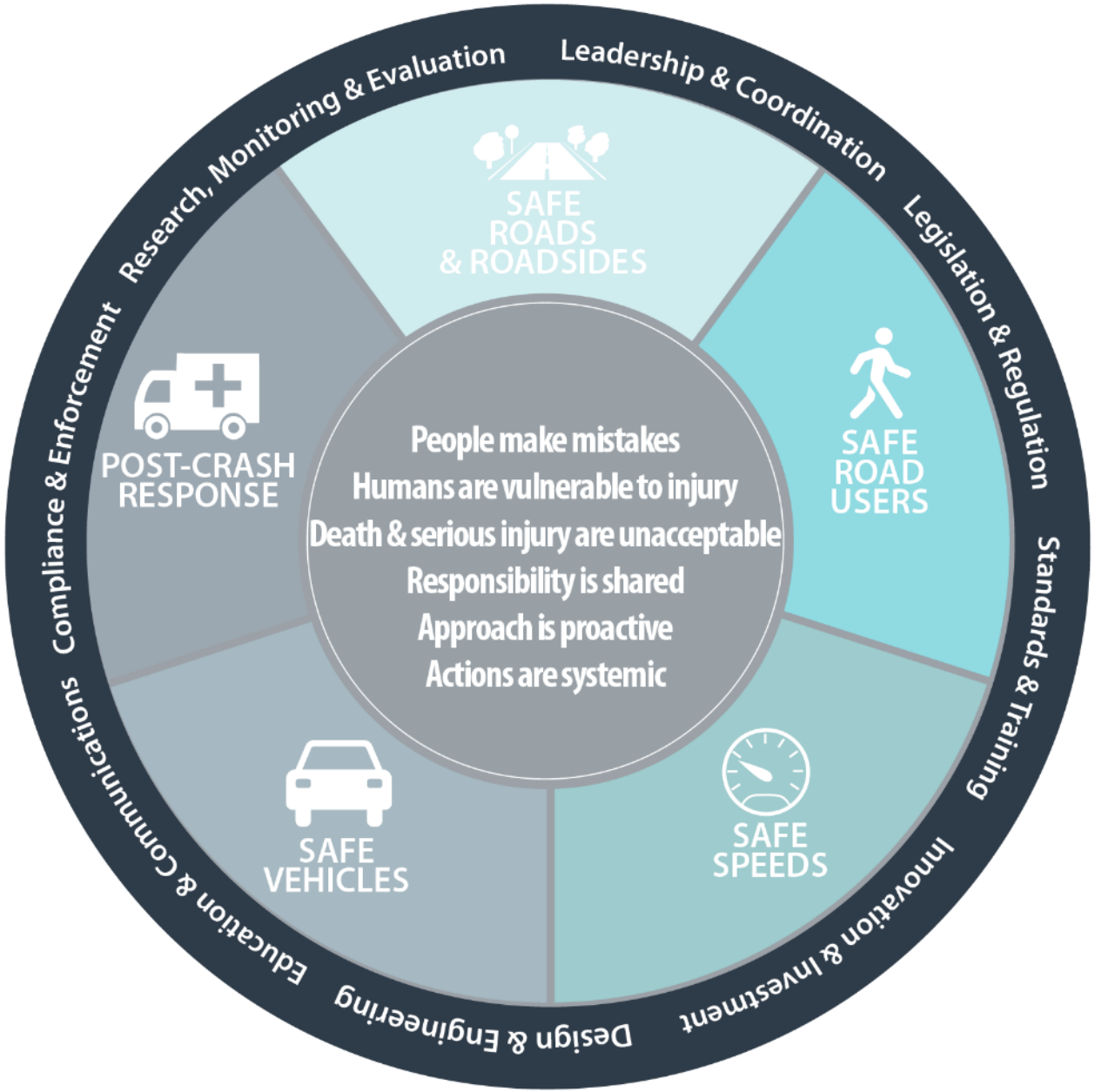
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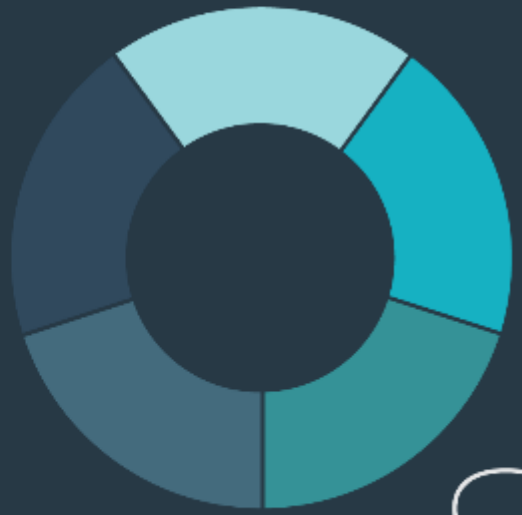
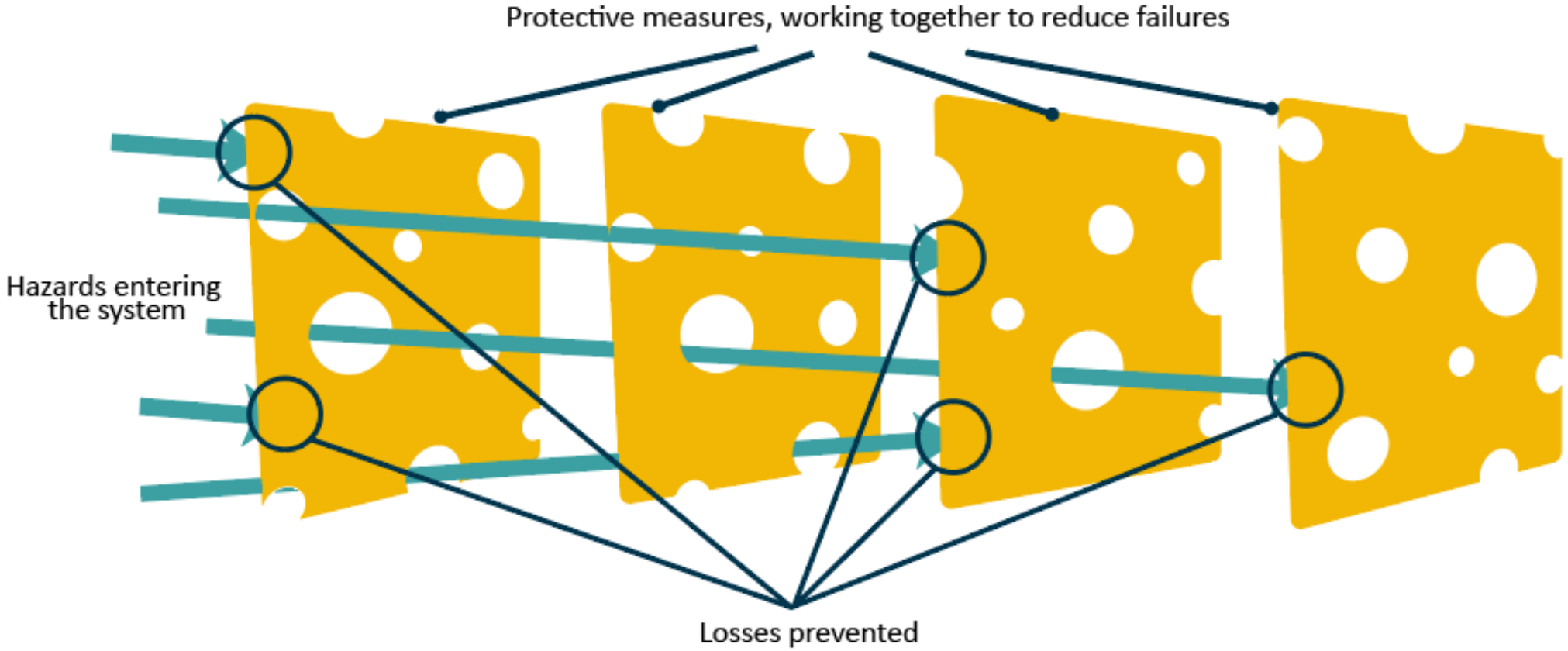


SAFE SYSTEM

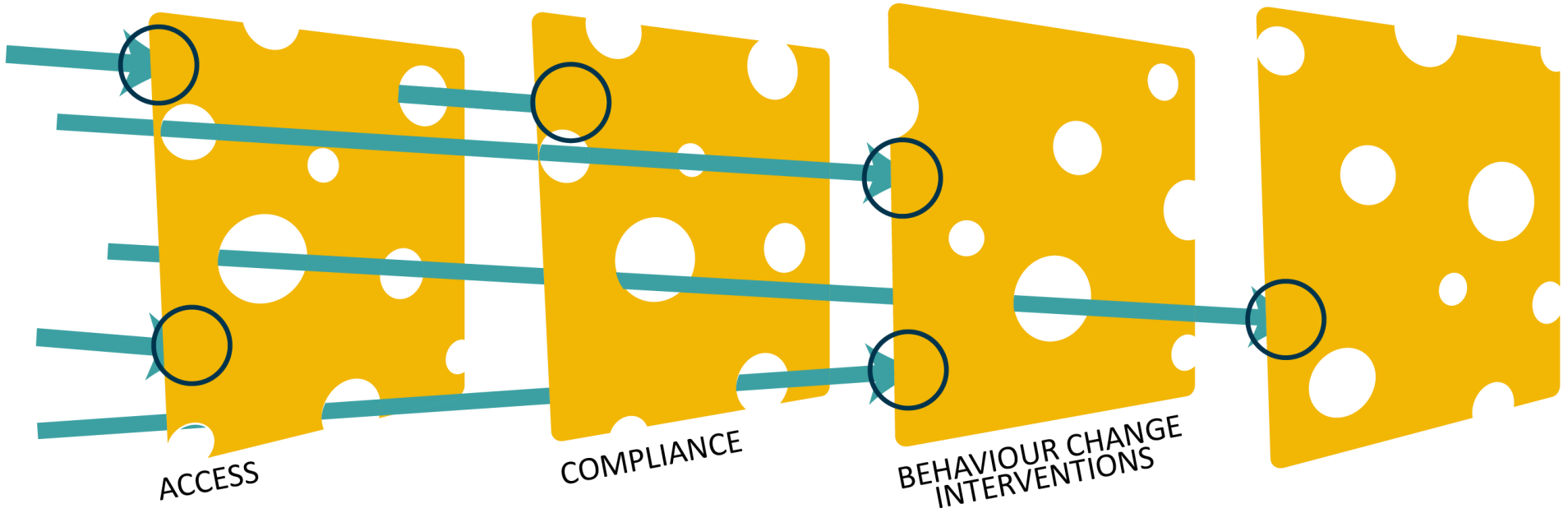
Managing Energy

Layers of Protection



An Approach to Safe Road Use

"The Contribution of Latent Human Failures to the Breakdown of Complex Systems“
Reason, James (1990)

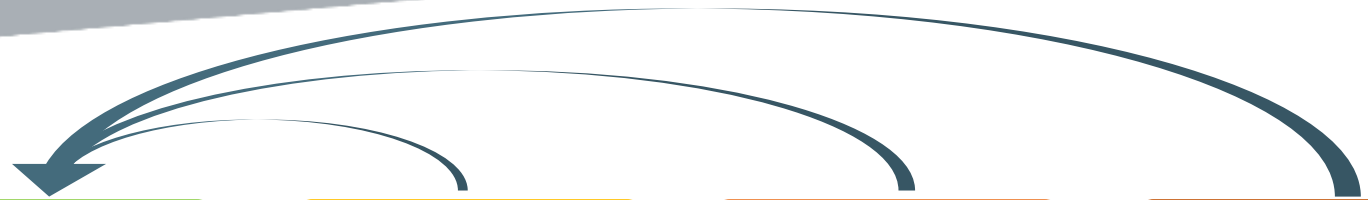


Licensing
Testing
Training

Seatbelts
Impairment
Distraction

Go beyond education
Need rigorous design
Require robust evaluation

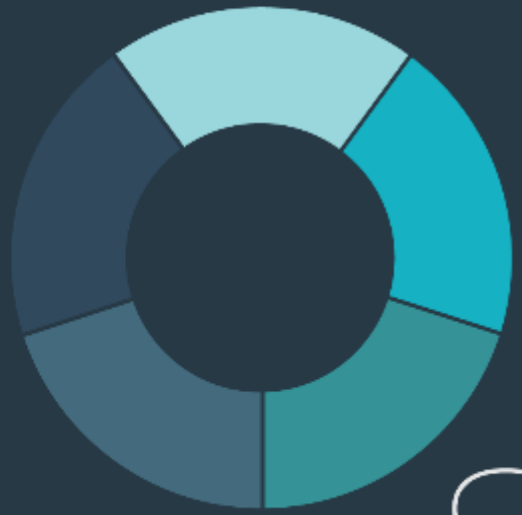
Crash Causation



Normal Road Use	Deviation from Safe Driving	Emerging Situation	Critical Situation	Crash Unavoidable	Crash
∞		c10 – 1 Sec		<1 Sec	
Conditions: Maintained Road Speed Limit Sober & Alert Wearing Seatbelt	Support for Safe Driving	Intervention in Driving	Immediate Correction	Preparation for Crash	
	Advisory ISA	Lane Keep Assist	Electronic Stability Control	Autonomous Emergency Braking	

Phases of Safety

Primary Safety		Secondary Safety		Tertiary Safety	
Reduce Crash Forces	Crash	Manage Energy	Minimise Risk of Secondary Injury	Connect to Emergency Response	Capture Evidence for Learning
Electronic Stability Control Autonomous Emergency Braking Anti-lock Braking Systems		Crumple zones Passenger safety cell Air bags deploy Seatbelts, pretensioners & load limiters Active head restraints deploy Steering column collapses	Safety glass fractures rather than shatters Fuel shuts-off	eCall Rescue sheets for vehicle Automatic door unlocking	Event data recorders

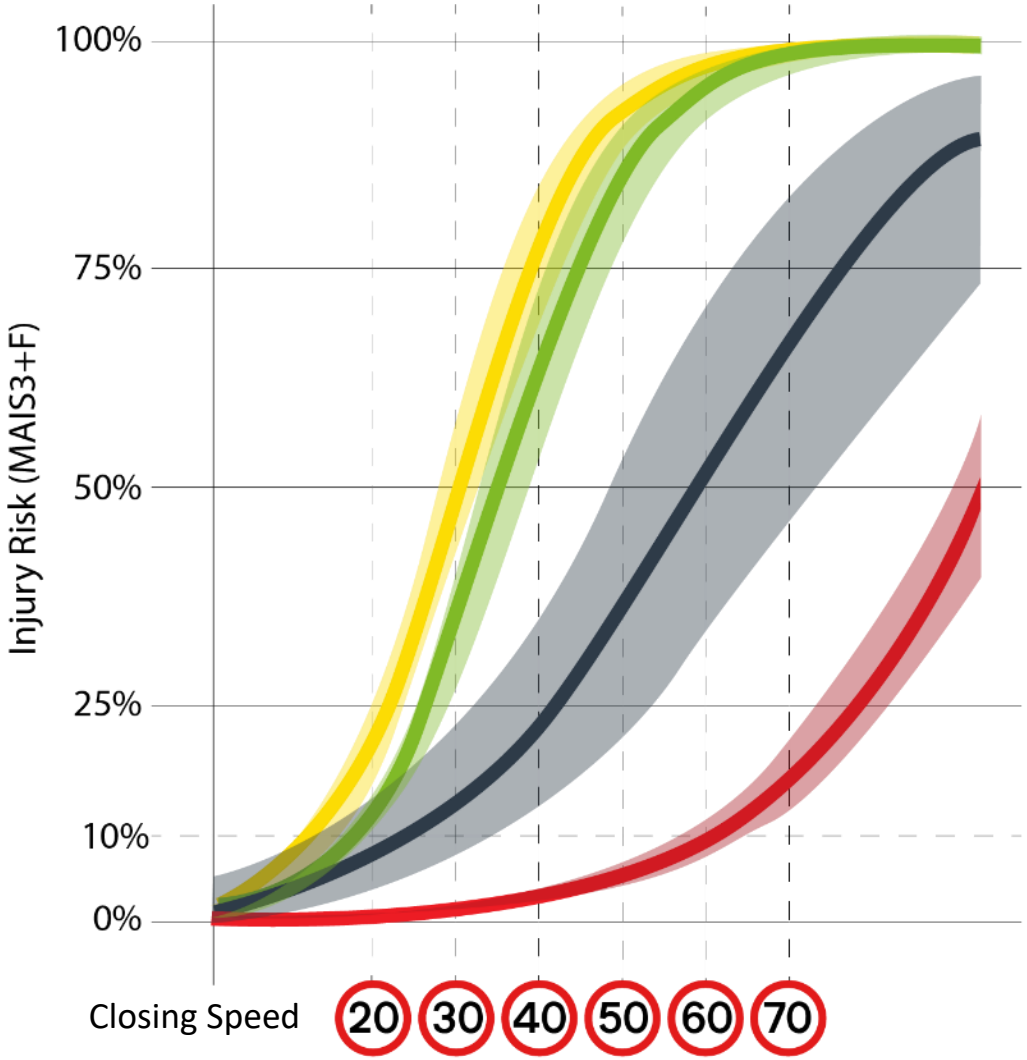


SAFE SYSTEM

Boundary Conditions

Rapid Increase in Injury Risk

- Pedestrians
- Cyclists
- Motorcyclists
- Drivers



https://tsr.international/TSR/article/view/23823/21217

Possible long-term maximum travel speeds related to the infrastructure, given best practice in vehicle design and 100% seat belt use. Source: Tingvall and Haworth (1999)

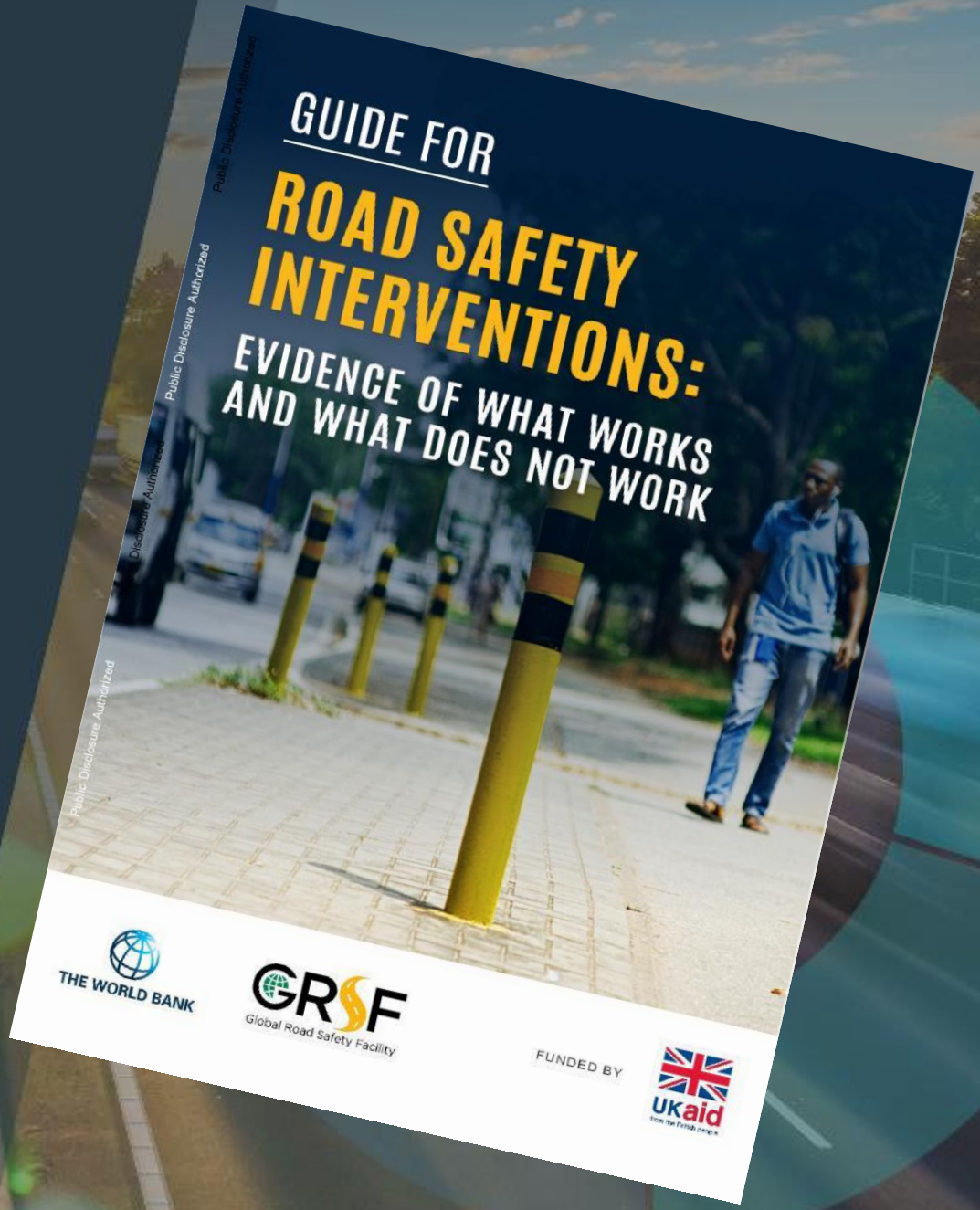
Type of infrastructure and traffic	possible travel speed (km/h)
Locations with possible conflicts between pedestrians and cars	30
Intersections with possible side impacts between cars	50
Roads with possible frontal impacts between cars	70
Roads with no possibility of a side impact or frontal impact (only impacts with the infrastructure)	100+

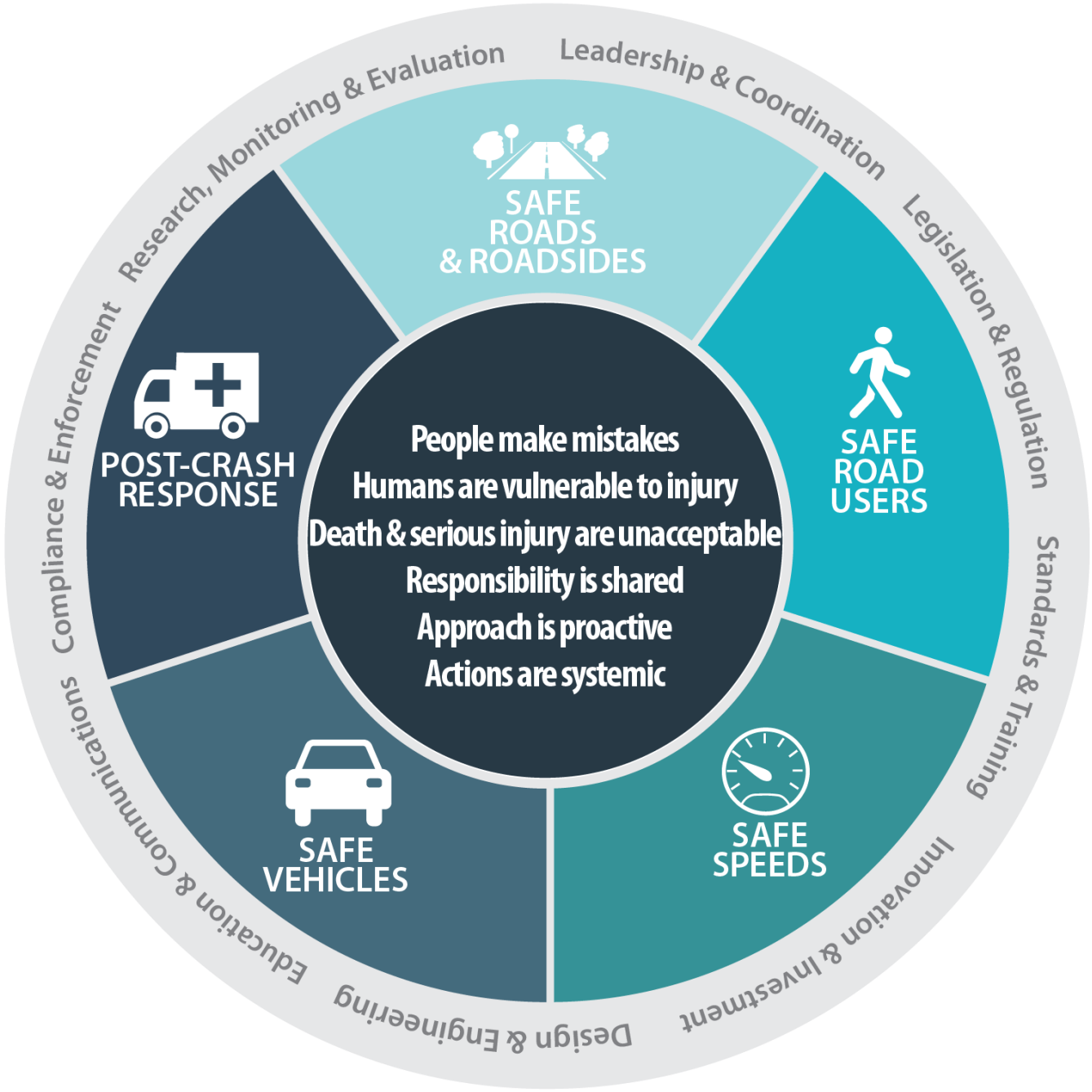
Given the limits of human frailty & fallibility – how should we change the system?

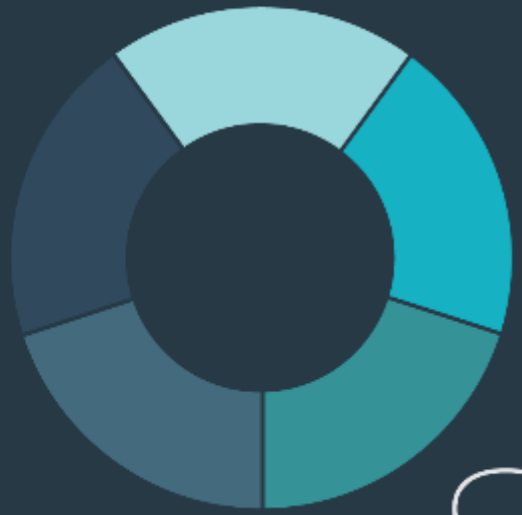
COFFE BREAK QUESTION

So, What Should We Do?

PART FOUR




Leadership & Coordination
Legislation & Regulation
Standards & Training
Innovation & Investment
Design & Engineering
Education & Communications
Compliance & Enforcement
Research, Monitoring & Evaluation
SAFE ROADS & ROADSIDES
SAFE ROAD USERS
SAFE SPEEDS
SAFE VEHICLES
POST-CRASH RESPONSE
People make mistakes
Humans are vulnerable to injury
Death & serious injury are unacceptable
Responsibility is shared
Approach is proactive
Actions are systemic



SAFE SYSTEM

Speed Management

Value of Managing Speed

1kph change in speed = 8% change in fatalities

1kph change in speed = 6% change in injury collisions

Elvik, 2019

Exponential model provides large benefits associates with small change in speed

Greatest benefit in reducing higher-severity casualties

Difficult to assess ‘serious’ injuries due to differing classifications

Value of Managing Speed

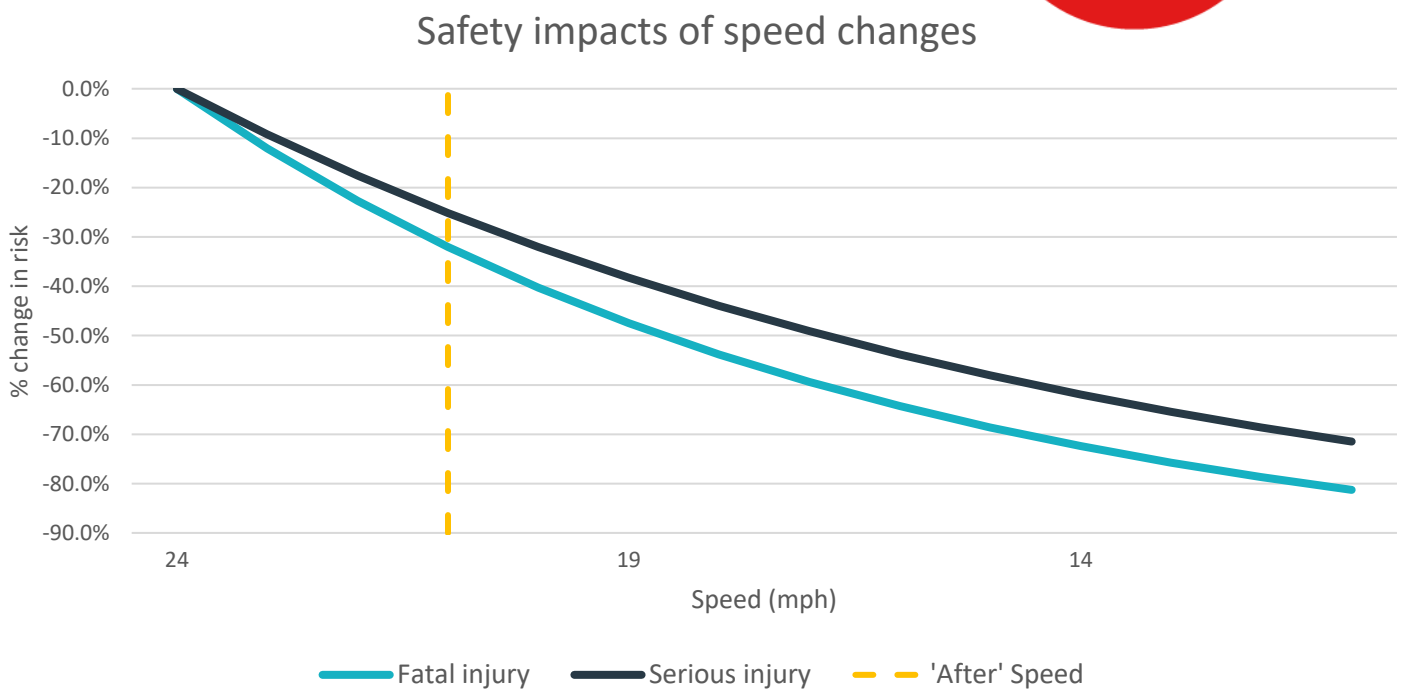
Data Entry

Enter initial mean speed	52	mph
Enter final mean speed	50	
Optional: *Enter number of fatalities before change*	113	
Optional: *Enter number of serious injuries before change*	690	

Results*

Change in fatalities (%)	23% *reduction*
Change in serious injuries (%)	18% *reduction*
Optional: *Change in fatalities (no.)*	*25.7 lives saved*
Optional: *Change in serious injuries (no.)*	*121.2 less injured*

www.roadsafetyfacility.org/publications/speed-impact-tool



Single carriageways roads

Reduce mean speeds by 2mph (52 > 50)

Casualty savings based on Scotland data for 2022

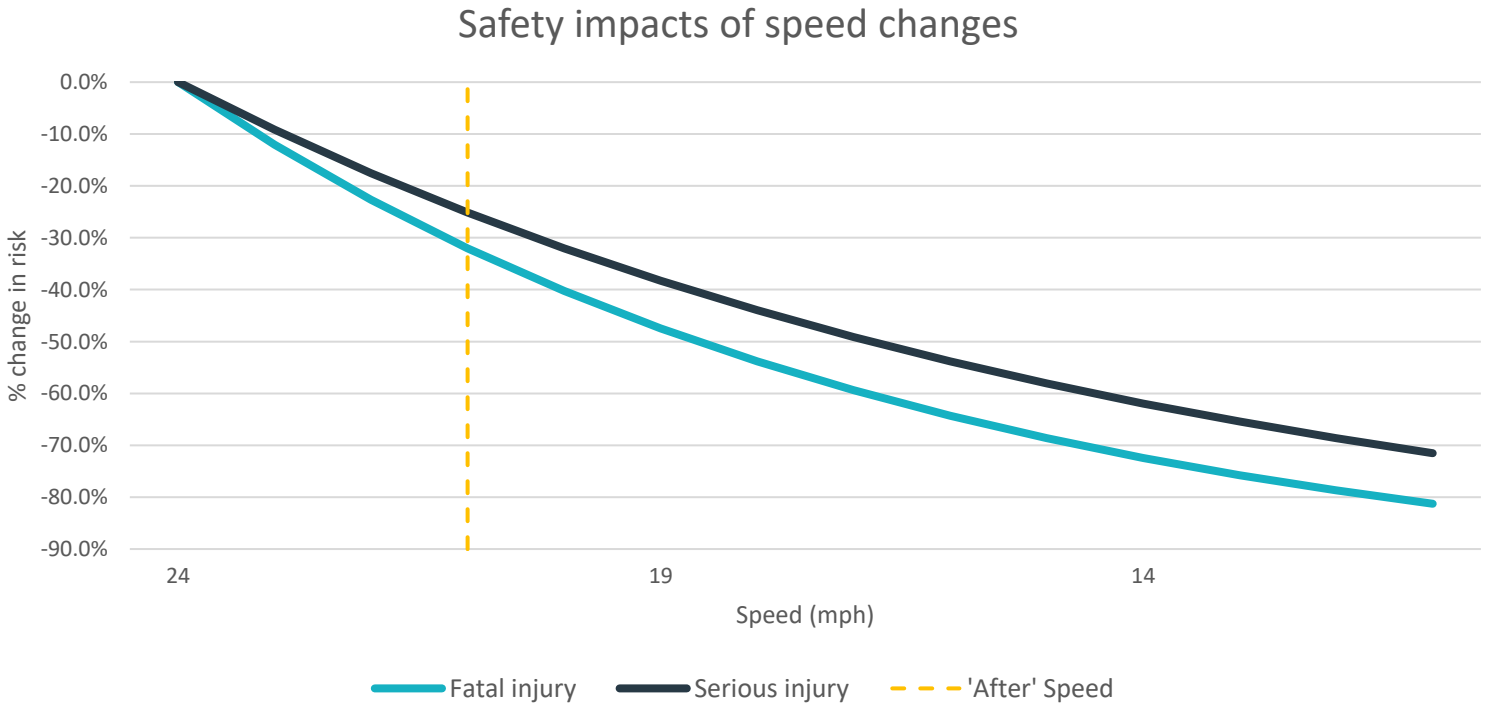
Value of Managing Speed

Data Entry

Enter initial mean speed	24	mph
Enter final mean speed	21	
Optional — *Enter number of fatalities before change*	31	
Optional — *Enter number of serious injuries before change*	662	

Results*

Change in fatalities (%)	32% *reduction*
Change in serious injuries (%)	25% *reduction*
Optional — *Change in fatalities (no.)*	*9.9 lives saved*
Optional — *Change in serious injuries (no.)*	*166.5 less injured*



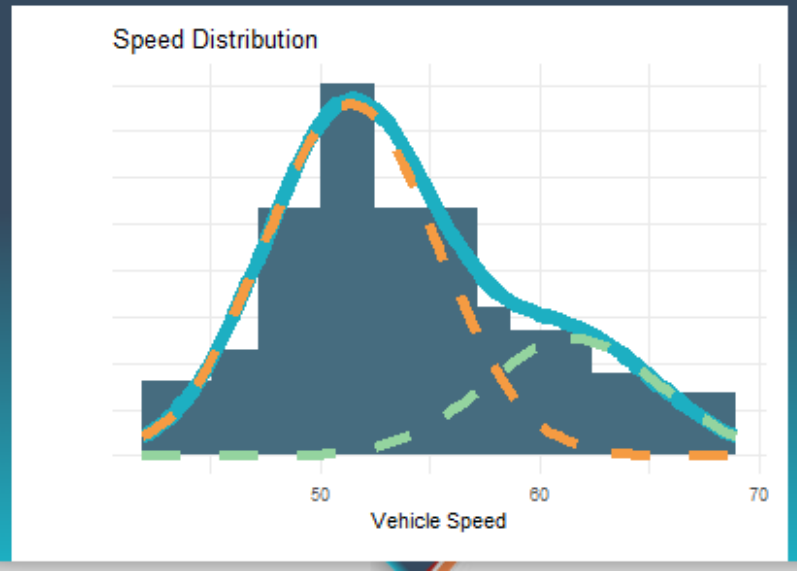
Casualties on 30mph roads in Scotland, 2022

Reduce speeds by 3mph (Wales results = 2.4mph)

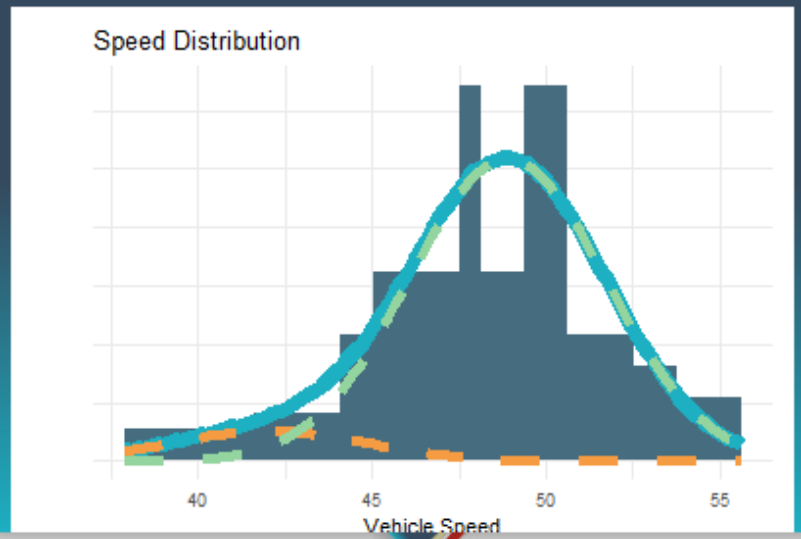
www.roadsafetyfacility.org/publications/speed-impact-tool

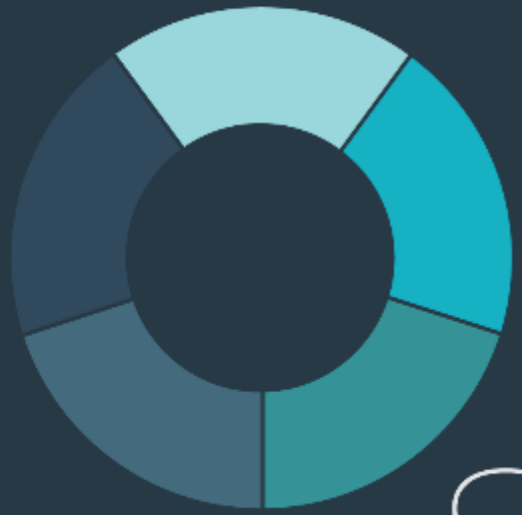
Safety Camera Analysis

ID18260003626258	
Street Name	Queensway
Speed Limit	50mph
Average Speed	53.7mph
Median Speed	52.8mph
Standard Deviation Speed	8.0mph
Average Travel Time	16:01
Median Travel Time	15:37
Standard Deviation Travel Time	08:27
Sample Size	1,055,498
Length	0.4km
Percentage Congested Traffic	75%
Average Congested Speed	51.4mph
Percentage Free Flowing Traffic	25%
Average Free Flowing Speed	61.5mph



ID18260003626258	
Street Name	Queensway
Speed Limit	50mph
Average Speed	48.4mph
Median Speed	48.6mph
Standard Deviation Speed	7.1mph
Average Travel Time	17:25
Median Travel Time	16:58
Standard Deviation Travel Time	03:32
Sample Size	1,829,052
Length	0.4km
Percentage Congested Traffic	9%
Average Congested Speed	42.1mph
Percentage Free Flowing Traffic	91%
Average Free Flowing Speed	48.9mph

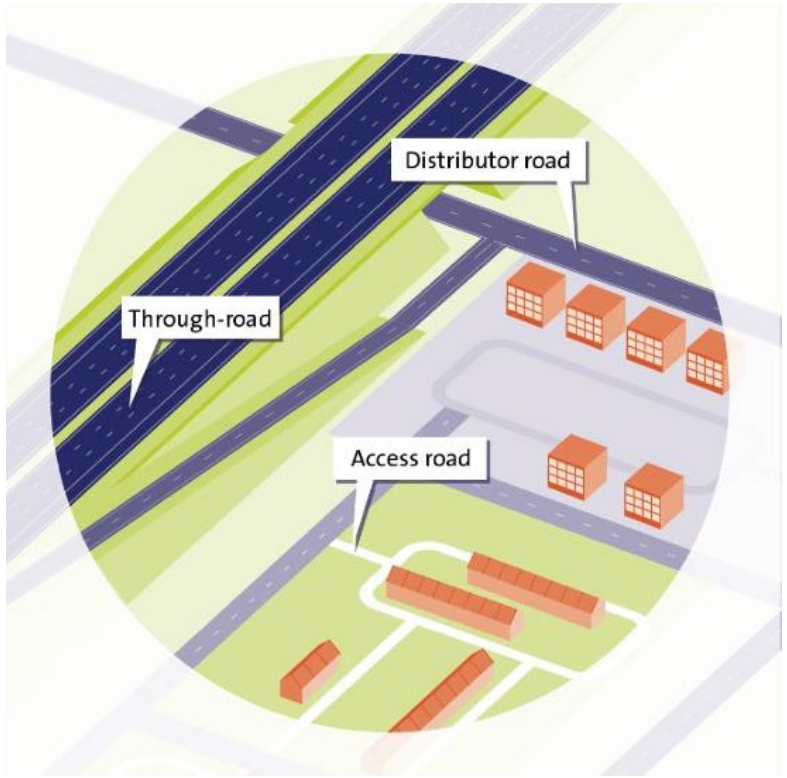




SAFE SYSTEM

Roads & Roadsides

Principle in Sustainable Safety



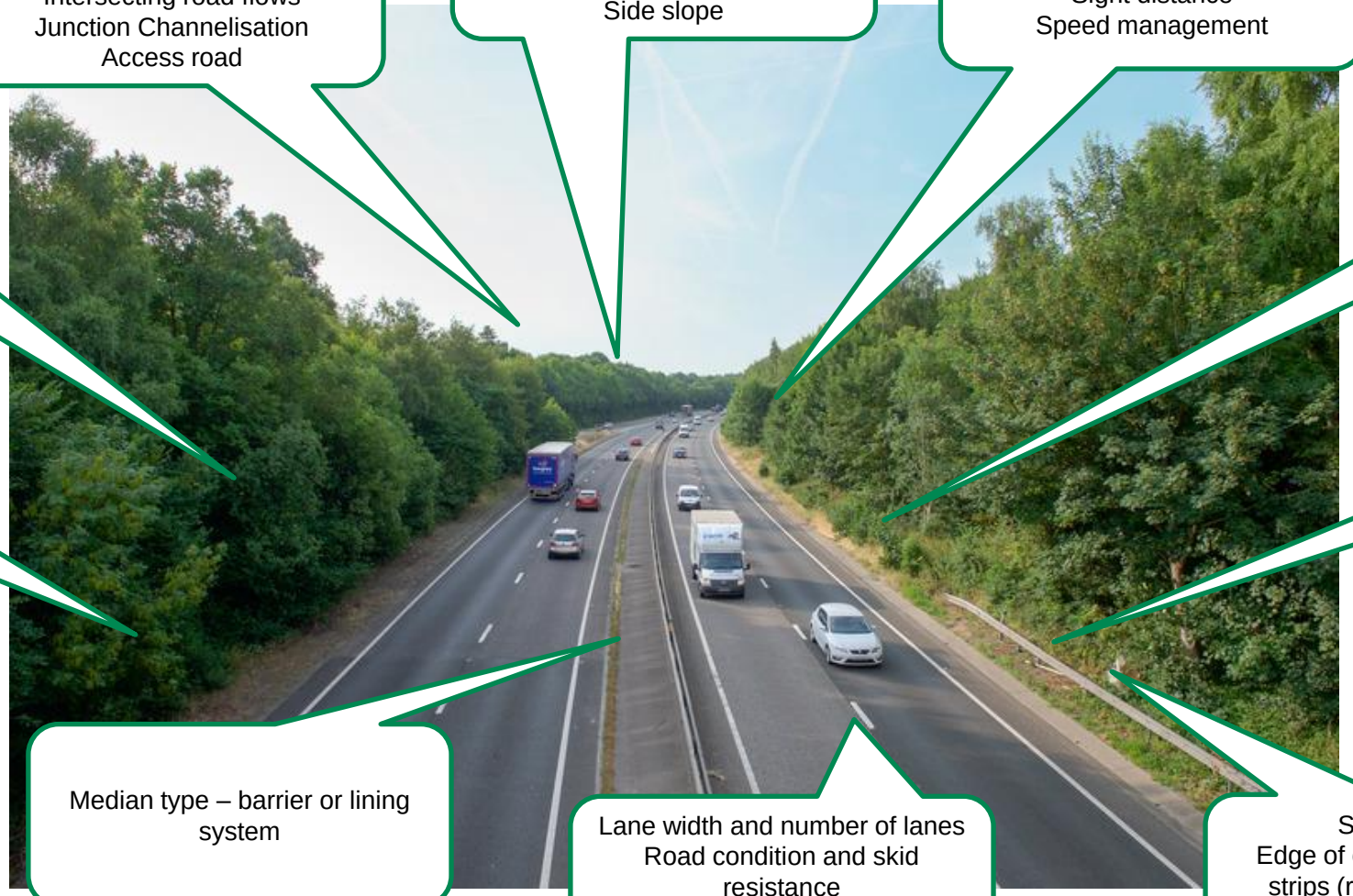
The three design principles are:

1. **Functionality of roads**: road sections and intersections have only one function: a traffic flow function or an exchange function.
2. **(Bio)mechanics**: limiting differences in speed, direction, mass and size and protection of the road user.
3. **Psychologics**: aligning the traffic environment with road user competencies.

The two organization principles are:

4. **Responsibility**: responsibilities are laid down unequivocally and are in line with the tasks of the parties involved.
5. **Learning and innovating**: traffic professionals continuously examine the causes of crashes and develop effective and preventive system innovations based on this research.

From https://swov.nl/sites/default/files/bestanden/downloads/FS%20Sustainable%20Safety.pdf



Junction type and quality
Signalisation
Intersecting road flows
Junction Channelisation
Access road

Paved shoulder
Raised rib edgeline
Roadside object
Roadside distance
Side slope

Curvature and curve quality
Grade
Sight distance
Speed management

Area type
Speeds: posted, 85th percentile and mean
Vehicle flows including % HGV and % motorcycle

Pedestrian flows
Pedestrian crossing type
Footway provision on each side
Crossing quality

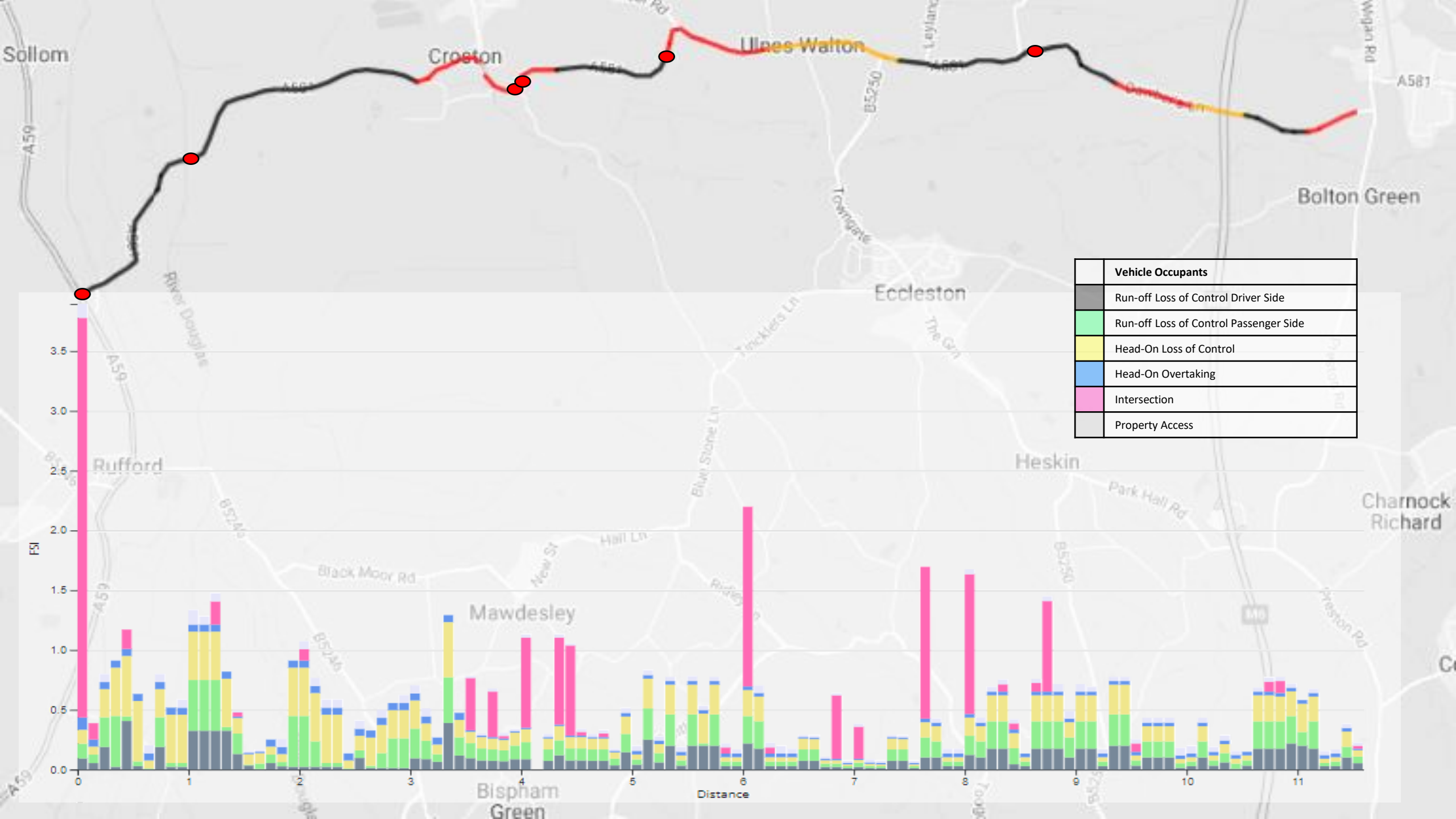
Cycle flows
Cycleway type

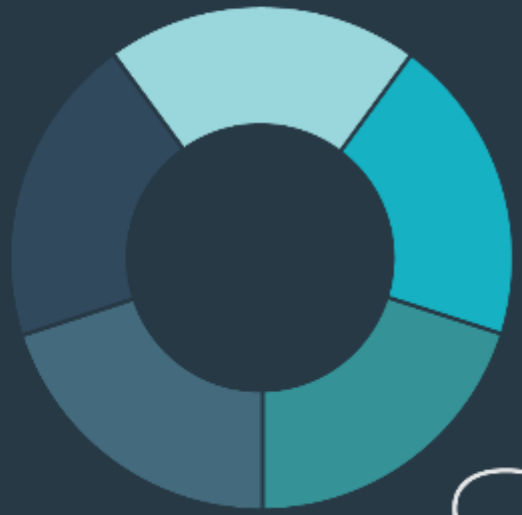
Paved shoulder
Raised rib edgeline
Roadside object
Roadside distance
Side slope

Median type – barrier or lining system

Lane width and number of lanes
Road condition and skid resistance
Delineation
Roadworks

Street lighting
Edge of carriageway rumble strips (raised rib edgeline)
Vehicle parking
Service road


Sollom
Croston
Ulnes Walton
Bolton Green
Eccleston
Rufford
Heskin
Mawdesley
Charnock Richard
Bispham Green
A59
A581
B5250
B5246
M6
Vehicle Occupants
Run-off Loss of Control Driver Side
Run-off Loss of Control Passenger Side
Head-On Loss of Control
Head-On Overtaking
Intersection
Property Access
FSI
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3
4
5
6
7
8
9
10
11
Distance



SAFE SYSTEM

Road Countermeasures

Longitudinal Barriers

Rigid

Image courtesy of National Highways

Semi-Rigid

Image 158140591 | Road Barrier © Anmbph

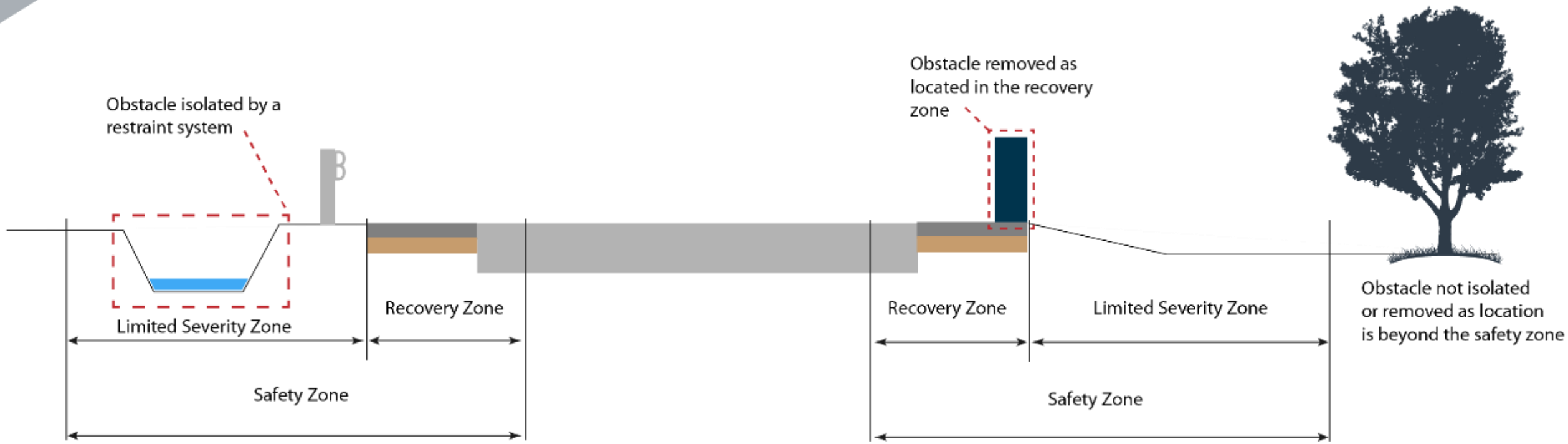
Flexible

Image courtesy of SwedWire

What About Motorcycles?

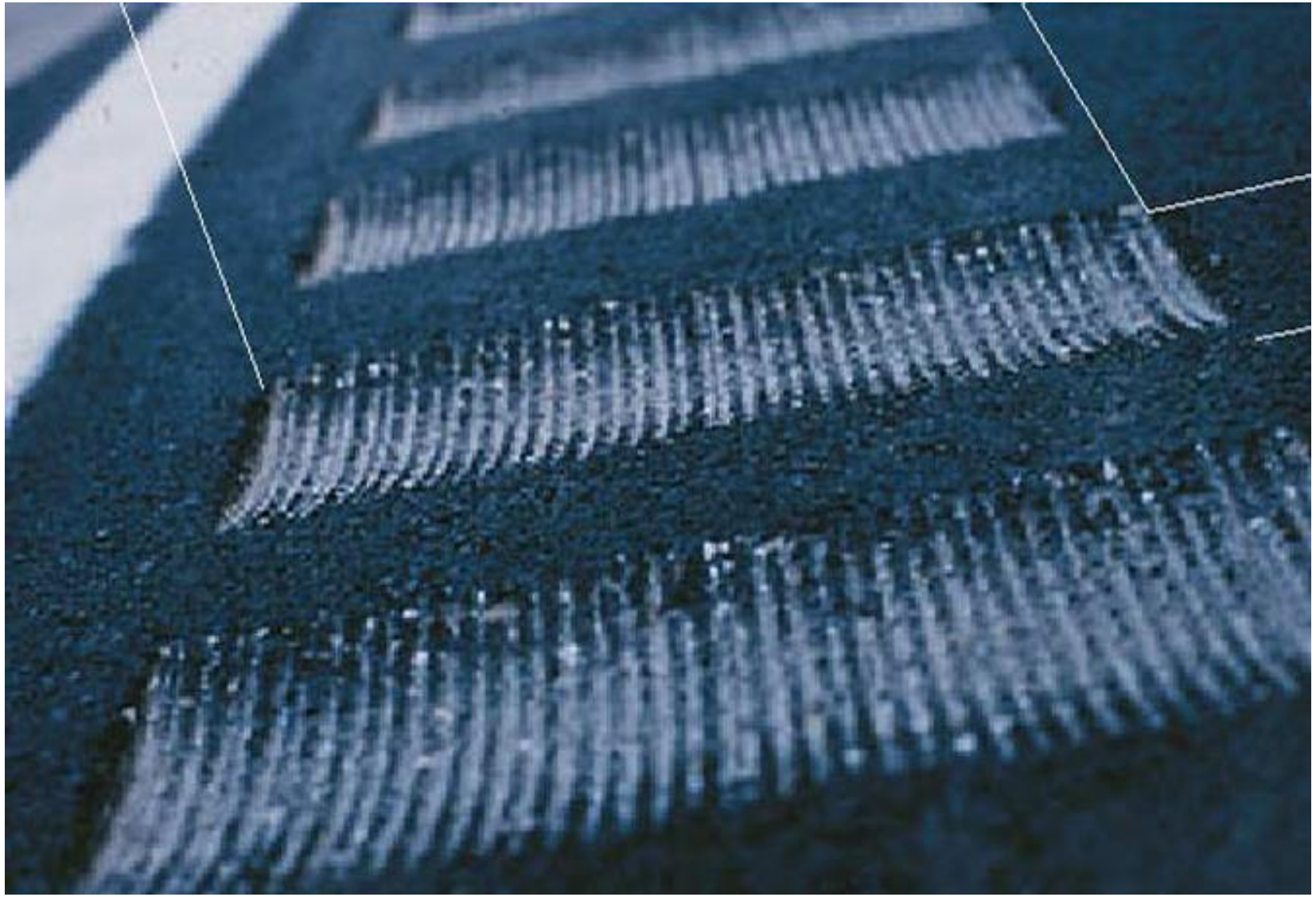
BikerShield™ underrun rail system by Safe Direction

Clearzone Concept



Passively Safe Infrastructure

Example of passively safe sign being hit by passenger car – courtesy of CEDR guide on forgiving roadsides

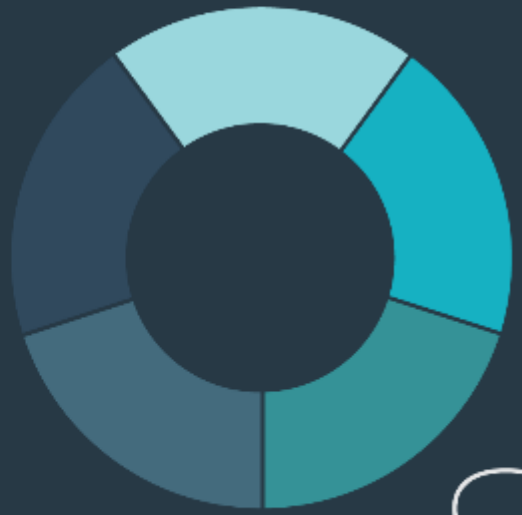


Tactile Warnings

Crash reduction can range from 13-13.2% for all accidents and 18-19.6% for injury accidents (Patel, 2007)

Video courtesy of Google M

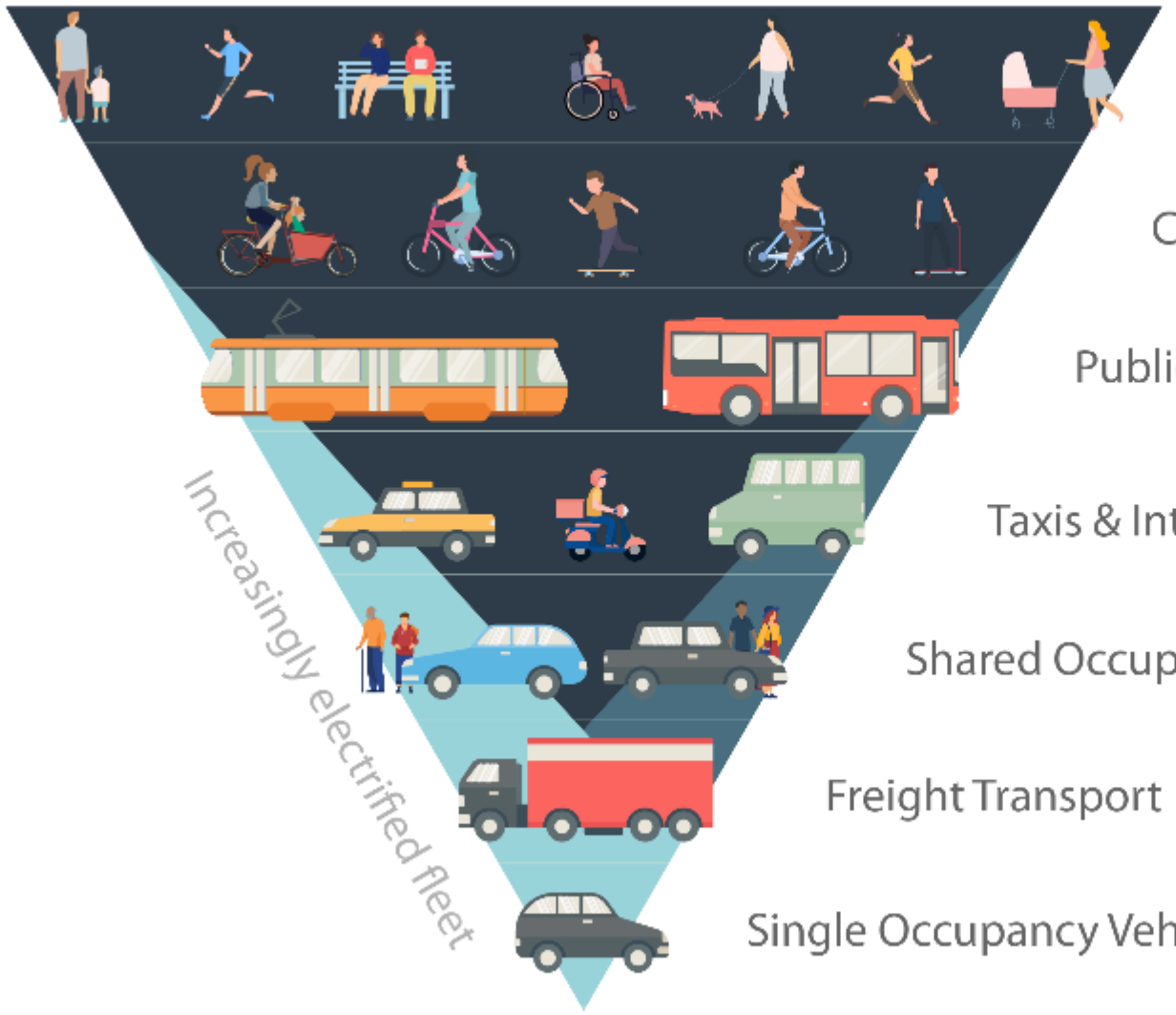
Image courtesy of Google Maps, 2024



SAFE SYSTEM

Managing Urban Roads

A Combined Hierarchy for Safe, Sustainable, Low Carbon Transport



Walking & Running

Cycling & Wheeling

Public Transport

Taxis & Intermediate Transport

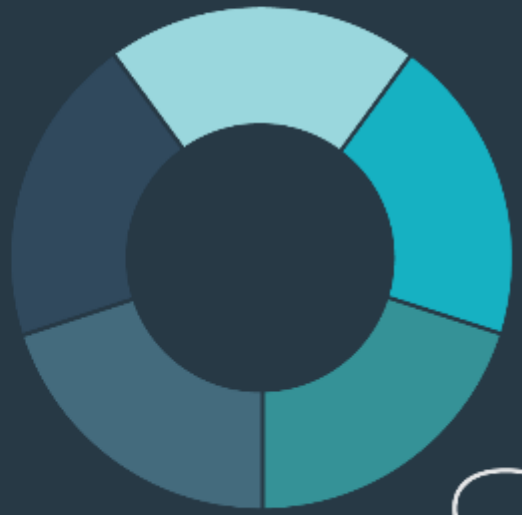
Shared Occupancy Vehicles

Freight Transport

Single Occupancy Vehicles

Image courtesy of Living Streets

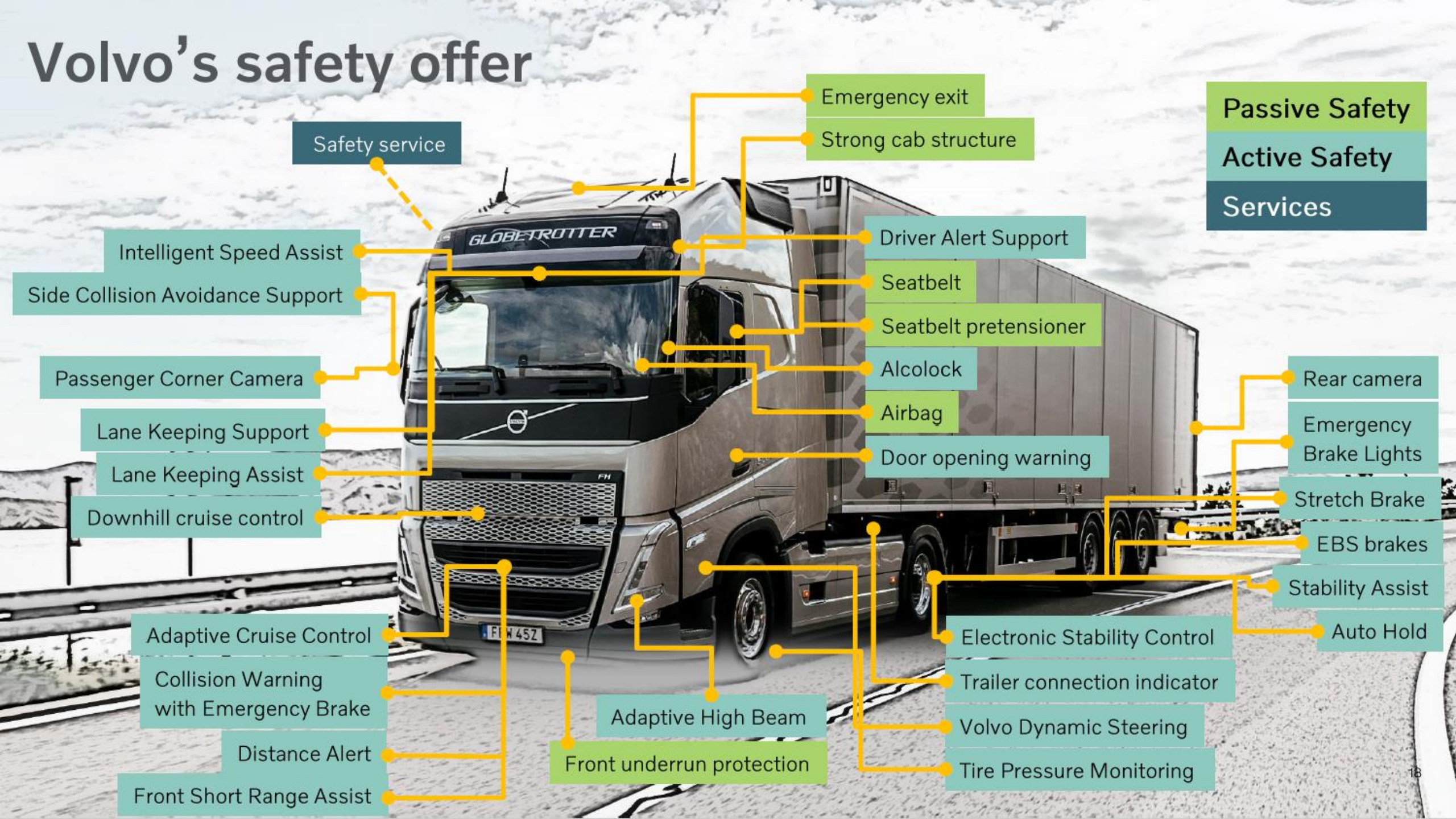
By Jack Fifield - https://www.flickr.com/photos/jackfifield/50579500182/, CC BY 2.0



SAFE SYSTEM

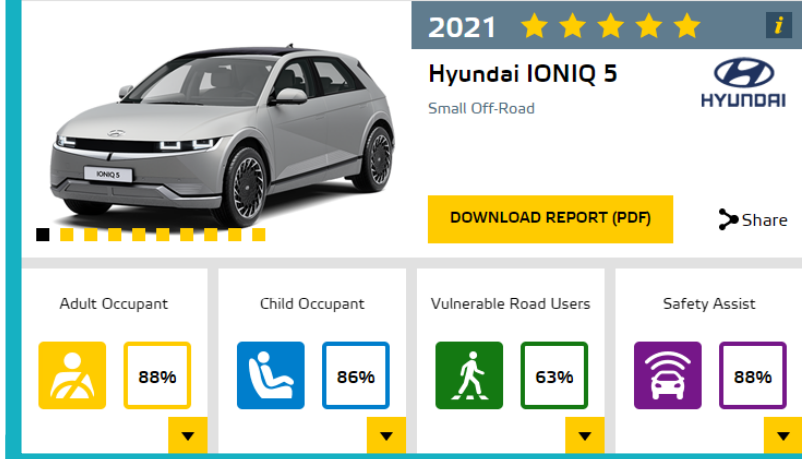
Safe Vehicle

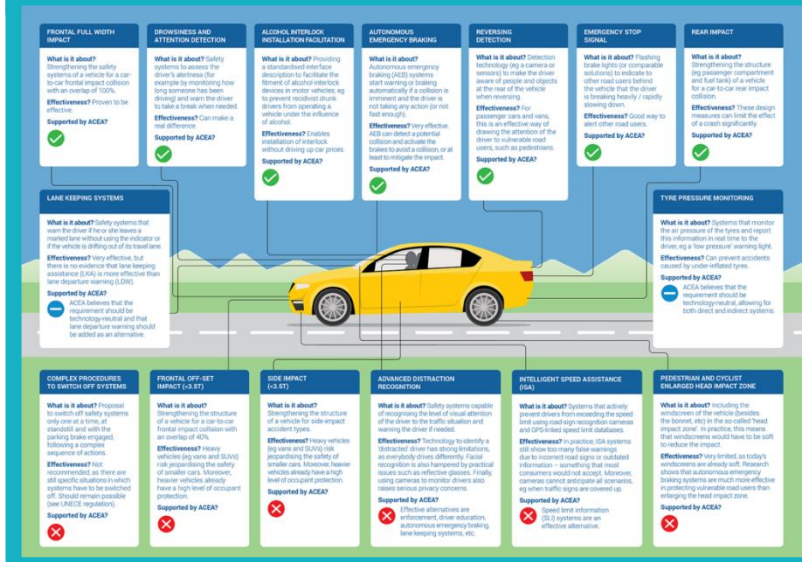
Volvo's safety offer

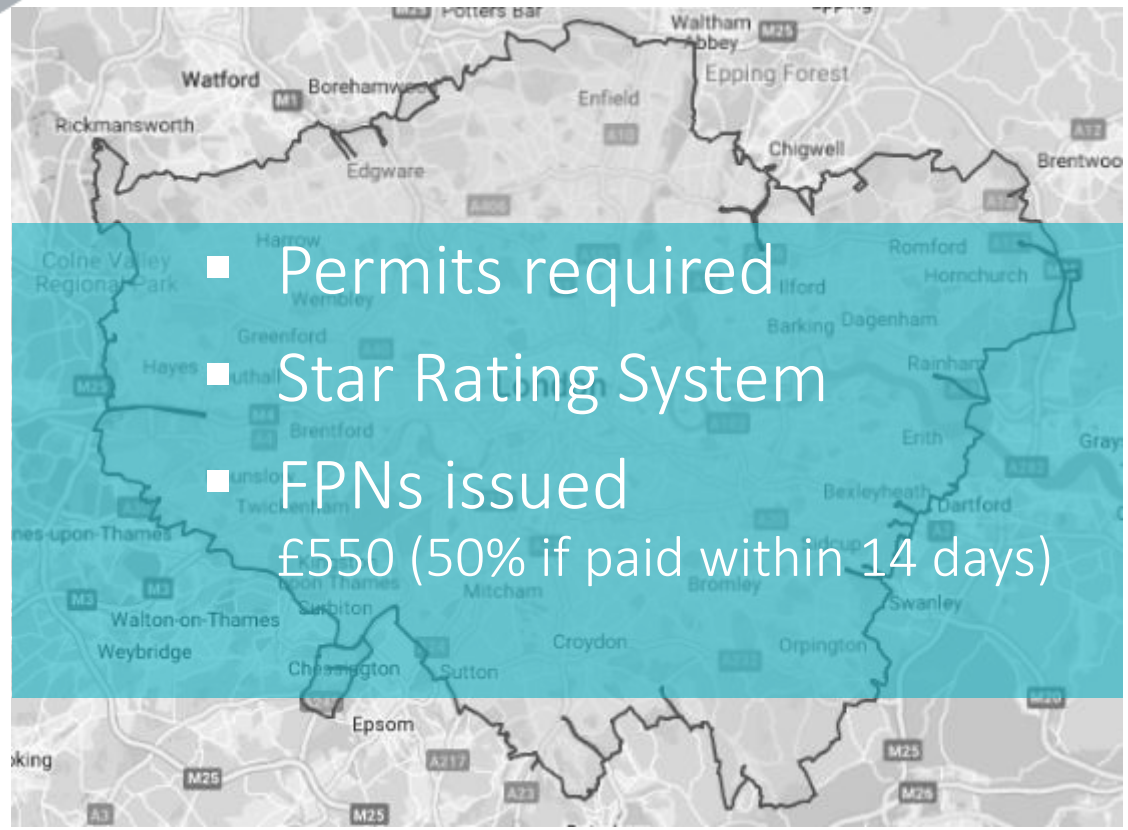


Policy Responses

- Consumer information (EuroNCAP)
- Improved vehicle safety regulations (GSR, PSR)
- Vehicle purchasing / staff use of vehicles
- Contracts (PSV, Refuse, School Transport, Freight)
  - ISA
  - Direct Vision
- Advice on procurement practice (technologies, standards, reporting)
- Standards schemes (ISO39001, Earned Recognition, FIA Road Safety Index, FORS)
- Promotion schemes (DFBB)

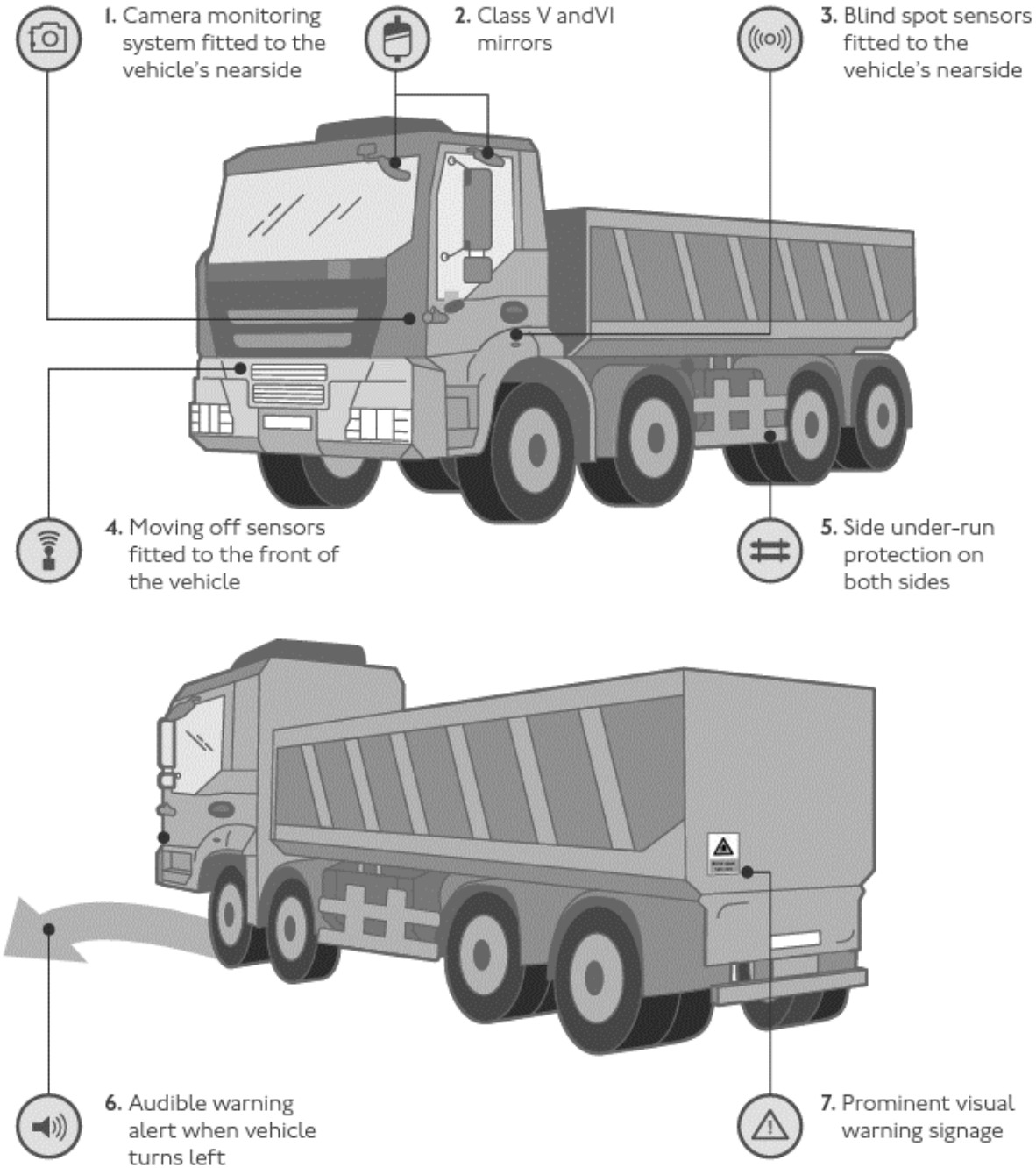


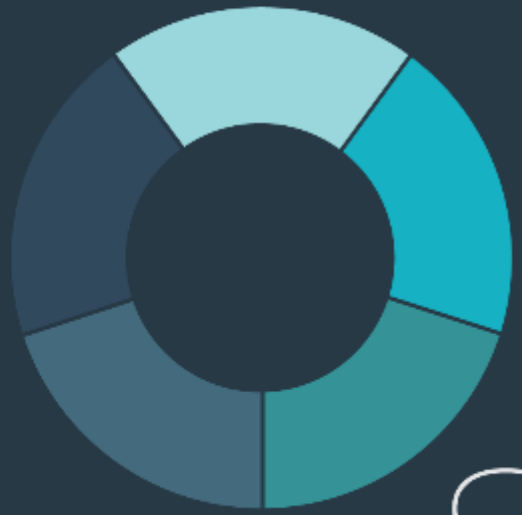




- Permits required
- Star Rating System
- FPNs issued
  £550 (50% if paid within 14 days)

HGV Safety Standard Permit Scheme





SAFE SYSTEM

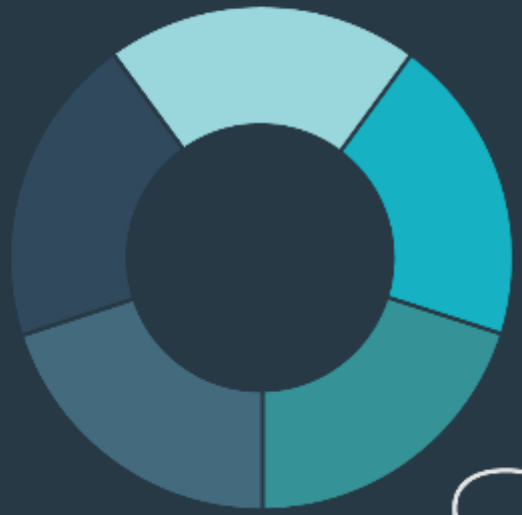
Safe Road Users

The role of the road user

INTERVENTION	DESCRIPTION	POTENTIAL EFFECTIVENESS
DRIVER LICENSING SYSTEMS THAT INCLUDE EXTENSIVE ON-ROAD SUPERVISED PRACTICE	Structured licensing that involves extensive supervised on-road training, and a robust examination of driver ability	EFFECTIVE
GRADUATED LICENSING SYSTEMS	Systems for novice drivers that limit the situations in which they can drive (that is, by limiting passengers; zero alcohol tolerance; restricting vehicles that can be driven)	EFFECTIVE
LICENSE THROUGH APPLICATION OR PAYMENT [25]	Systems for licensing that do not require extensive on-road training and strict testing, but rather are obtained through application (including through illegal payment)	NOT EFFECTIVE
INCREASE AGE FOR DRIVING LICENSE ELIGIBILITY	Raising the minimum age of eligibility for new drivers	EFFECTIVE
HAZARD PERCEPTION TRAINING AND TESTING	Training novice drivers to better anticipate and perceive hazards as part of rigorous driver licensing regimes	EFFECTIVE
POST-LICENSE DRIVER AND RIDER EDUCATION AND TRAINING [26,27]	Post-license skills training for drivers or riders	NOT EFFECTIVE: SOME RESULT IN INCREASED RISK
SCHOOL-BASED EDUCATION AND TRAINING [28]	Training programs or education within the school system that teach driving skills to high-school students	NOT EFFECTIVE: SOME RESULT IN INCREASED RISK
PUBLIC EDUCATION AND CAMPAIGNS [29]	Comprehensive and on-going public education campaigns that are linked in content and timing with enforcement and penalty regimes	EFFECTIVE
ENFORCEMENT	Includes roadside enforcement of drink driving, speed enforcement (roadside or through automated cameras); seat belt and helmet wearing	EFFECTIVE
PENALTIES	Fines (best if unavoidable, and not subject to corruption) and demerit points (points-based licensing systems)	EFFECTIVE

Global Road Safety Facility, *Guide for road safety interventions: Evidence of what works and what does not work*, (2021)

ALCOHOL INTERLOCKS [30]	Alcohol interlocks test the breath of a driver for alcohol, and if present, prevent the vehicle from starting. Modern versions also require rolling repeat tests, and can distinguish human lips from a pump to minimize the risk of the system being circumvented.	EFFECTIVE
FATIGUE MONITORING [3]	Systems designed to monitor driving fatigue through in-vehicle systems that recognize signs of fatigue and provide direct warnings and interventions to prevent continued driving	EFFECTIVE
SPEED MONITORING [31]	Systems designed to monitor driving speed through in-vehicle systems and provide direct warnings and interventions to prevent continued speeding	EFFECTIVE
INCREASED SEAT BELT WEARING RATES	Measures to increase seat belt wearing rates	HIGHLY EFFECTIVE
INCREASED HELMET WEARING RATES	Wearing helmets while riding motorbikes or bicycles	HIGHLY EFFECTIVE



SAFE SYSTEM

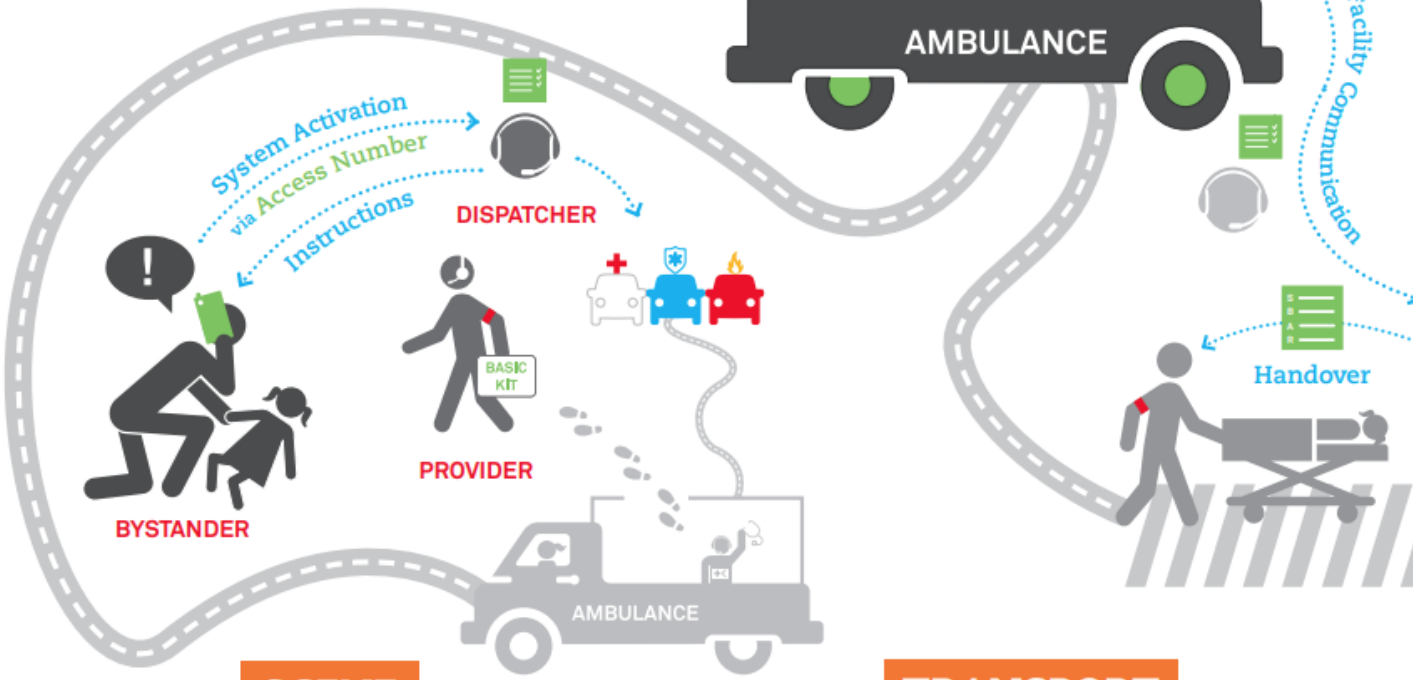
Post Crash Response

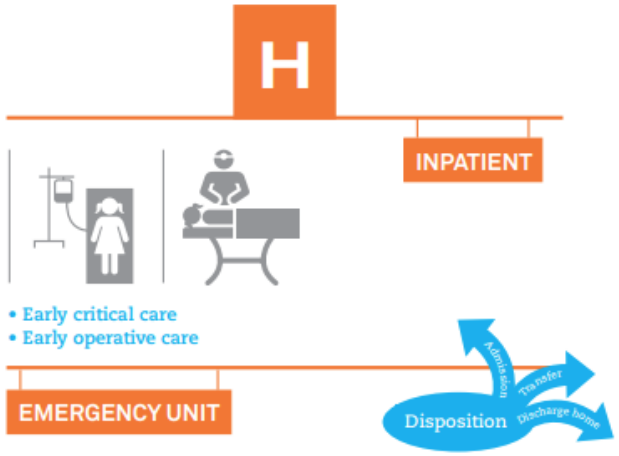
World Health Organization

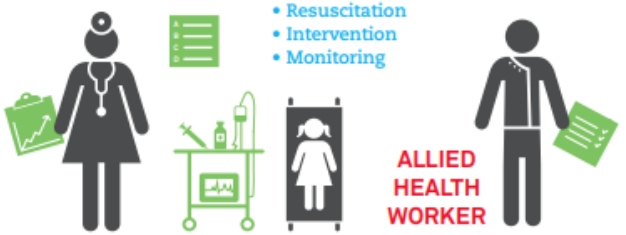
EMERGENCY CARE SYSTEM FRAMEWORK

All around the world, acutely ill and injured people seek care every day. Frontline providers manage children and adults with injuries and infections, heart attacks and strokes, asthma and acute complications of pregnancy. An integrated approach to early recognition and management saves lives. This visual summary illustrates the essential functions of a responsive emergency care system, and the key human resources, equipment, and information technologies needed to execute them. The reverse side adresses elements of governance and oversight.

HUMAN RESOURCES | FUNCTIONS | VEHICLES, EQUIPMENT, SUPPLIES, INFORMATION TECHNOLOGIES







SCENE

- BYSTANDER RESPONSE
- DISPATCH
- PROVIDER RESPONSE

TRANSPORT

- PATIENT TRANSPORT
- TRANSPORT CARE

FACILITY

- RECEPTION
- EMERGENCY UNIT CARE
- DISPOSITION
- EARLY INPATIENT CARE

www.who.int/emergencycare · emergencycare@who.int

Learning & Justice

Learning

- Forensic Collision Investigations
- Fatal Incident Studies
- STATS19 Data
- Trauma & Health Data
- Coroners Reports
- Academic Research

Justice

- Family Liaison Service
- Bereavement Support
- Rehabilitation Services
- Criminal Proceedings

Interim Targets to 2030

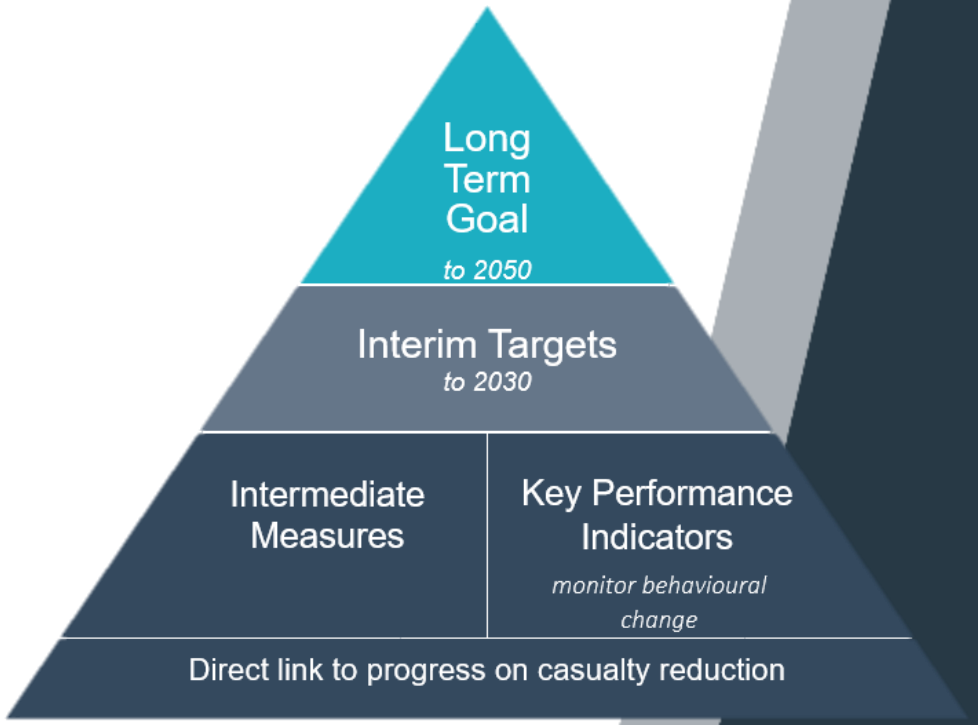
50% reduction in people killed
50% reduction in people seriously injured
60% reduction in children (aged <16) killed
60% reduction in children (aged <16) seriously injured

Intermediate Outcome Targets

40% reduction in pedestrians killed or seriously injured
20% reduction in cyclists killed or seriously injured
30% reduction in motorcyclists killed or seriously injured
20% reduction in road users aged 70 and over killed or seriously injured
70% reduction in road users aged between 17 to 25 killed or seriously injured
Percentage of motorists driving/riding within the posted speed limit
The casualty rate for the most deprived 10% SIMD areas is reduced to equal to the least deprived 10% SIMD areas.

Intermediate Measures

Casualty rate per 100 million vehicle kilometres for cyclists killed and seriously injured
Casualty rate per thousand population for pedestrians killed and seriously injured
Number of people killed and seriously injured in collisions where at least one driver/rider was driving for work, not commuting



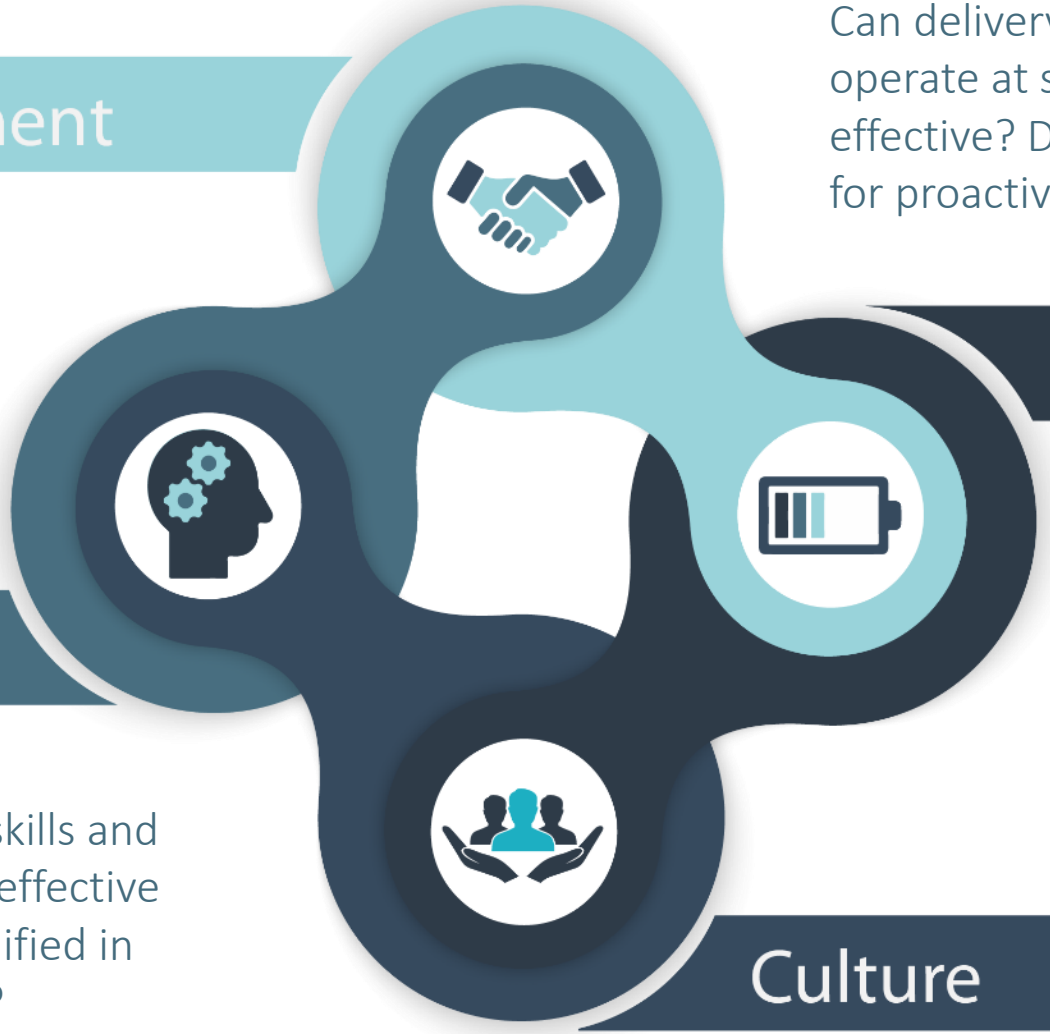
Key Performance Indicators				
No	**RSF2030 Outcome**	**KPI description**	**Organisation responsible for collection of data**	**Assessment frequency**
01	**Safe Speeds**	Percentage of drivers/riders driving WITHIN the speed limit	Transport Scotland	Quarterly
02	**Safe Road Use**	Percentage of drivers NOT distracted by a handheld mobile phone	Transport Scotland	Every three years
03	**Safe Road Use**	Percentage of vehicle occupants wearing a seatbelt or child restraint system correctly	Transport Scotland	Every three years
04	**Safe Road Use**	Percentage of drivers/riders driving WITHIN the legal limit for alcohol or specified drugs	Transport Scotland	Every six months
05	**Safe Road Use**	Overall casualty rate by SIMD decile (10 equally sized groups)	Transport Scotland	Annually
06	**Safe Roads and Roadsides**	Percentage of distance travelled by vehicles that are travelling on roads with a risk rating below a relevant threshold	Transport Scotland	Annually
07	**Safe Vehicles**	Percentage of new passenger cars, LGVs and HGVs with a 5-star EuroNCAP safety rating	Transport Scotland	Annually
08	**Post-Crash Response**	Time elapsed in minutes between the emergency call following a collision resulting in personal injury and the arrival at the of the emergency services.	Scottish Fire and Rescue Services	Every six months

The Implementation Gap

PART SIX

Commitment

Does Safe System have the requisite level of leadership, stakeholder ownership and resourcing to succeed?



Capacity

Can delivery organisations operate at sufficient scale to be effective? Does the system allow for proactivity in approach?

Capability

Do agencies have the skills and expertise required for effective delivery and is this codified in guidance and training?

Culture

Is there a Safe System culture, underpinned by agreed ambition, shared values and common language?

Commitment

Does Safe System have the requisite level of leadership, stakeholder ownership and resourcing to succeed?

- **Leadership** – national, local, policing, health, private sector
- **Coordination** – competition or collaboration, shared approaches
- **Policy Priority** – economy, justice, land-use planning, environment, net-zero
- **Investment** – appraisal, sufficient resources, route to procurement
- **Innovation** – public sector, private sector & academia working collaboratively, a clear research agenda.

Capacity

Can delivery organisations operate at sufficient scale to be effective? Does the system allow for proactivity in approach?

- **Local Authorities** – engineering teams, procurement, delivery
- **Police** – road policing expertise, enforcement capacity, collision investigation, quality STATS19 returns
- **Emergency Response, Trauma & Rehabilitation** – equipment, facilities, crews
- **Public Health/RSS** – campaigns, channels, hard to reach groups
- **Civil Society** – advocacy opportunity, policy & practice

Capability

Do agencies have the skills and expertise required for effective delivery and is this codified in guidance and training?

- **Research, data and analytics** – ability to drive insights
- **Local Authorities** – guidance, intelligent client, skills (planning, delivery, evaluation)
- **Supply Chain** – skills, coordination, guidance, incentives
- **Emergency response** – updated guidance on extrication, BLS/ALS

Culture

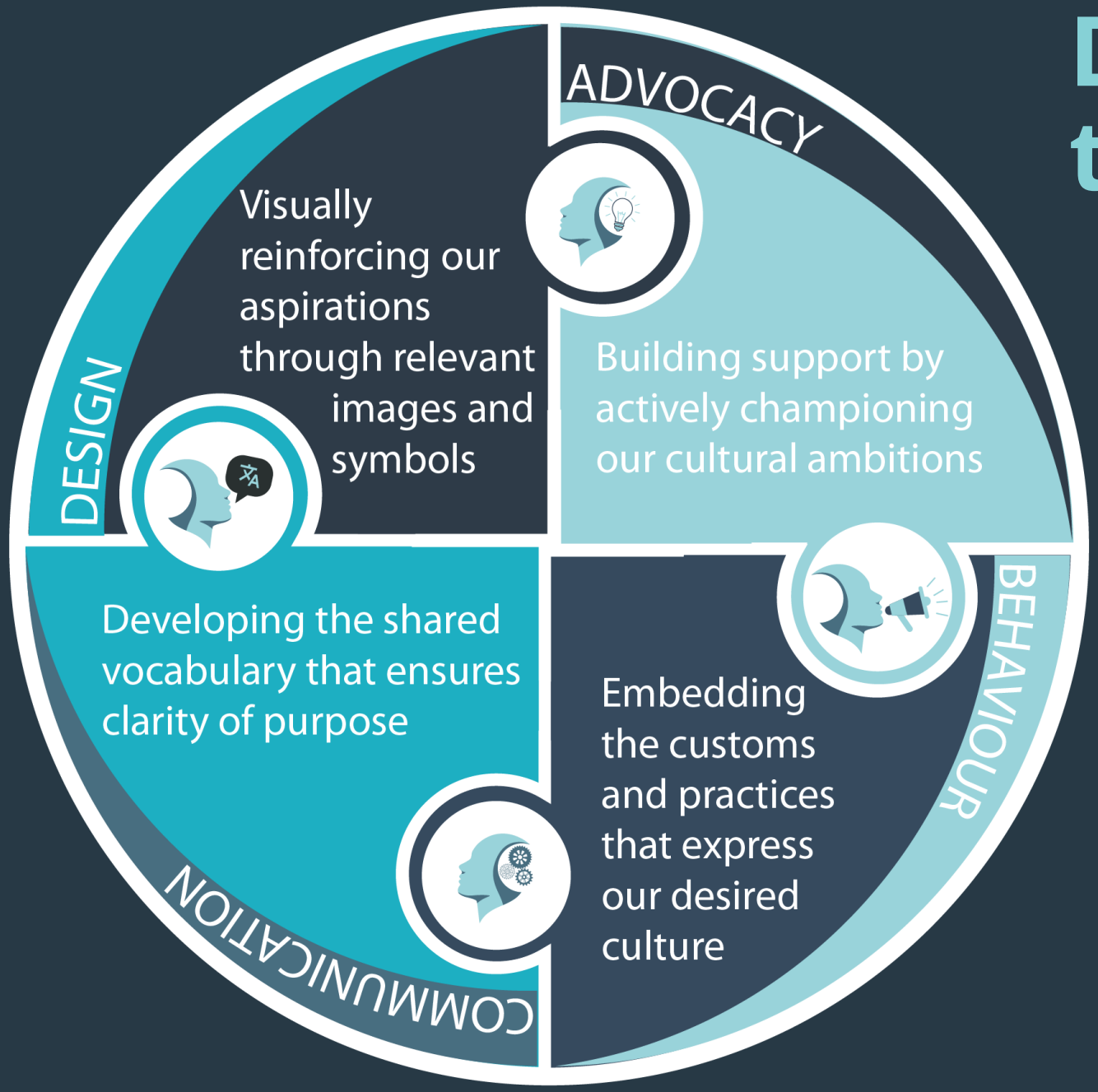
Is there a Safe System culture, underpinned by agreed ambition, shared values and common language?

- **Shared responsibility** – Appropriate roles across stakeholders, accountability for delivery
- **Language** – Common terminology, consistent understanding
- **Behaviour / Customs** – Practices that reinforce ambition
- **Symbols** – Clear communication – internal & external

https://journalofroadsafety.org/article/92784-creating-a-cultural-maturity-model-to-assess-safe-system-readiness-within-road-safety-organisations

Agilysis, 2022

Developing the Playbook



Agilysis, 2024

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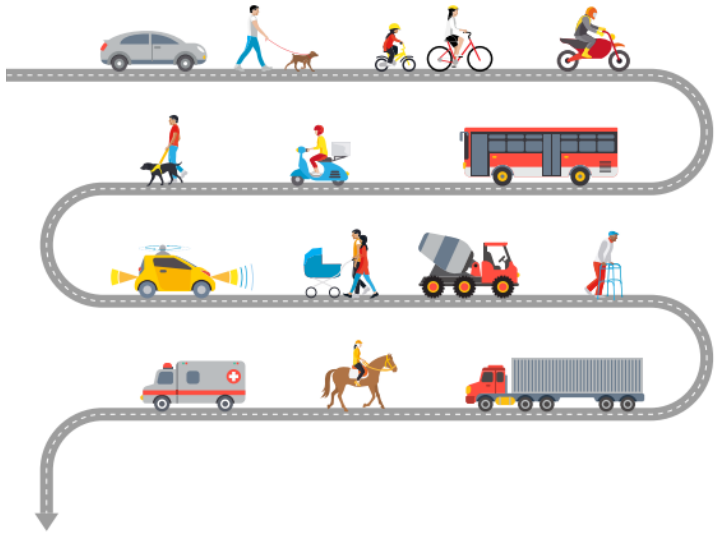
Road Safety Scotland Annual Seminar
EICC: 26 March 2024

TRANSPORT SCOTLAND
CÒMHDHAIL ALBA

Scotland's Road Safety Framework to 2030

Together, making Scotland's roads safer



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