



PASS+CO®

We make roadside safety.

J. Marten **Hiekmann**

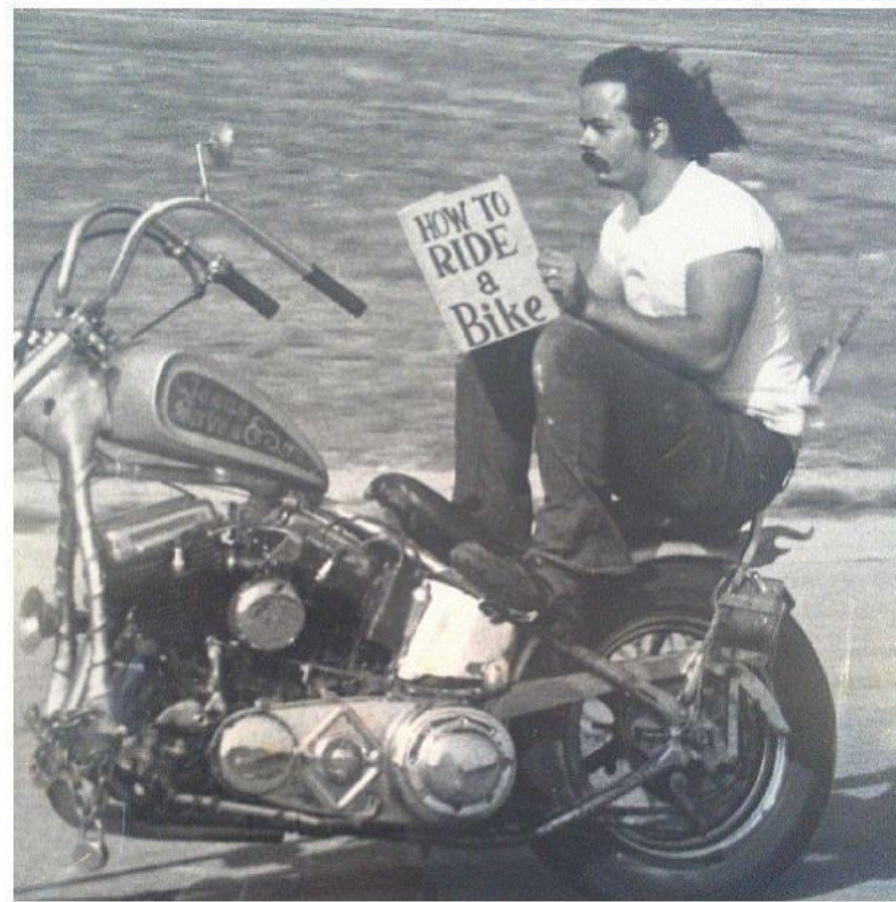


- **PROSA** family business manufacturing [®]
installing and selling steel roadside safety barriers **worldwide**
- Owning **12 international** independent limited companies
- Research and development of **road restraint systems (RRS)**
- Business in **110 countries**

Safety of vulnerable road users

„Can we make **roadsides safer** for **motorcyclists**?“

Motorcyclists



Motorcyclists



Motorcyclists



Roadside safety barriers



Roadside safety barriers



Roadside safety barriers



The problem

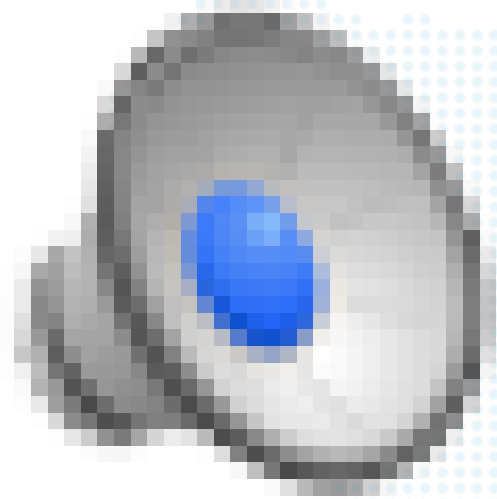
- Sliding under / against or into barriers
- PTW **more vulnerable**, less active protection
- Hitting **against obstacles** (e.g. post or tree)
- Less **visible**
- High **speed**
- Bad **road conditions**/curvy roads
- Depeding on **weather condition**



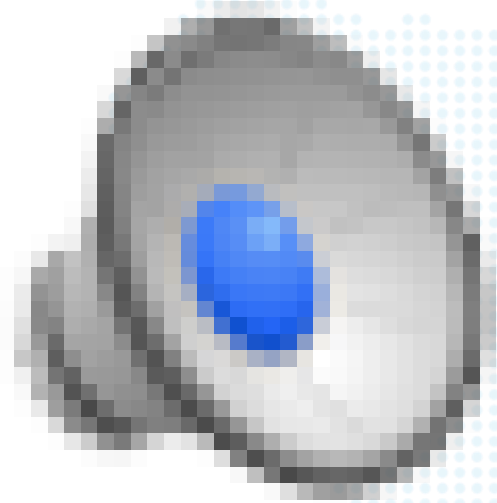
The problem: sliding (in curves)



The problem: sliding



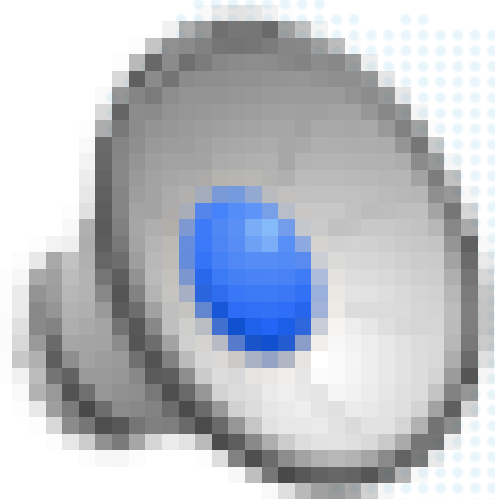
The problem: sliding



The problem: sliding



The problem: speed, weather, sliding



The problem: Weather, sliding





The problem



European reaction



**MORE ROADSIDE
SAFETY FOR
MOTORCYCLISTS**



CEN/TS EN1317-8:2011

- **Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers**

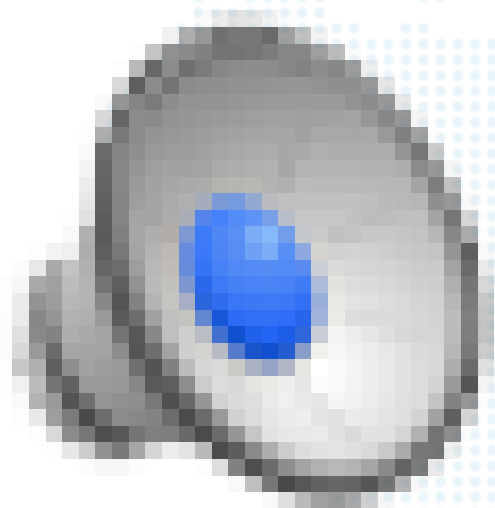
CEN/TS EN1317-8:2011

- **Motorcycle road restraint systems which reduce the impact severity of motorcyclist collisions with safety barriers**
- **Highly based on Spanish Standard UNE 135900**

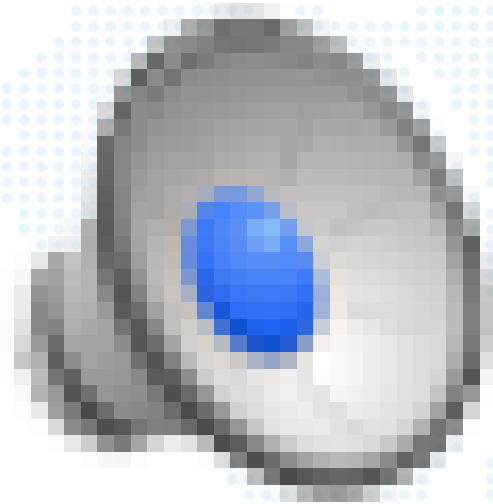
Part 8: Technical specifications

- **Full scale on-ground sliding impact testing** of ATD (Dummy, 90 kg)
= laying on the ground, face-up, head first

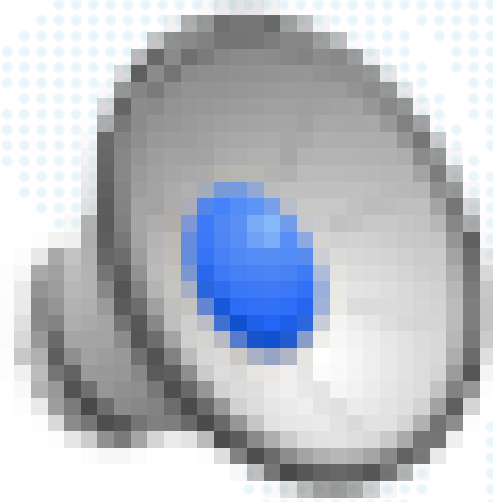
Typical but deadly...



Not much to do...



Crashes sliding



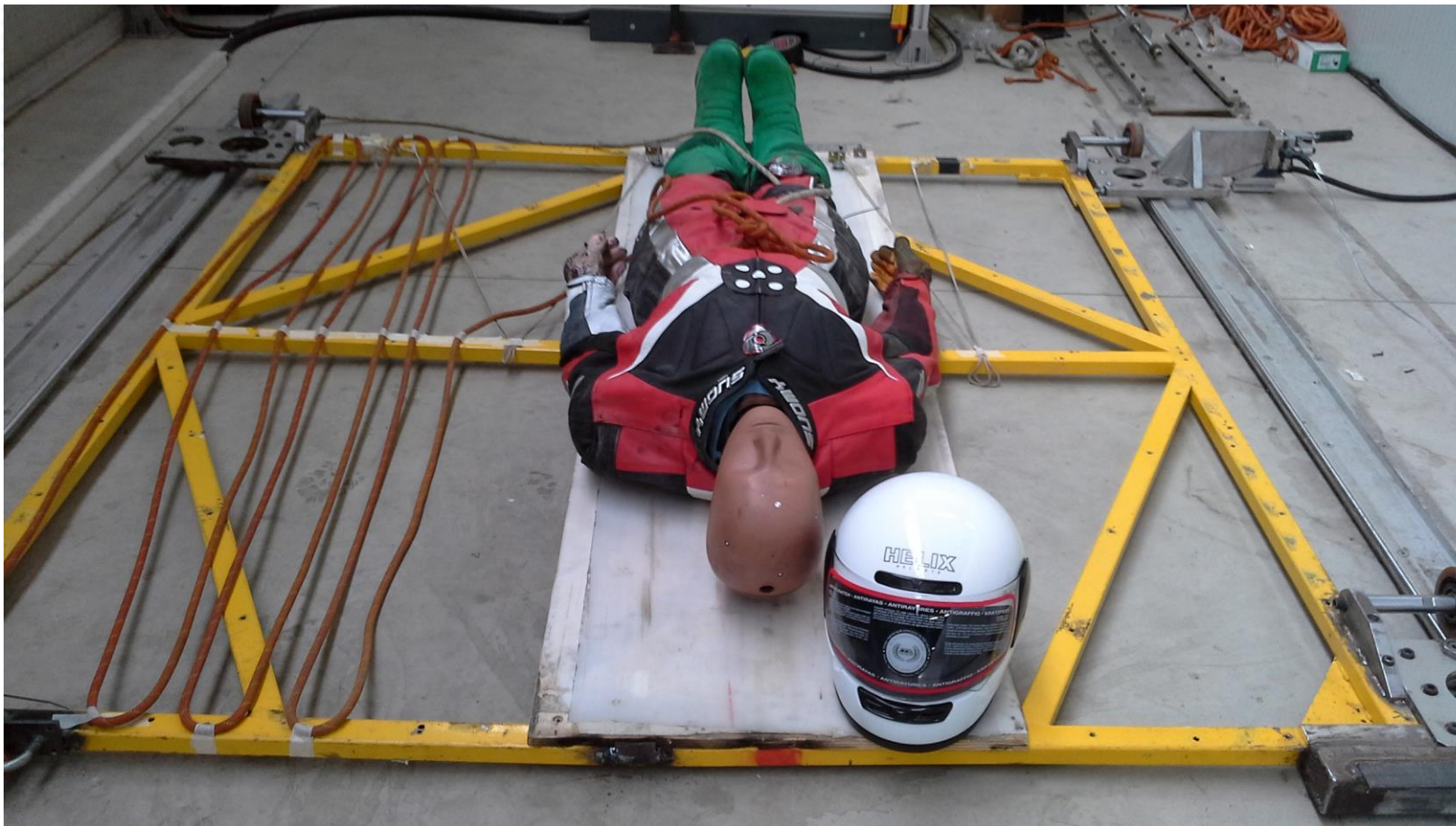
Part 8: Technical specifications

- Full scale on-ground sliding impact testing of ATD (Dummy, 90 kg) = laying on the ground, face-up, head first, 30° angle to impact point
- **ATD fully protected with helmet, clothing (EN1621-1), leather gloves and leather boots**

Part 8: Technical specifications

- Full scale on-ground sliding impact testing of ATD (Dummy, 90 kg) = laying on the ground, face-up, head first, 30° angle to impact point
- ATD **fully protected** with helmet, clothing (EN1621-1), leather gloves and leather boots
- **Legs and arms on body**

Part 8: Technical specifications



EN1317-8: Types of MPS

Continuous Motorcycle Protection System (CMPS)



Discontinuous Motorcycle Protection System (DMPS)

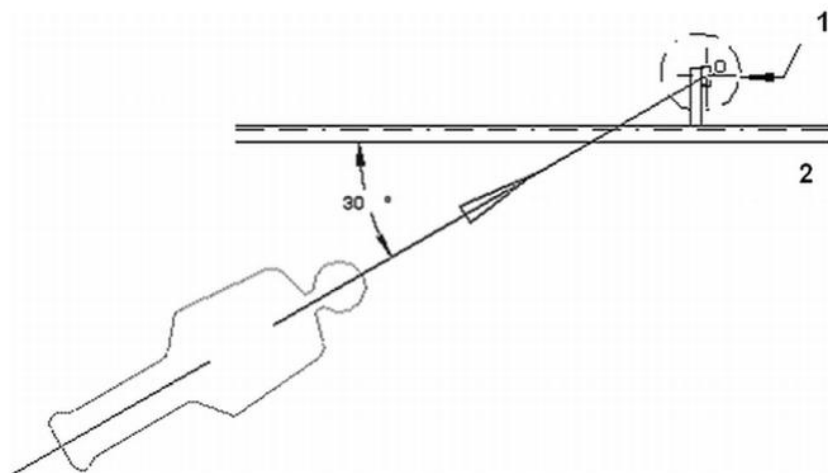


Part 8: Technical specifications

- Full scale on-ground sliding impact testing of ATD (Dummy, 90 kg) = laying on the ground, face-up, head first, 30° angle to impact point
- ATD **fully protected** with helmet, clothing (EN1621-1), leather gloves and leather boots
- Legs and arms **on body**
- **Speed class 60 km/h or 70 km/h**

Part 8: Technical specifications

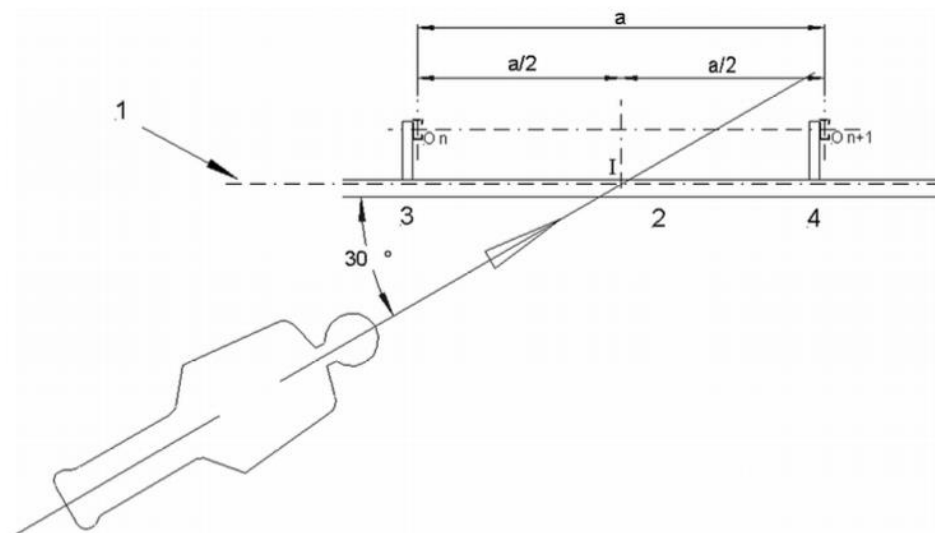
Post-centered impact



Legende

- 1 kontinuierliches System
- 2 diskontinuierliches System

Mid-span impact



Legende

- 1 Berührungsfläche des Systems
- 2 kontinuierliches System
- 3 Pfosten n
- 4 Pfosten n+1

Part 8: Criteria

Test	MPS type	Launch configuration	Speed (km/h)
TM.1.60	CMPS and DMPS	Post-Centred	60
TM.2.60	DMPS	Post offset	60
TM.3.60	CMPS	Mid-span	60
TM.1.70	CMPS and DMPS	Post-Centred	70
TM.2.70	DMPS	Post offset	70
TM.3.70	CMPS	Mid-span	70

Example for CMPS

Class	Tests required	
C60	TM.1.60	TM.3.60
C70	TM.1.70	TM.3.70

90 kg ATD

30° angle to impact point

Post-centered and Mid-span

Speed 60 km/h or 70 km/h

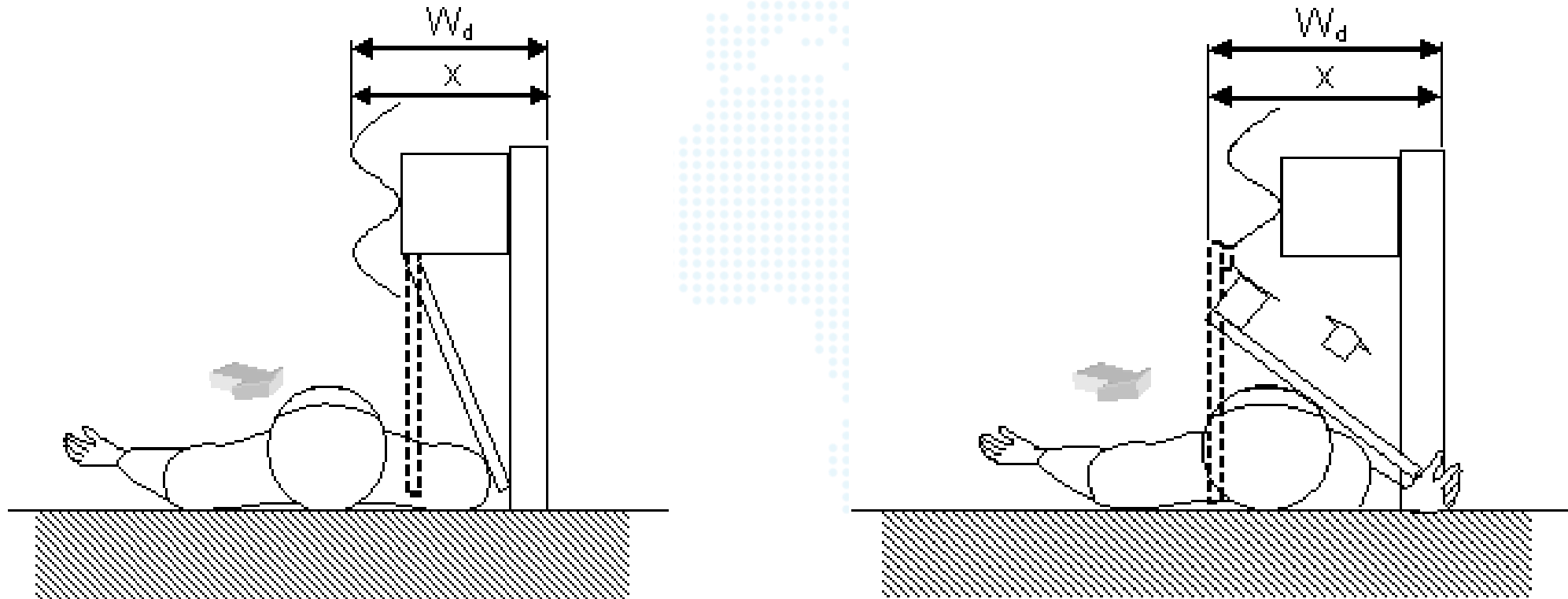
Part 8: Test results

→ Speed class: 60 km/h or 70 km/h


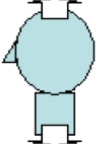
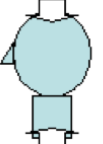



→ Severity Level: Level I or Level II

→ Dummy working width (Wd): distance between the foremost part of the undeformed system and the maximum dynamic lateral position of any part of the system or ATD

Dummy working width (W_d)



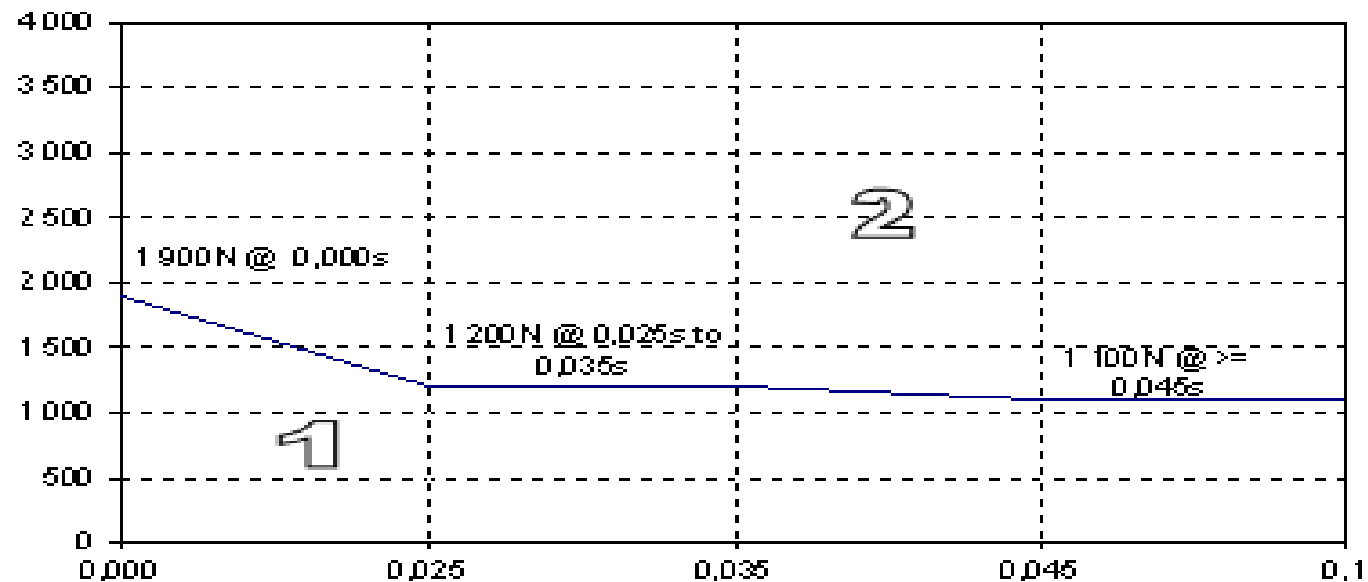
Part 8: Measurements

SL	Maximum admissible values						
	Head	Neck					
	HIC ₃₆	F _x (N) 	F _{Z_{tens}} (N) 	F _{Z_{comp}} (N) 	Moc _x (N.m) 	Moc _y (N.m) 	Moc _{y flex} (N.m) 
I	650	Figure ...	Figure ...	Figure ...	134	42	190
II	1000	Figure ...	Figure ...	Figure ...	134	57	190

Example: Level I



3

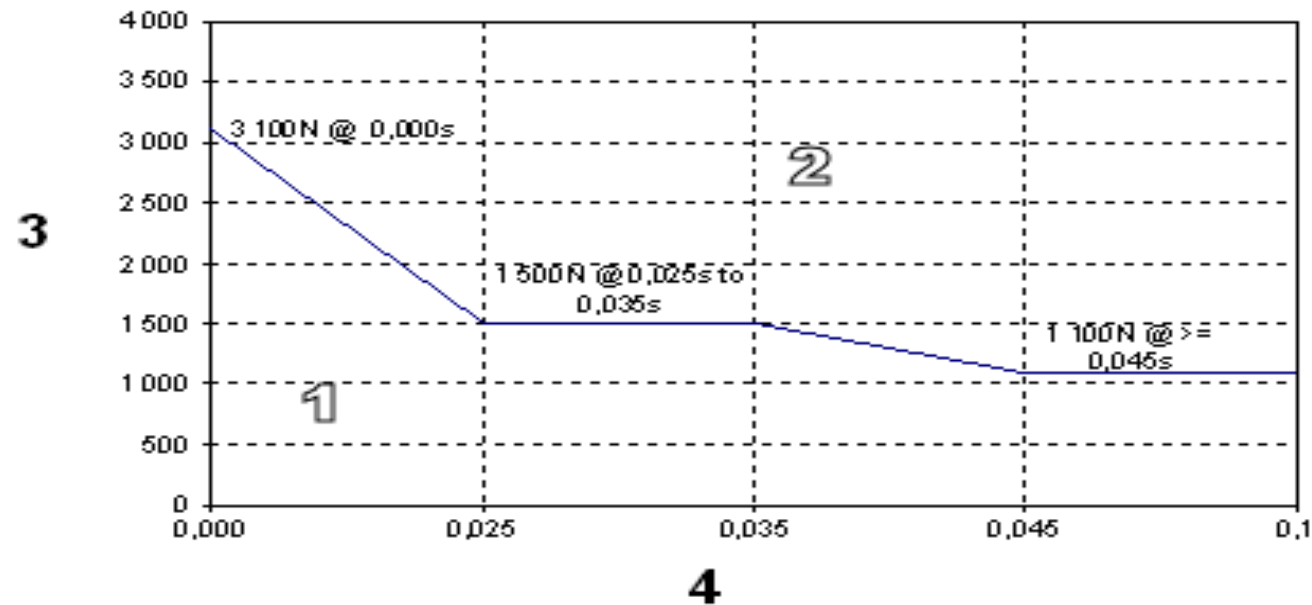


4

Anterior – posterior neck shear force criterion neck for **Level I**

[1 = Pass, 2 = Fail, 3 = Anterior-posterior neck shear force (N), 4 = Permitted duration for a given shear force (s)]

Example: Level II



Anterior – posterior neck shear force criterion neck for **Level II**

[1 = Pass, 2 = Fail, 3 = Anterior-posterior neck shear force (N), 4 = Permitted duration for a given shear force (s)]

How to do this in real life?

Different solutions



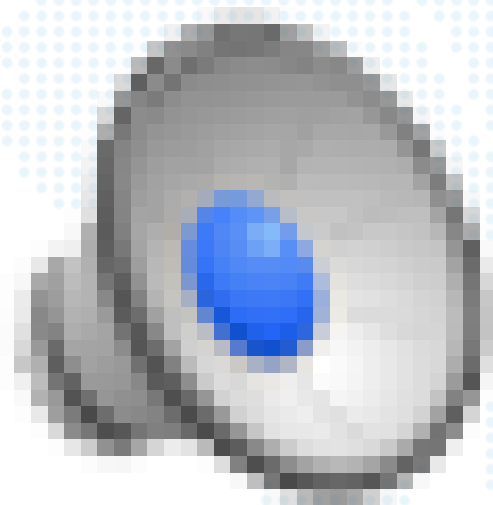
Different solutions



Different solutions



Different solutions

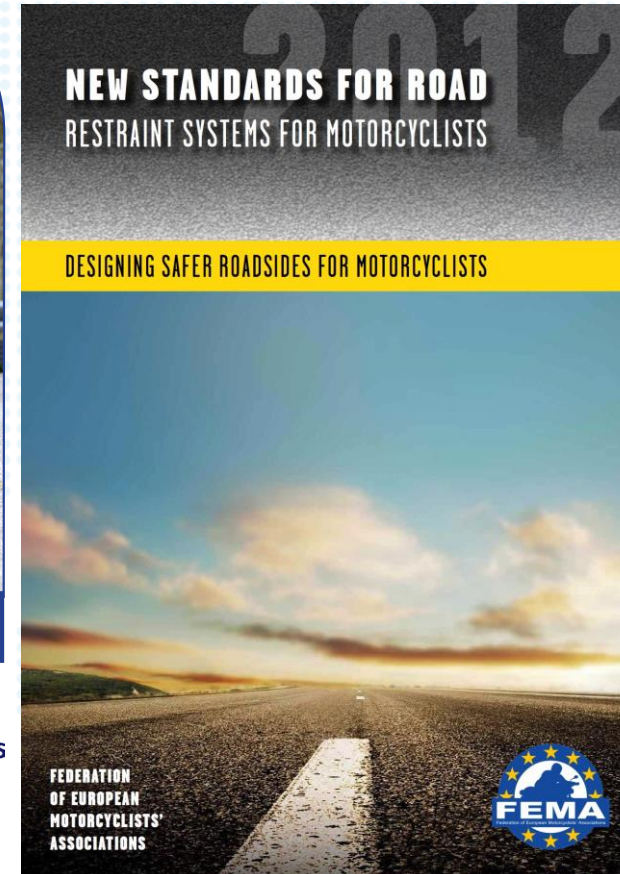


MPS studies

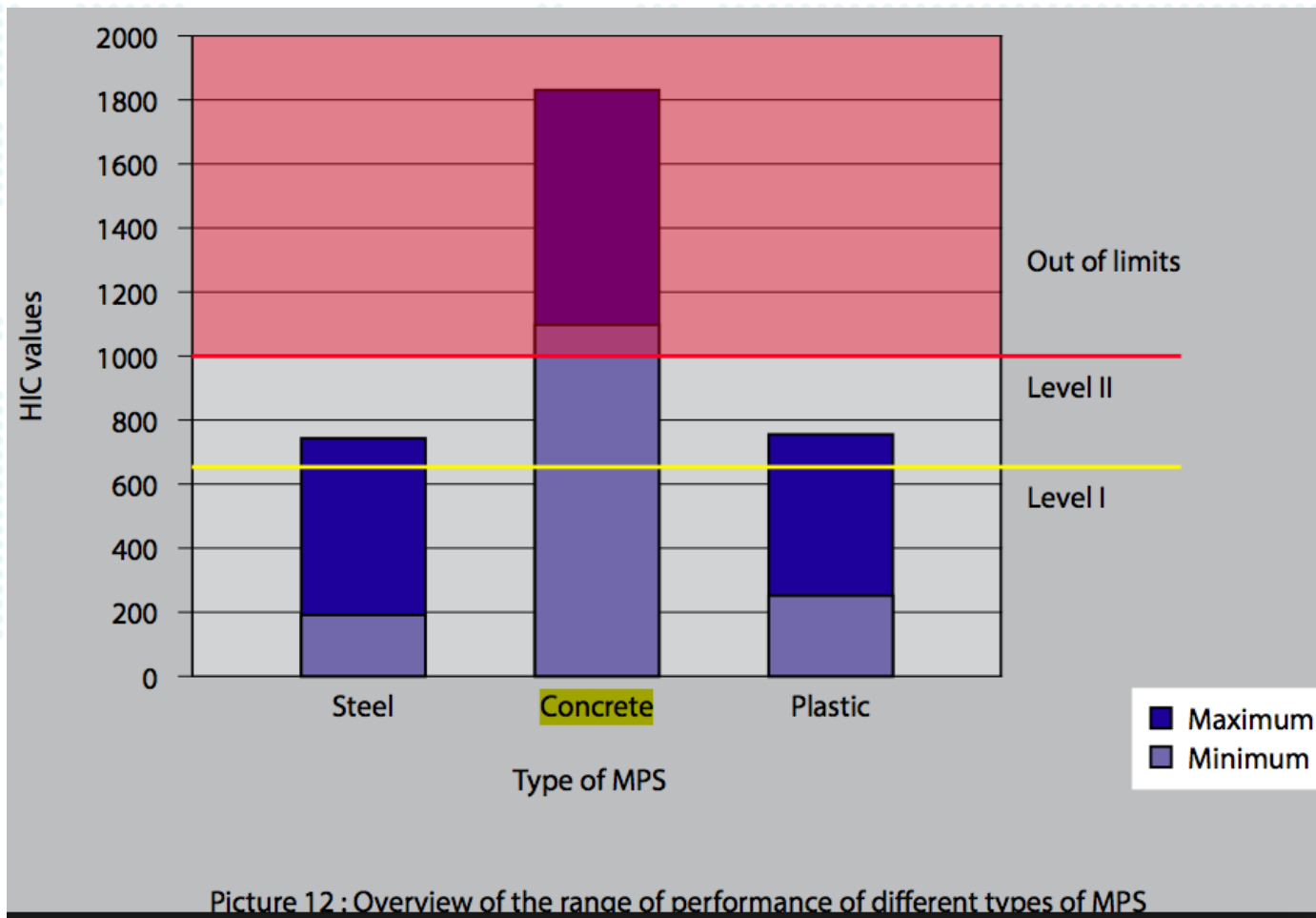


Motorcyclist Protection System

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MPS studies



Picture 12 : Overview of the range of performance of different types of MPS





MPS studies

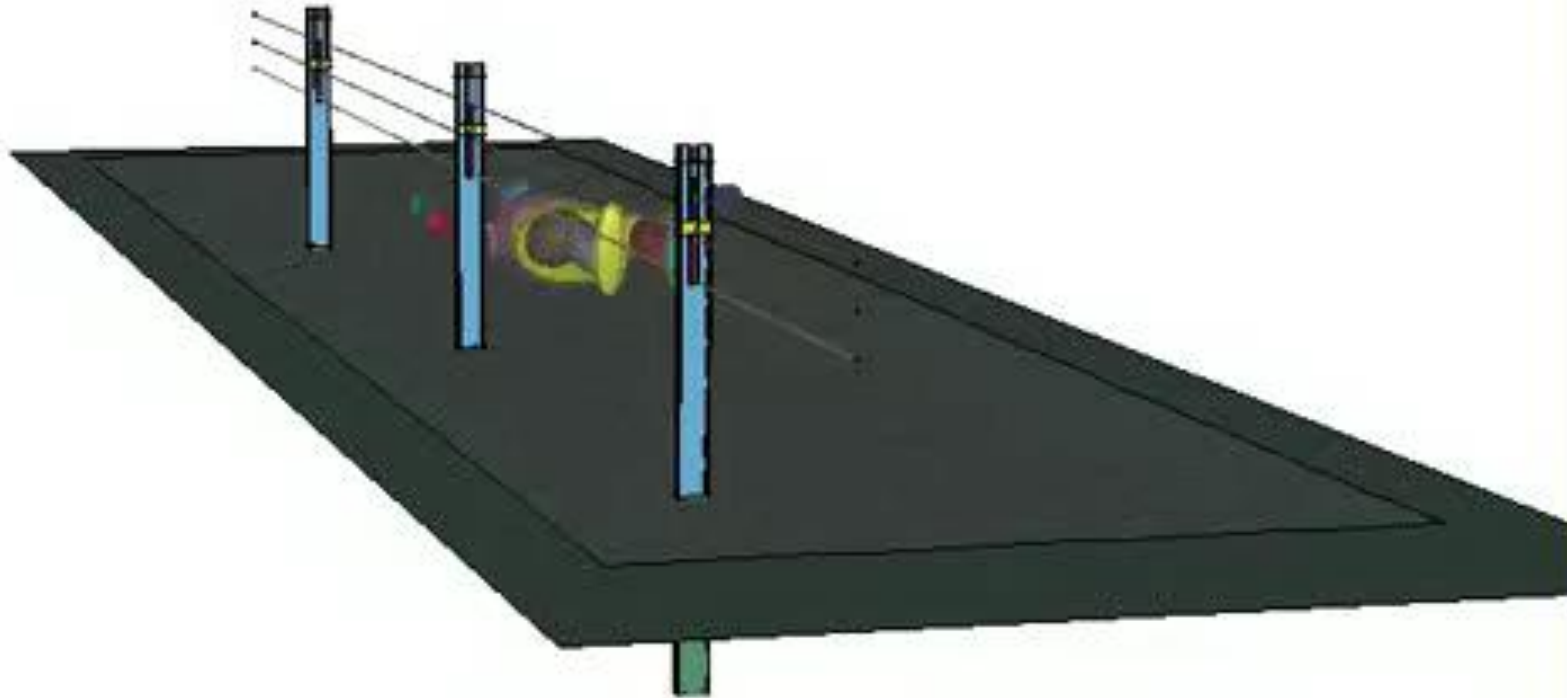
5.1. Toward better research and data collection

In 2008, the European Road Assessment Programme (EURORAP), an international not-for profit association whose members are motoring organizations and national and regional road authorities, produced a review titled 'Barriers to Change'¹³ which provides an analysis of the issues and a series of recommendations for improvements to barrier design. The paper shows that motorcycle crashes cost the European economy billions annually, and argues that the response is not proportionate to the scale of the problem. It examines crash barriers that routinely save the lives of car occupants but can cause traumatic death to motorcyclists, recommends that engineers be provided with clear guidance on the design of barriers and the locations where they should be used. FEMA was part of the panel.

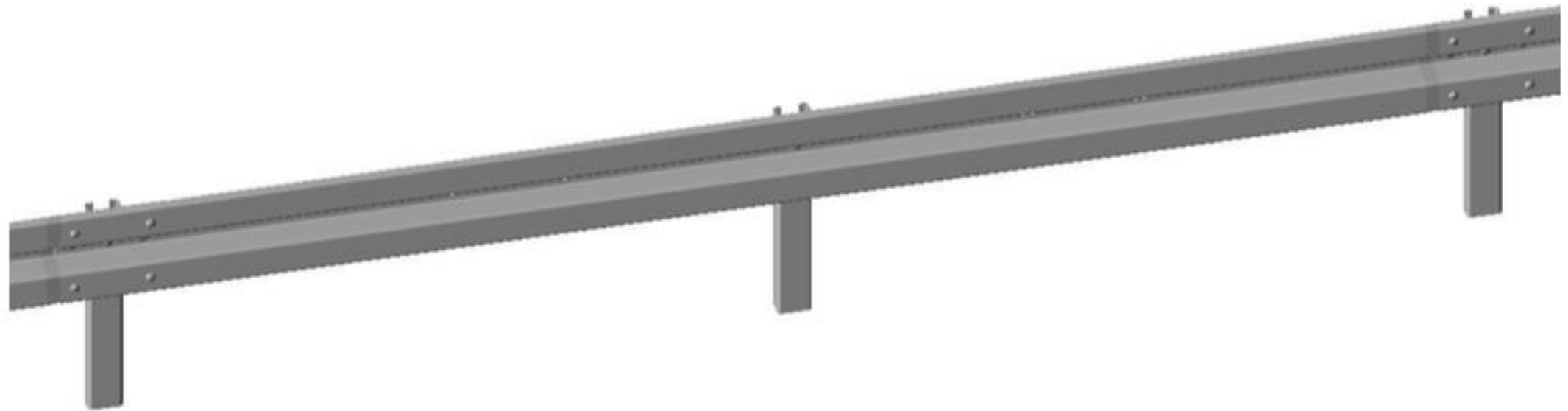
SMART RRS (2008 – 2012)¹⁵ : The project investigated available studies on guardrails and statistics and found out that motorcyclists impacting fixed objects occurred in 4% of the cases in urban areas, while it was between 10% and 20% in rural areas, with a fatal outcome 2 to 5 times higher than in other types of accidents. It also discovered that the best solution seems to be the addition of a lower rail to the most common single beam design, as it provides better energy absorption than concrete solutions or wire rope safety barriers. Wire rope safety barriers are viewed by motorcyclists as the most aggressive form of restraint systems. This view is supported by computer simulations and tests, which indicate that injuries will be severe if a rider hits the cables or the support due to the smaller impact

„It also discovered that the solution seems to be the **addition of a lower rail to the most common single beam design**, as it provides better **energy absorption than concrete solutions or wire...**“

DUMMY TEST - 80 KM/H - 20 DEGREES
Time = 0



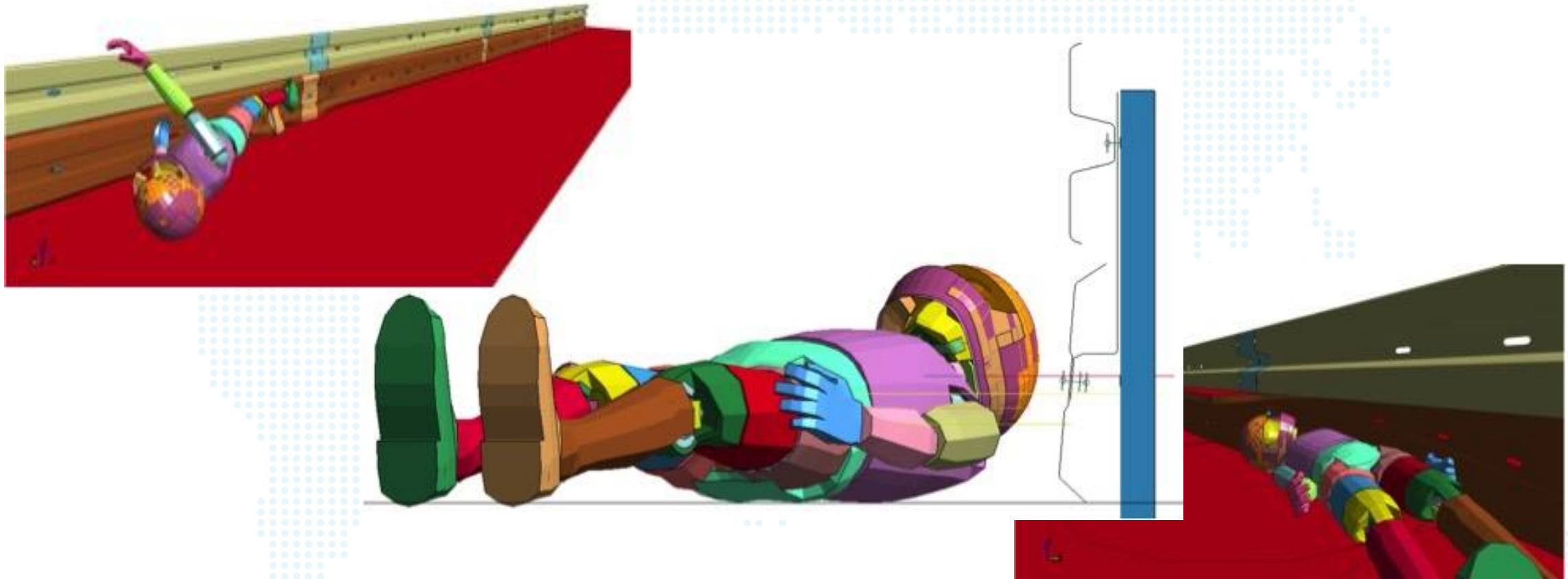
Our approach



Our approach



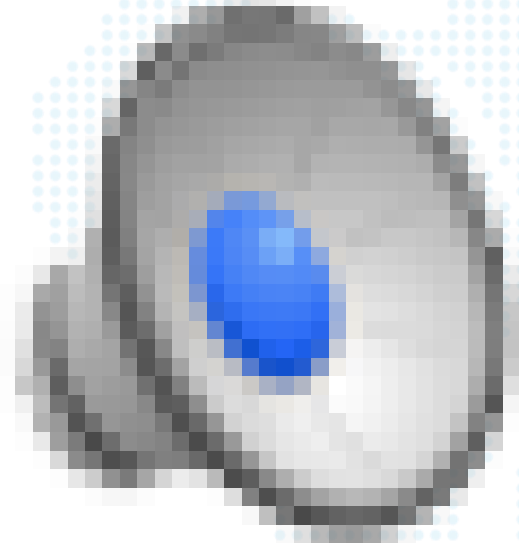
Our approach



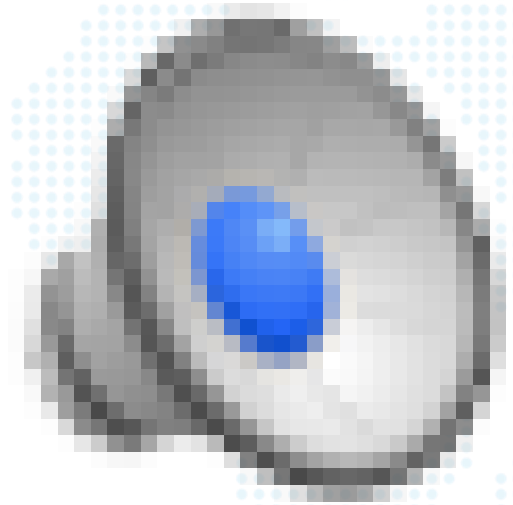
Our approach



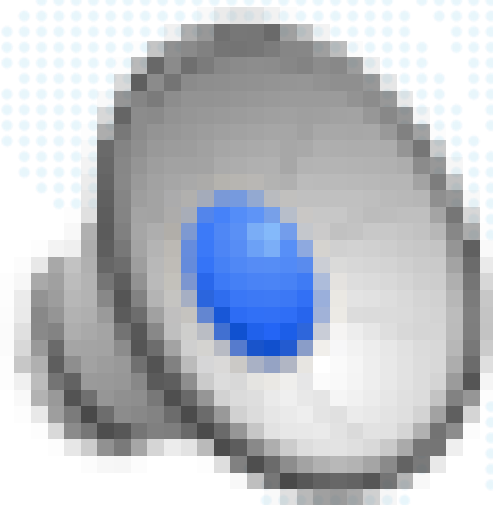
Test post-centered



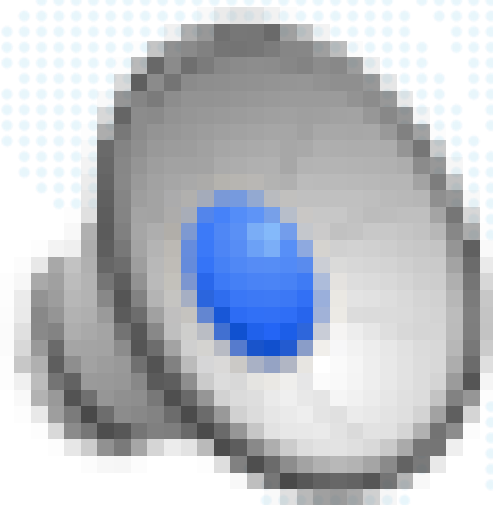
Test post-centered



Test mid-span



Test mid-span



passco MPS

Level II
60 km/h
Wd= 0,3



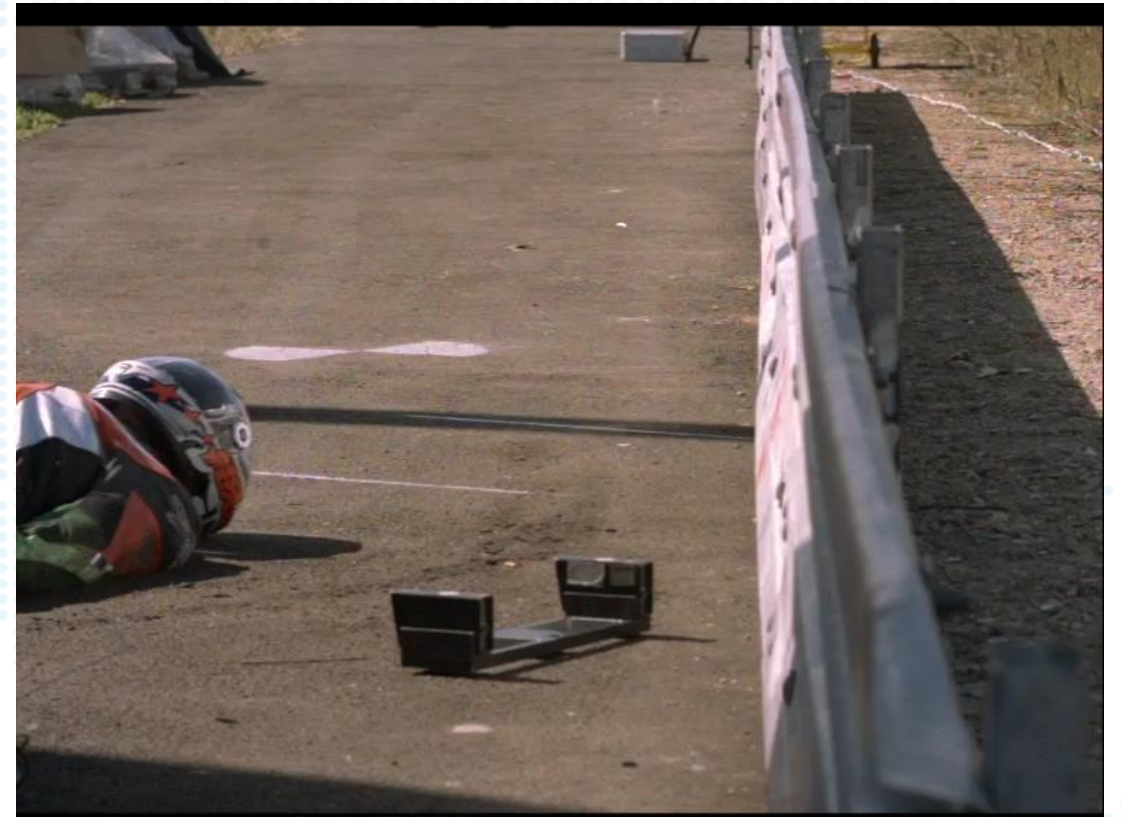
passco MPS (car crash test)



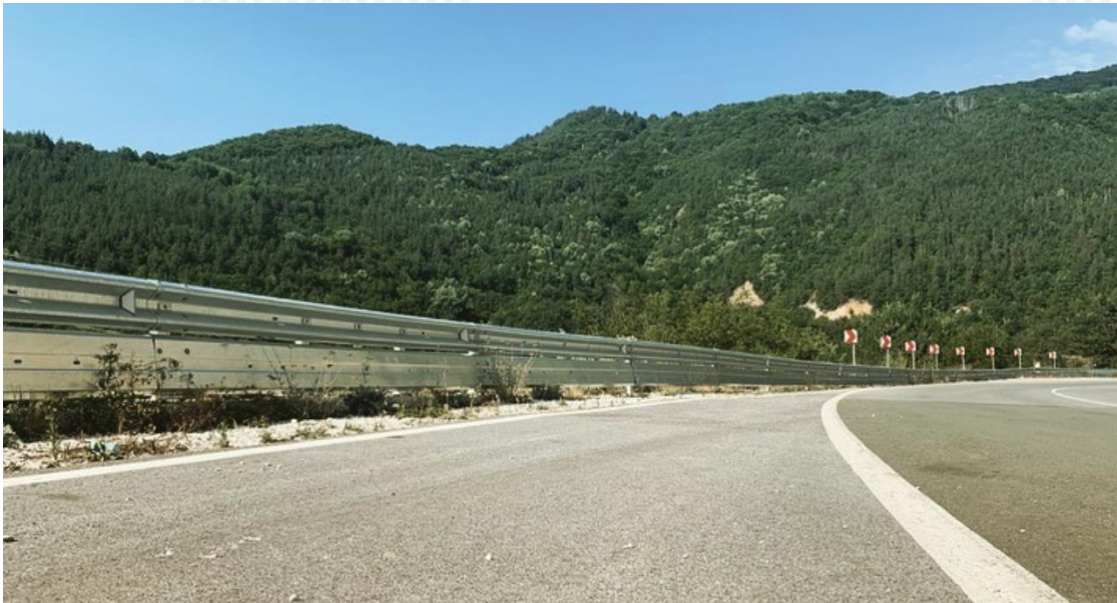
passco MPS

- **First German MPS, fully crash tested according to EN1317-8 and EN1317-1/2**
- **Passed Level II and N2-A-W3**
- **CE certified**
- **Globally lightest steel MPS solution**
- **Upgrade on existing RRS**
- **Easy installation**

Compare performance



Bulgaria



„Can we make **roadsides safer for motorcyclists?**“

YES, we can! How?

- Analyse MPS spots (e.g. along the coast, mountains)
- Use tools to gather information about MPS
- Use latest technology, latest technical specifications
- Install tested MPS (always better than non-tested solution)
- Upgrade existing barriers / RRS

„Where there is roads, there is motorcyclists, they have a **right of protection** too“

PASS+CO®



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Vision Zero for the Balkans
June 1 – 2, 2022

