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2016 Annual Conference & Innovation Awards

Brussels, Wednesday 3 February 2016

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Thematic Session 2:

Bringing Smart Transportation Infrastructures into Reality

2016 STA Annual Conference & Innovation Awards

Case Studies

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How to Increase Road Safety "Smartness":

Focus on Safer Roadsides through Passive Safe Road Infrastructure

Patrick Asimus

movea

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Some numbers and facts…

- Every year, 1,3 million people die as a of a road traffic collision

- 3.000 deaths each day

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Some numbers and facts…

- In Europe, about **26.000 people killed** per year and 200.000 people injured.

- **30 %** of road deaths involve single vehicle accidents and **1/3** of people die by driving into obstacles close to the road.

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Some numbers and facts…

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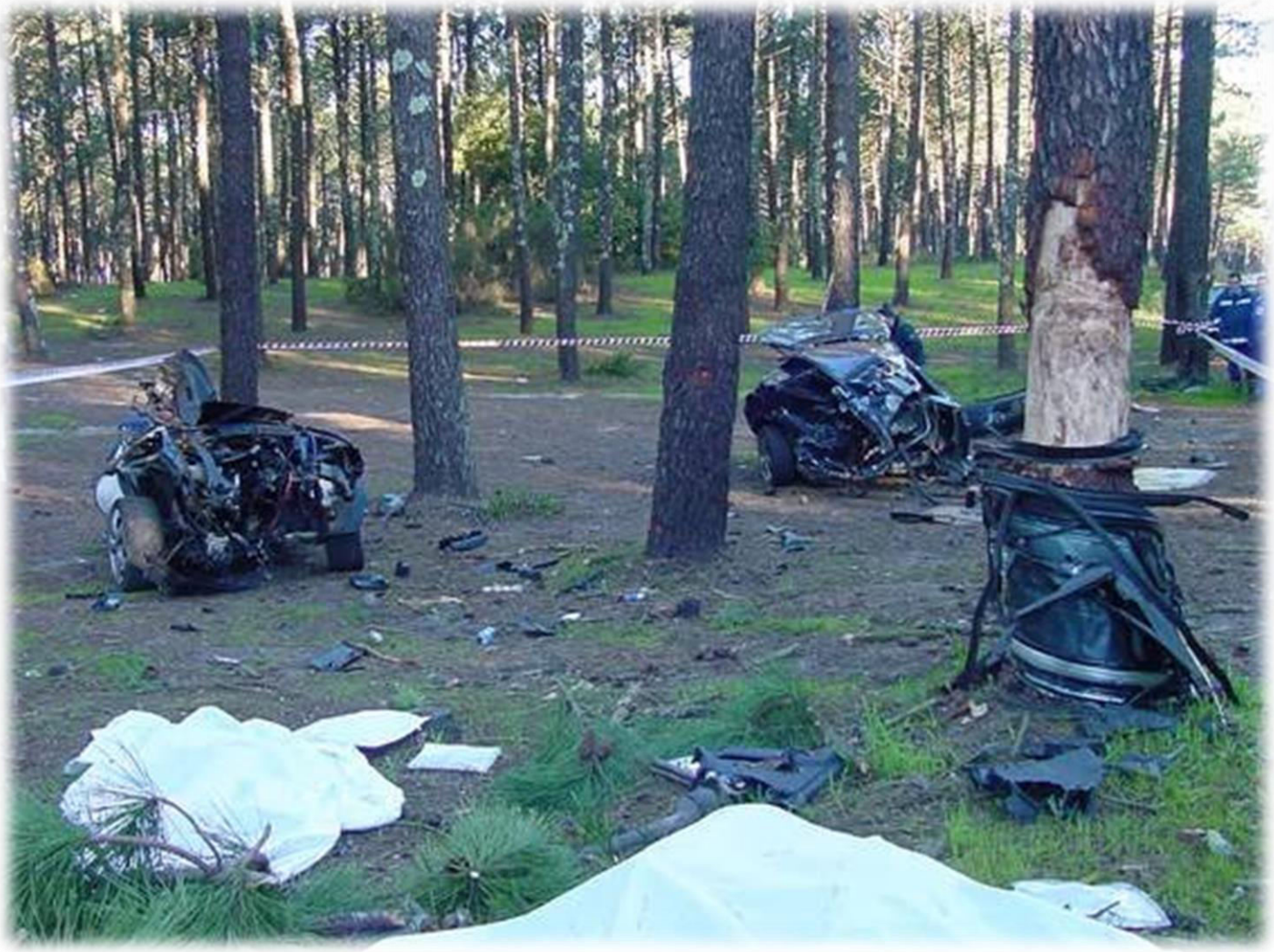

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2. Consequences of hitting an obstacle

- Driving into an obstacle can be deadly at 65 km/h in case of a frontal impact

- 35 km/h in case of a side impact

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2. Consequences of hitting an obstacle

Machine factors

VEHICLE

DRIVER

3 pillars of ROAD SAFETY

Physical factors

Human factors

ROAD SAFETY EQUIPMENTS

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2. Consequences of hitting an obstacle

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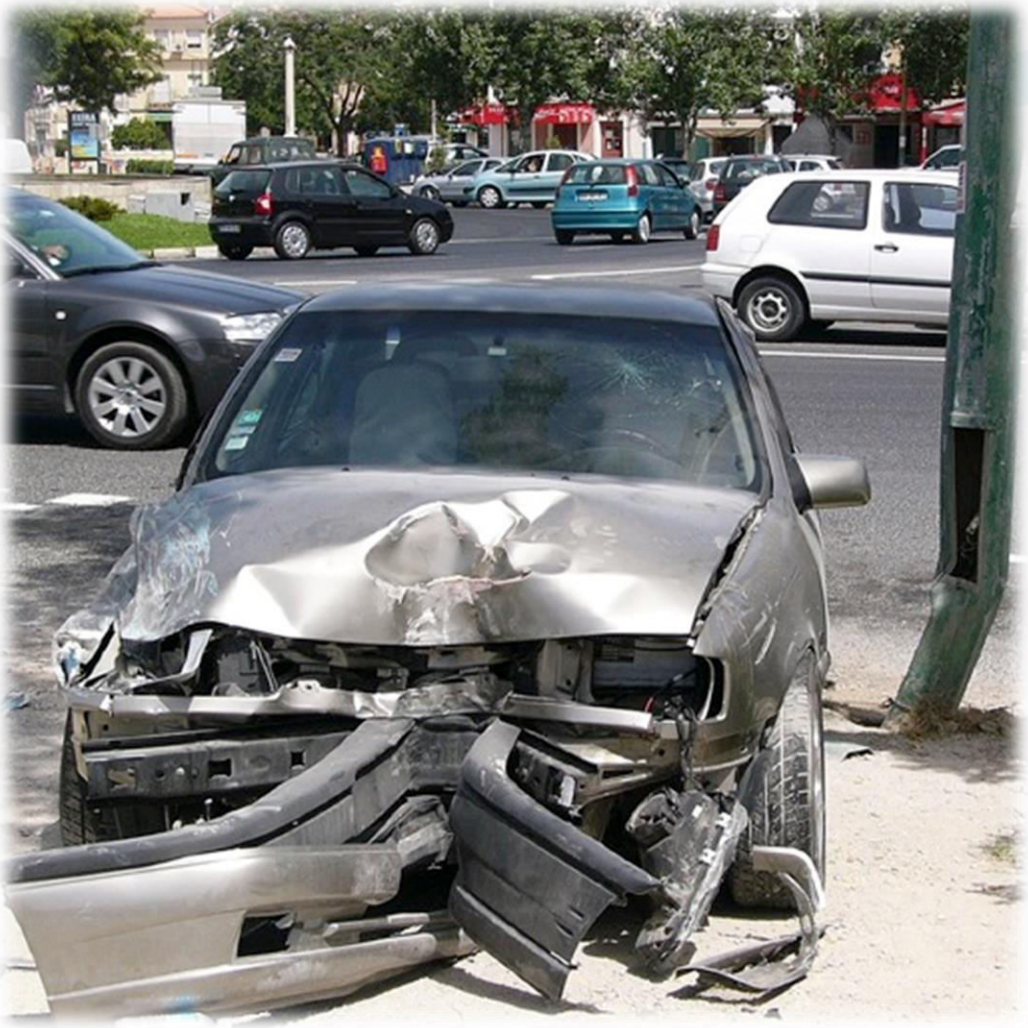
2. Consequences of hitting an obstacle



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2. Consequences of hitting an obstacle

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2. Consequences of hitting an obstacle

The obstacle is too rigid and the slowing down is too abrupt.

The shock to the people into the vehicle is then too big and may be fatal.

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3. What are the solutions ?

When the car hits an obstacle:

Deformation by the car to absorb partially the impact

When the passenger hits the cockpit of the car:

Well fastened seatbelt to avoid hitting the steering wheel or the window & activation of the airbag

When the organs bump into each other and human tissue threats to implode:

Creating a longer slowing distance in a controlled way minimises the forces exerted on the occupants

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3. How to treat obstacles on the roadside?

Solution 1 : designing safe roadsides

This philosophy of a "forgiving road" is the mere recognition that road users sometimes leave the running carriageway for explainable or unexplainable reasons.

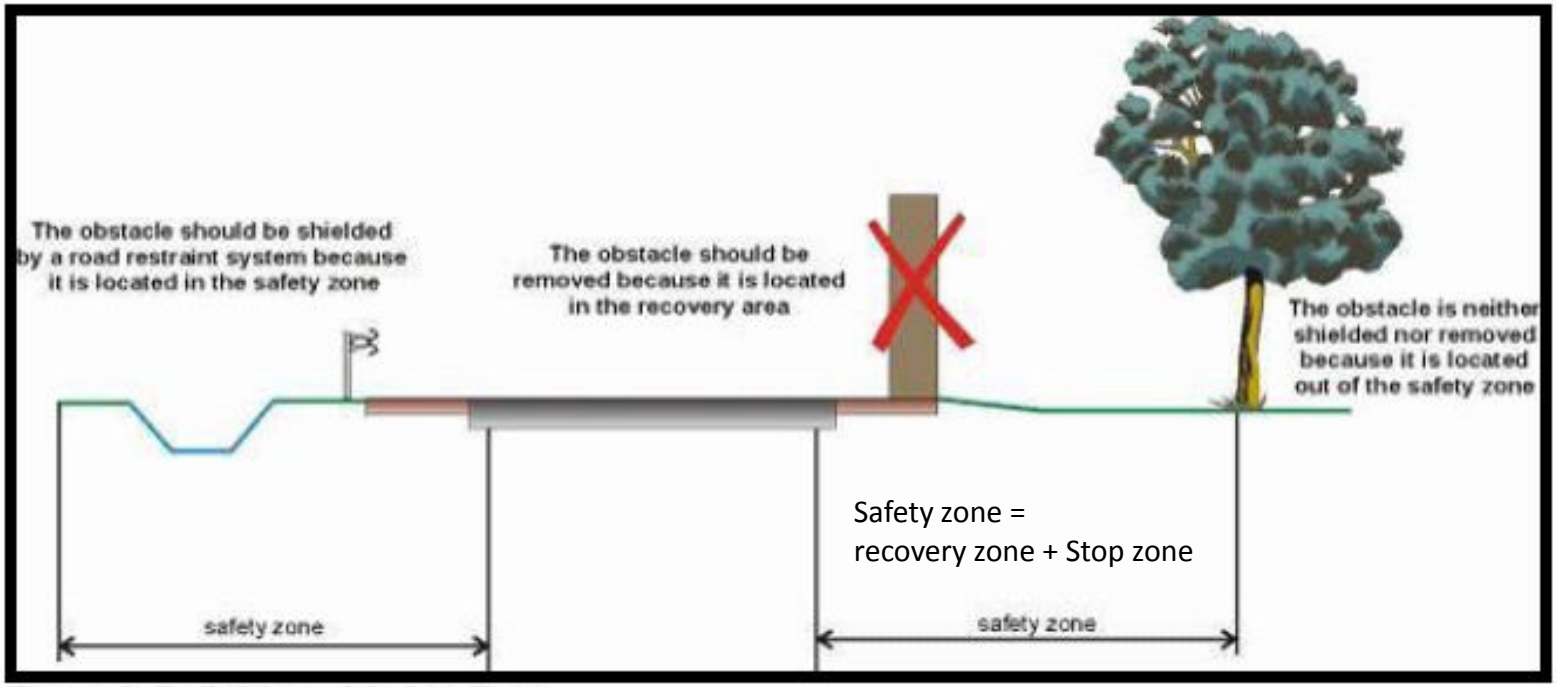

Figure 3. Definition of Safety Zone

This is OK for new roads (if enough space) but what happens on existing roads?

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3. How to treat obstacles on the roadside?

Solution 2 : remove all the obstacles ?

If the obstacle has no use in being close to the road, **remove it.**

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3. How to treat obstacles in the roadsides ?

Solution 3 : make the roadsides forgiving

In many cases, traffic signs, lighting columns camera mast, need to be there to improve traffic safety or for some other reason.

So make it **forgiving in 2 ways :**

- If something is installed in the clear zone, it should be forgiving, so approved **according EN 12767.**
- If you can not design the road as being "forgiving", **isolate it with a guardrail certified EN 1317** in respecting the installation manual regarding the working width and the total length.

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4. The EN 12767: Safe Pole Performance and Testing

- **Dedicated to passively safe street furniture and road equipment : mainly signpost, lighting column and traffic light**

- **Describes the crash tests methodology and sort the products by performance.**
- Depending on their design, safe poles will either yield (bend over) or fail (break or shear off).

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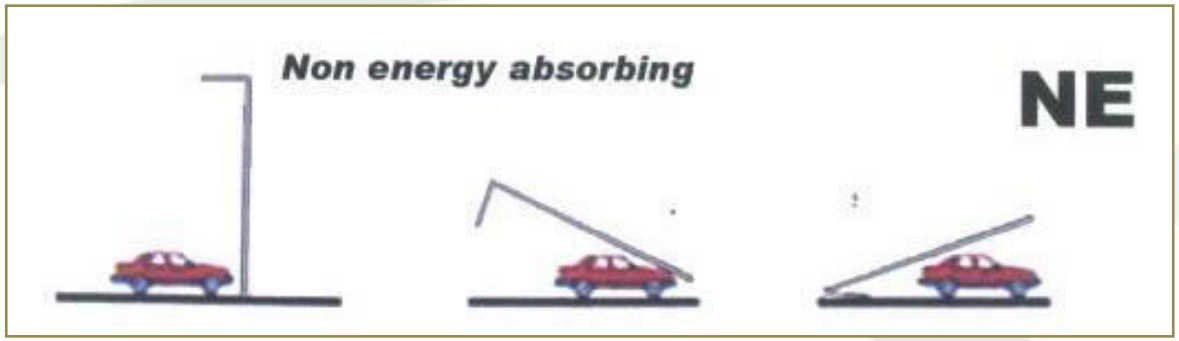
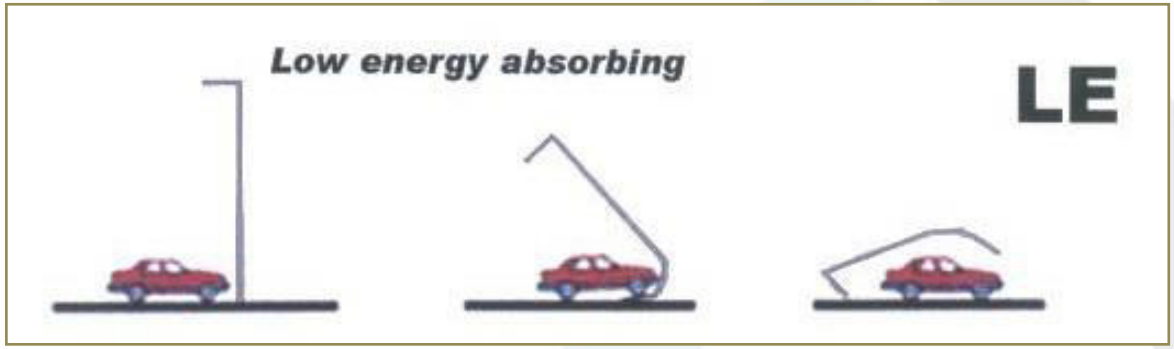
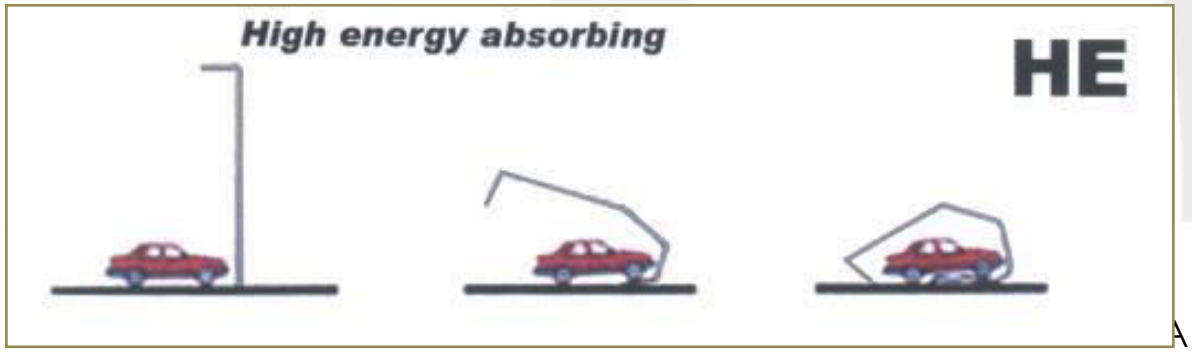
3 Energy Absorption Categories



The pole breaks or comes out of the ground. The speed of the car is not really reduced so **no energy is absorbed.** There might be the risk of having a second accident.



The pole bends slightly and then breaks or comes out of the ground, **there is some energy absorbed so the speed is slightly reduced.**



The speed of the car is slowed down, **the energy of the impact is highly absorbed.**

ARDS

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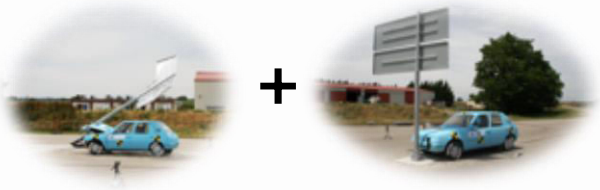
4. The EN 12767: Safe Pole Performance and Testing

- **35, 50, 70 and 100 km/h**

- **2 impact tests minimum :**

35 km/h (mandatory)**+**

50 or 70 or 100 km/h



900 kg

Speed classes	*Impact speed in km/h*
50	*35 and 50*
70	*35 and 70*
100	*35 and 100*

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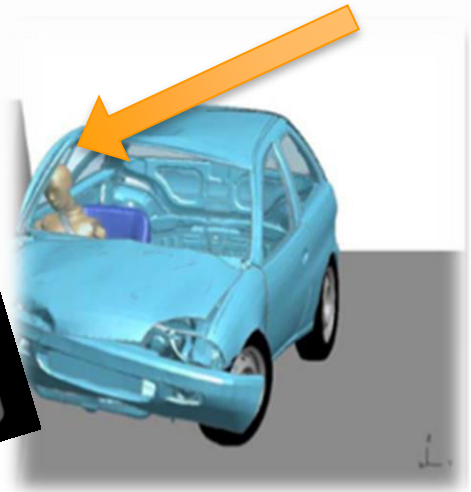
4. The EN 12767: Safe Pole Performance and Testing

4 levels of safety for car occupants

Level of safety for occupant	*Comments*
1 to 3	*Increased safety*
4	*Without any risk*

- These levels are determined from ASI and THIV values measured during the crash-tests.
- No intrusion into the passenger compartment



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4. The EN 12767: Safe Pole Performance and Testing

Table 5 — Occupant safety

Energy absorption categories	Occupant safety level	Speeds			
		Mandatory low speed impact test 35 km/h		Speed class impact tests 50 km/h, 70 km/h and 100 km/h	
		Maximum values		Maximum values	
		ASI	THIV km/h	ASI	THIV km/h
HE	1	1,0	27	1,4	44
HE	2	1,0	27	1,2	33
HE	3	1,0	27	1,0	27
LE	1	1,0	27	1,4	44
LE	2	1,0	27	1,2	33
LE	3	1,0	27	1,0	27
NE	1	1,0	27	1,2	33
NE	2	1,0	27	1,0	27
NE	3	0,6	11	0,6	11
NE	4	No requirement	No requirement	See 5.6	

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Best practices with safe poles

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Best practices with safe poles

Vertical road infrastructure and equipment improve road safety for sure.

BUT the poles should not be an obstacle when hit in an off road accident.

The European standard EN12767 is there to approve products for their passive safety.

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The only place where safe poles don't work

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4. The EN 12767: Safe Pole Performance and Testing

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Thank You for Your Attention

Patrick Asimus