SAFETY-PRODUCT

ZIPpole

OFFICES
Hoogbuul 18
2250 Olen
Belgium

PRODUCTION
Hoogbuul 18
2250 Olen
Belgium

CRASH SITE
Hoogbuul 18
2250 Olen
Belgium

Dec 2024

How to design safe roadsides?

In road design, allowances need to be made that can help compensate for human error, and roads and roadsides are built in such a way that their physical characteristics minimize potential harmful consequences to all.

World Health Organization

DECADE OF ACTION FOR ROAD SAFETY 2011-2020

VISION ZERO INITIATIVE
TRAFFIC SAFETY BY SWEDEN

Vision zero: "in every situation, a person might fail, the roadsystem should not"

Why is there a need for forgiving roadsides?

Belgium:

35,1% of people who die in traffic,
die by driving off road.

The biggest risk to die in an accident is by driving into an obstacle in the roadside.

Source: BIVV, Belgian Institute for road safety, 2023

How is this in your country?

How to design safe roadsides?

How to treat obstacles close to the road?

- Create large clear zones
- Remove obstacles from the roadside
- Relocate obstacles
- Fragilize by using energy absorbing structures, use existing standards like EN12767 for products
- Isolate with a barrier, use existing standards like EN1317 for products
- Delineate

EN12767, crash test standard

HE = High Energy absorbing

NE = Non Energy absorbing or break away

How to select the right type of passive safe pole ?

Non Energy absorbing | 100NE
High Energy absorbing | 100HE

- in case of no other road users
- in case of stable / flat roadside
- in case of no secondary risk
- in case of a large clear zone

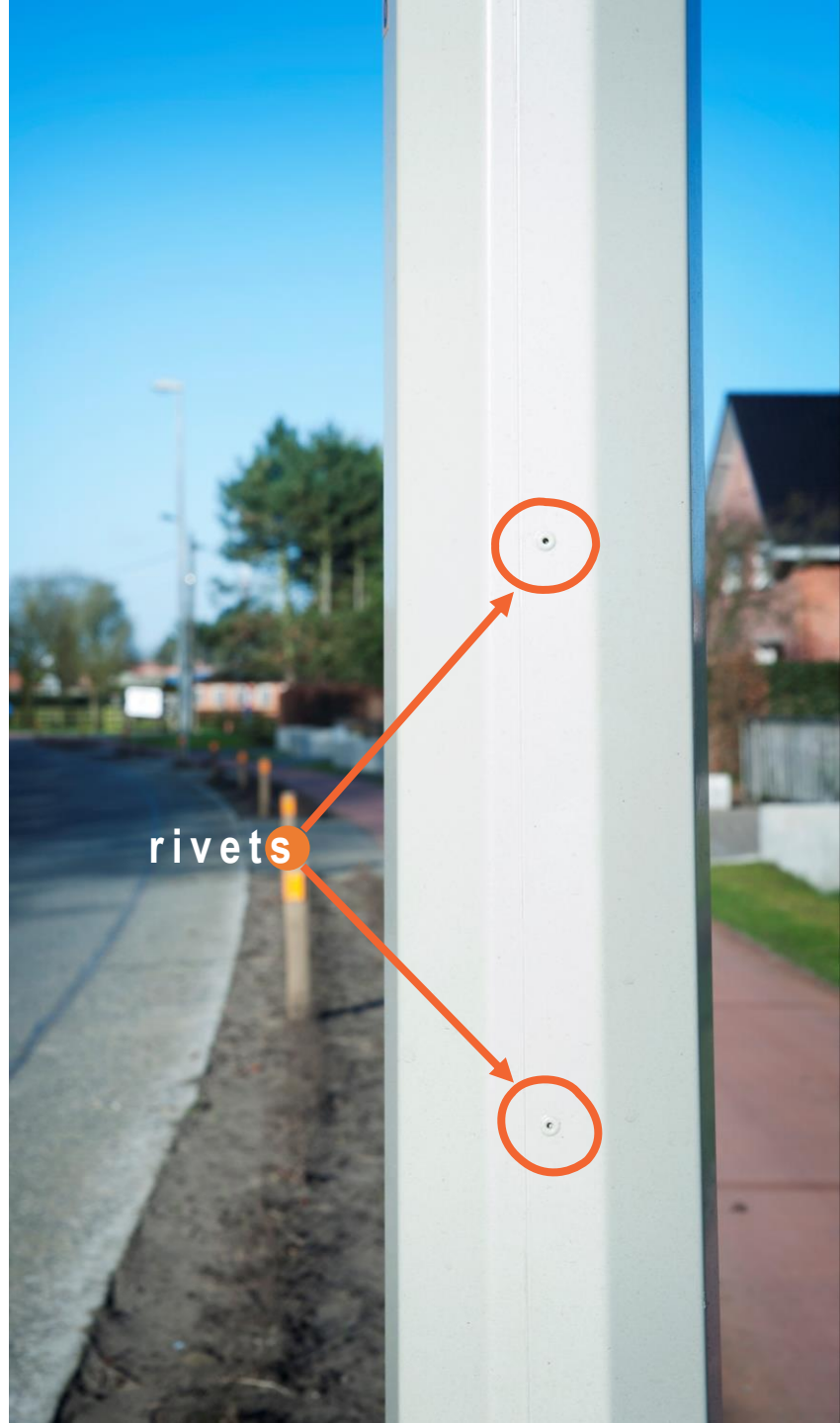
High Energy absorbing | 100HE

- in case of other road users
- in case of unstable roadside, ditches
- in case of secondary risk
- in case of a limited clear zone

ZIPpole

How does it work?

- Bended plate(s) in elastic steel, riveted together
  - » strong in vertical direction
  - » weak in horizontal direction when hit in an impact
- The rivets collapse one by one like a ZIP
- The strong shape looses its strength and the plate bends
- The energy is absorbed by the steel resisting in bending
- The car is slowed down



EN12767, EUROPEAN STANDARD TO APPROVE PASSIVE SAFE VERTICAL ROAD INFRASTRUCTURE

Table 1 – Impact speeds

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

EN12767:2019, Table A.3 - Energy absorption categories

Impact speed, V_I	50 km/h	70 km/h	100 km/h
Energy absorption category	Exit speed, V_e Km/h		
HE	$V_e = 0$	$0 \leq V_e \leq 5$	$0 \leq V_e \leq 50$
LE	$0 \leq V_e \leq 5$	$5 \leq V_e \leq 30$	$50 \leq V_e \leq 70$
NE	$5 \leq V_e \leq 50$	$30 \leq V_e \leq 70$	$70 \leq V_e \leq 100$
$E (J) = m/2 * v^2$:	$(50^2 - 0^2)$	< $(70^2 - 5^2)$	< $(100^2 - 50^2)$
	2500	< 4875	< 7500

EN12767

EN12767:2007

100	HE	3

EN12767:2019

100	HE	C	S	NS	MD	1

Speed class: 50 / 70 / 100

Energy absorption level: NE / LE / HE

Occupant safety level: A / B / C / D

Backfill type: S / R / X

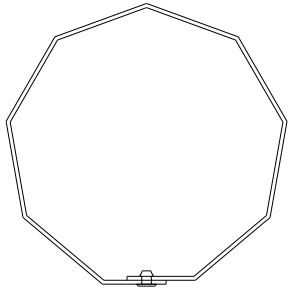
Collapse mode: NS / SE

Directional sensitivity: SD / BD / MD

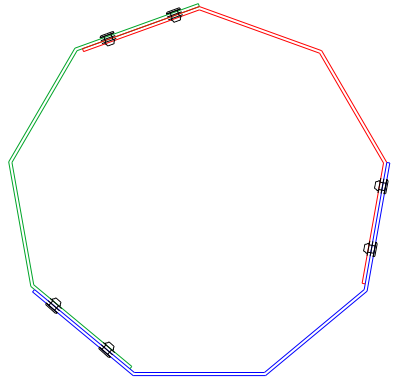
Roof indentation: 0 / 1

EN12767:2019, EUROPEAN STANDARD TO APPROVE PASSIVE SAFE VERTICAL ROAD INFRASTRUCTURE

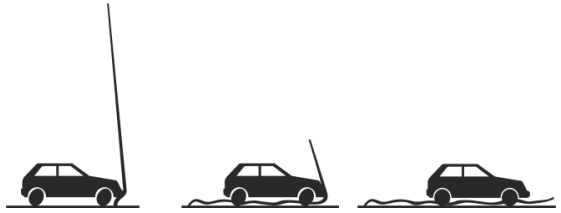
ZIPpole
Ø 260
BMC= 21.000 Nm
6-12m



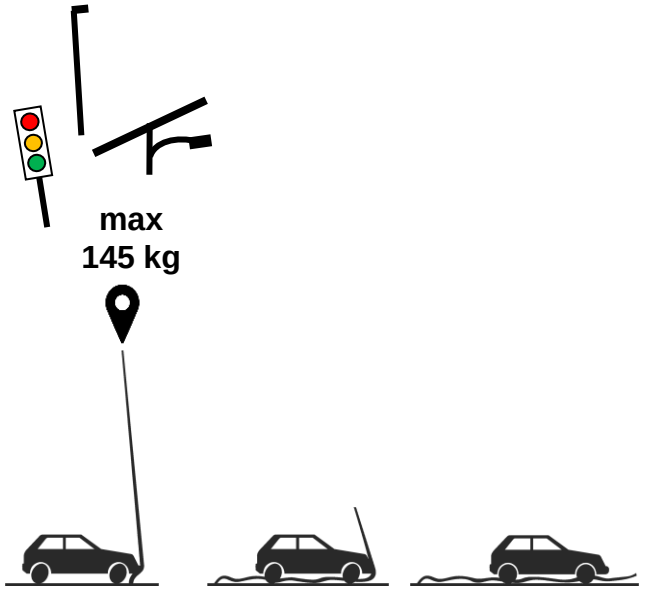
ZIPpole 3XL
Ø 350mm
BMC= 40.000 Nm
6- 18m



100HE/ High Energy absorbing , fixed in the ground
100-HE-C-S-NS-MD-1



100HE/ High Energy absorbing
100-HE-E-S-NS-MD-1



100NE/ Non Energy absorbing, not fixed in the ground
100-NE-C-S-SE-MD-1

Installation of the ZIPpole

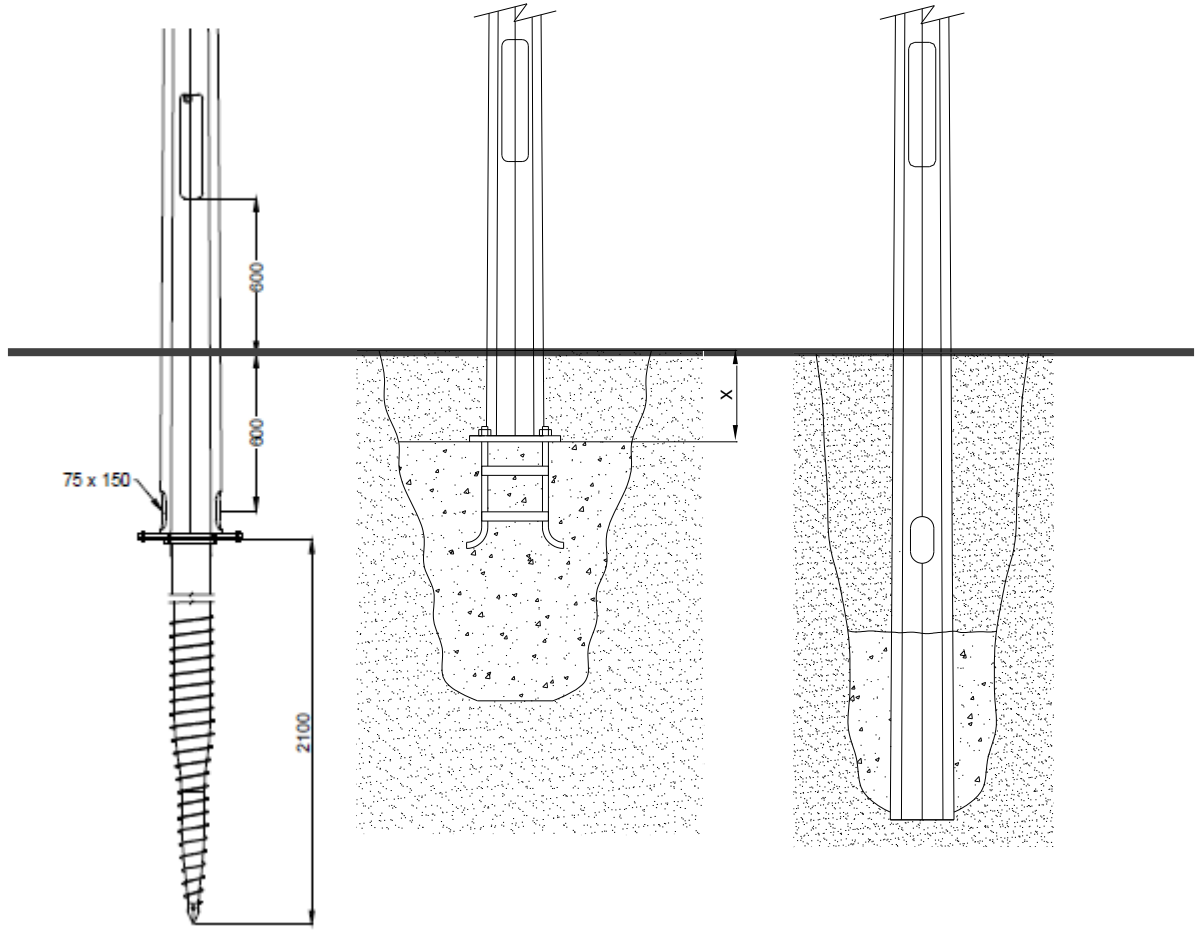
ZIPpole, EN40 as lighting pole

EN12767, 100 High Energy absorbing

from 6m to to 12m

fixed in the ground

100-HE-C-S-NS-MD-1



Installation of the ZIPpole

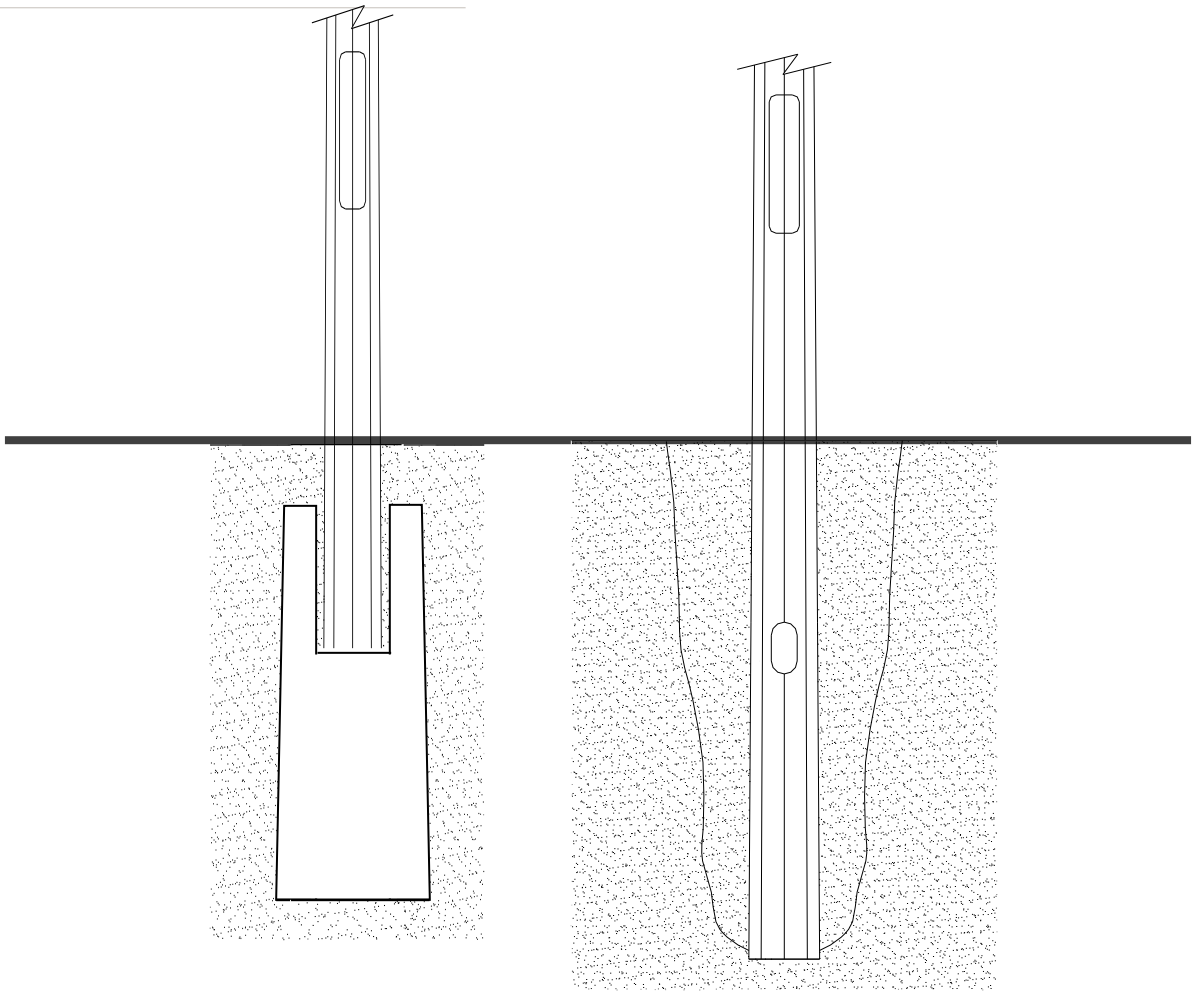
ZIPpole, EN40 as lighting pole

EN12767, 100 Non Energy absorbing

up to 12m

not fixed in the ground

100-NE-C-S-SE-MD-1



Installation of the ZIPpole3XL

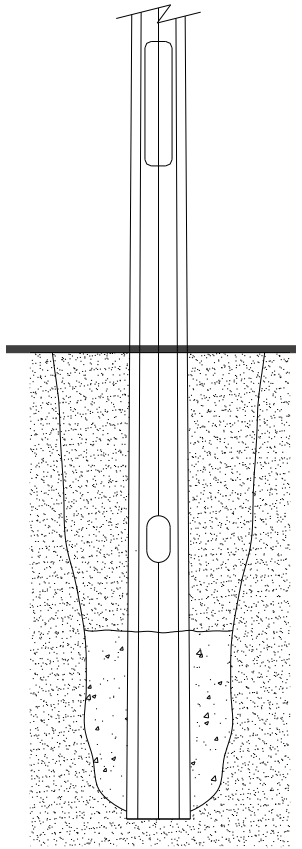
ZIPpole3XL, EN40 as lighting pole

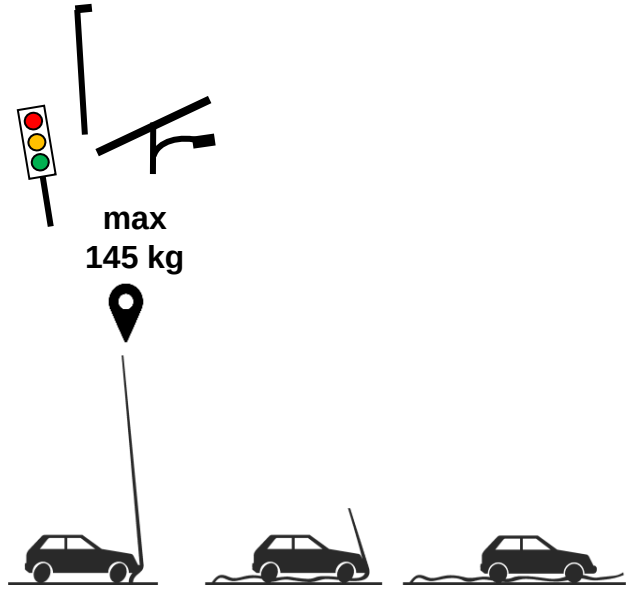
EN12767, 100 High Energy absorbing

from 6m to 18m

fixed in the ground

100-HE-E-S-NS-MD-1





for heavy load on low height, starting from 6m

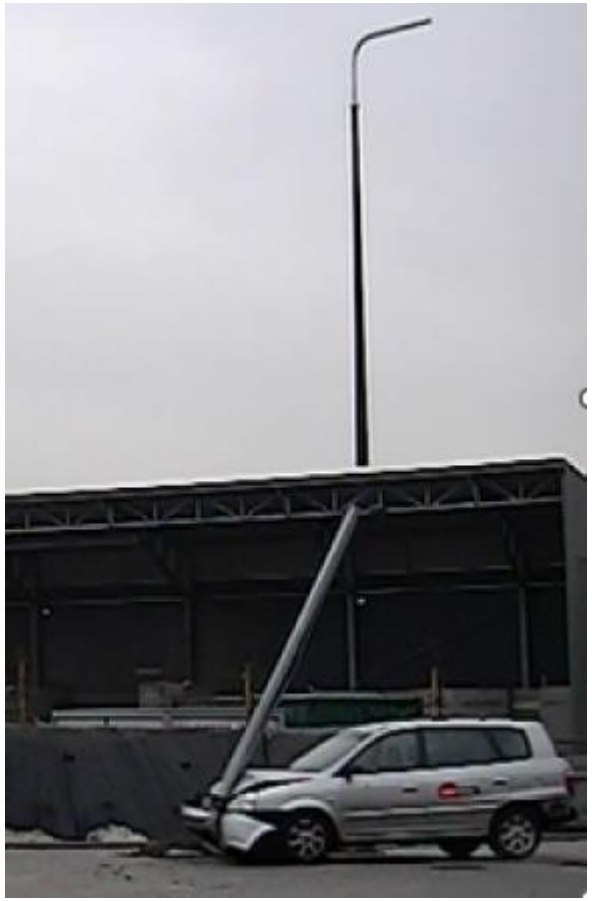
or high height up to 18m

Demonstration films on www.zippole.com/crash-tests

ZIPpole

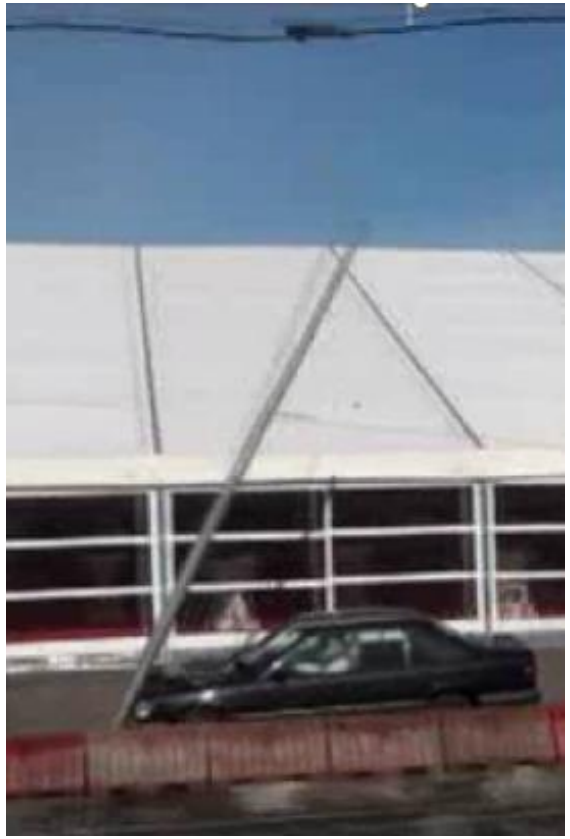
Demonstration films on www.zippole.com/crash-tests

ZIPpole3XL



Demonstration films on www.zippole.com/crash-tests

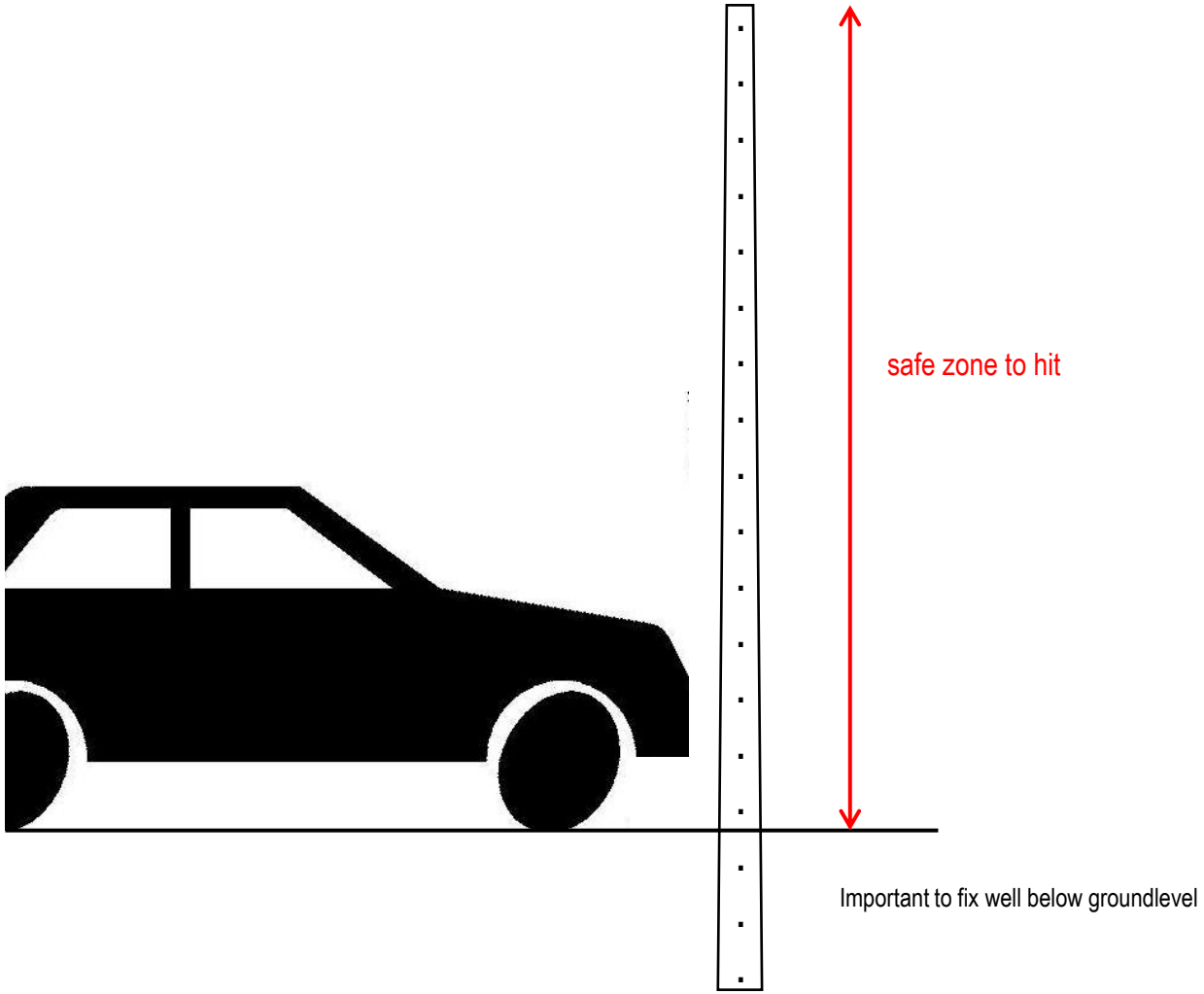
ZIPpole or ZIPpole3XL with overhead cables



Demonstration films on www.zippole.com/crash-tests

ZIPpole or ZIPpole3XL with overhead cables

Sidewards impact into the ZIPpole.

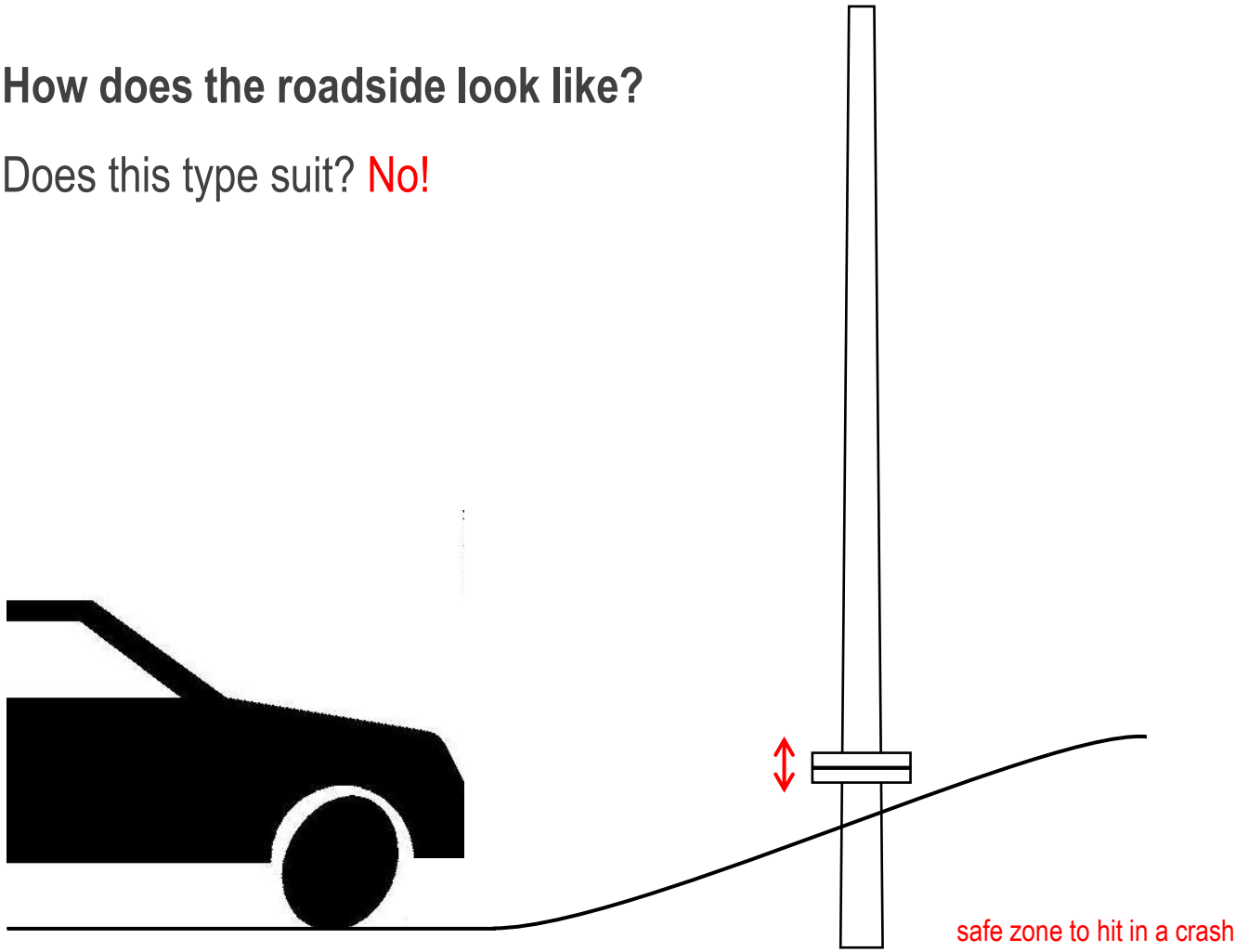


Accident into ZIPpole with a car coming from the other direction of the road

HOW TO SELECT THE RIGHT PRODUCT

How does the roadside look like?

Does this type suit? No!

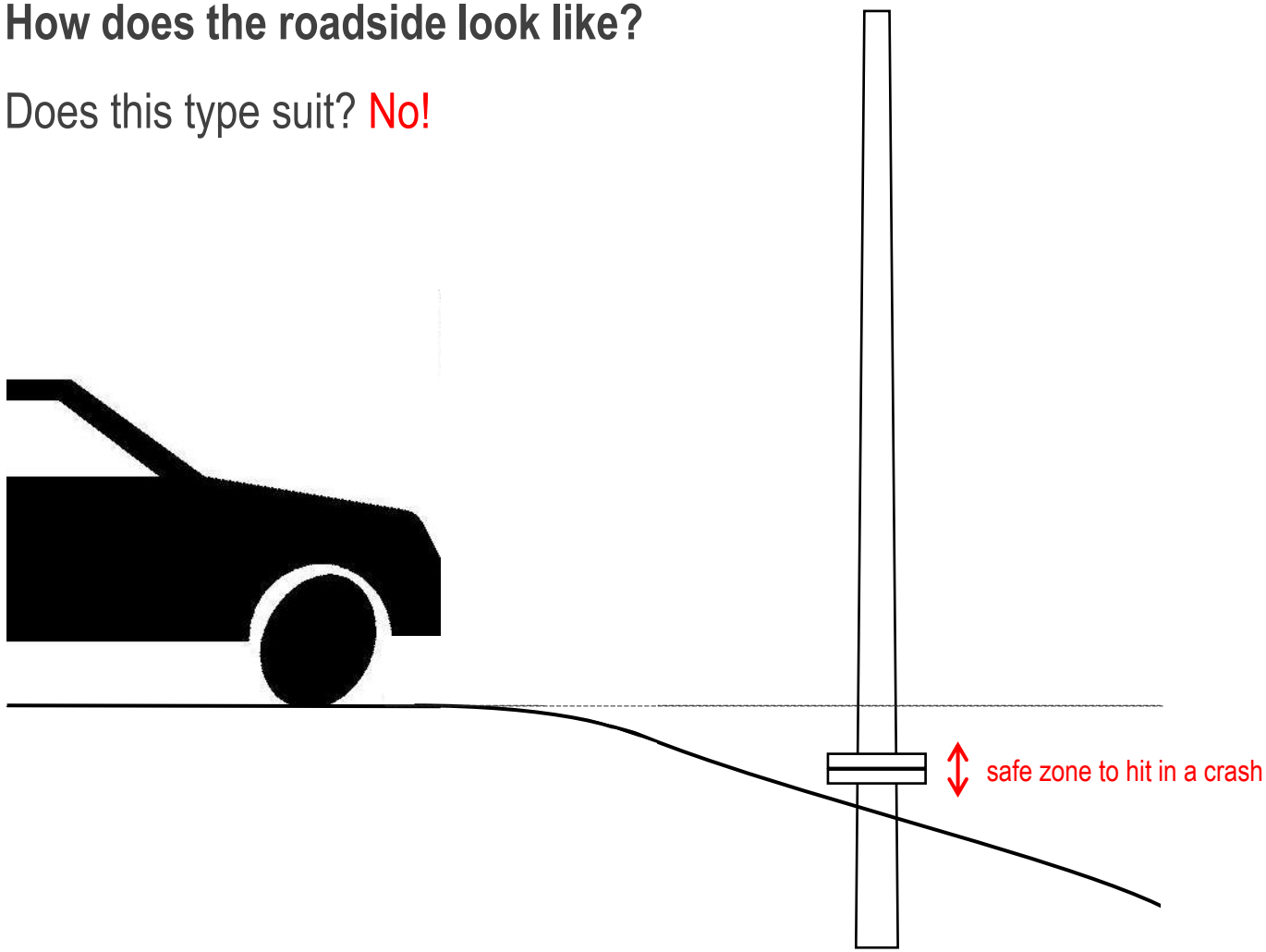


Product didn’t function in the accident

HOW TO SELECT THE RIGHT PRODUCT

How does the roadside look like?

Does this type suit? No!

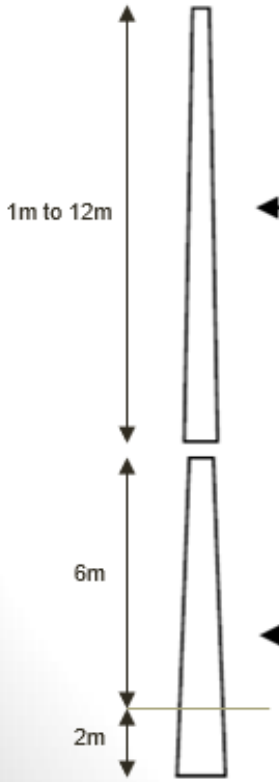


Product didn’t function in the accident

ZIPpole references

ZIPpole3XL

SAFETY-PRODUCT



← ZP or other type of pole, can be a conventional pole, no need to be passive safe, can be of local producer

← ZP3XL

ZIPpole

ZIPpole fixing small equipment

Corrosion Resistant Band & Buckle

Type 304 Stainless Steel Band

This alloy will provide a very good corrosion resistance in fresh water and industrial atmospheres. Often selected for light duty applications in food processing, chemical, power transmission and cable management.

Part No.	Material	Width in	Width mm	Thickness in	Thickness mm	Average Breaking Strength (lbs)	Package Quantity	Weight lbs	Weight kg	Application Tools
304 Stainless Steel Band										
C91399	304 SS	3/8	9.6	0.020	0.51	600	200'/Roll	5.9	2.7	C00169 C00369 C07569 C08569 C40099 J02069*
C91499	304 SS	1/2	12.7	0.020	0.51	850	200'/Roll	7.6	3.4	
C91599	304 SS	5/8	15.8	0.020	0.51	1000	200'/Roll	9.5	4.3	
C91699	304 SS	3/4	19.1	0.020	0.51	1275	200'/Roll	11.3	5.0	

*The J02069 can be used with 3/8" maximum width product.

850 lbs= ~3825N

the rivets of the ZIPpole collapse at 4400N

ZIPpole references

ZIPpole not that soft

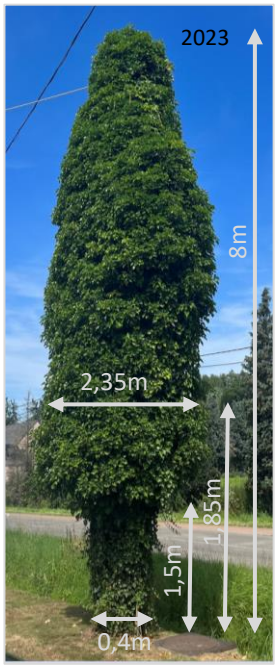
ZIPpole green

the story of the “green” ZIPpole

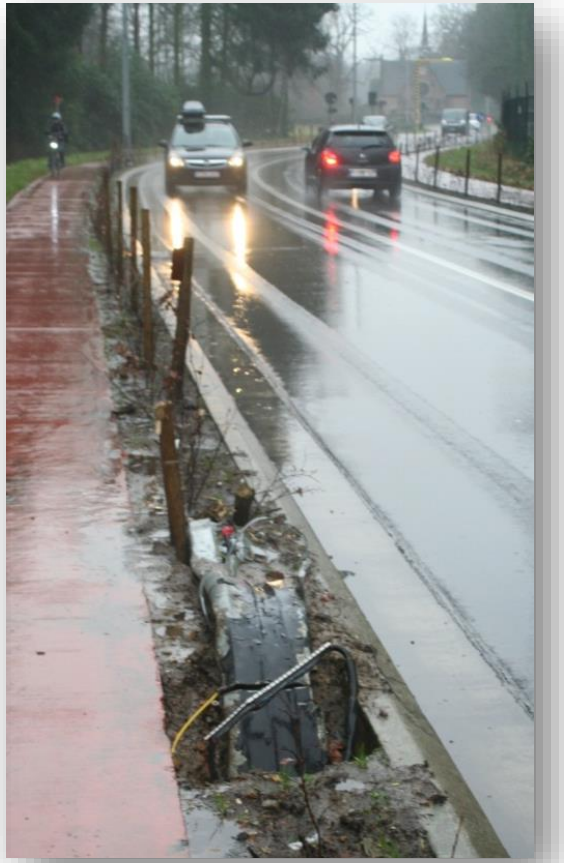
experiment started in 2013

“green” ZIPpole was crashtested in June 2023…

100HE1 or 100-HE-E according EN12767

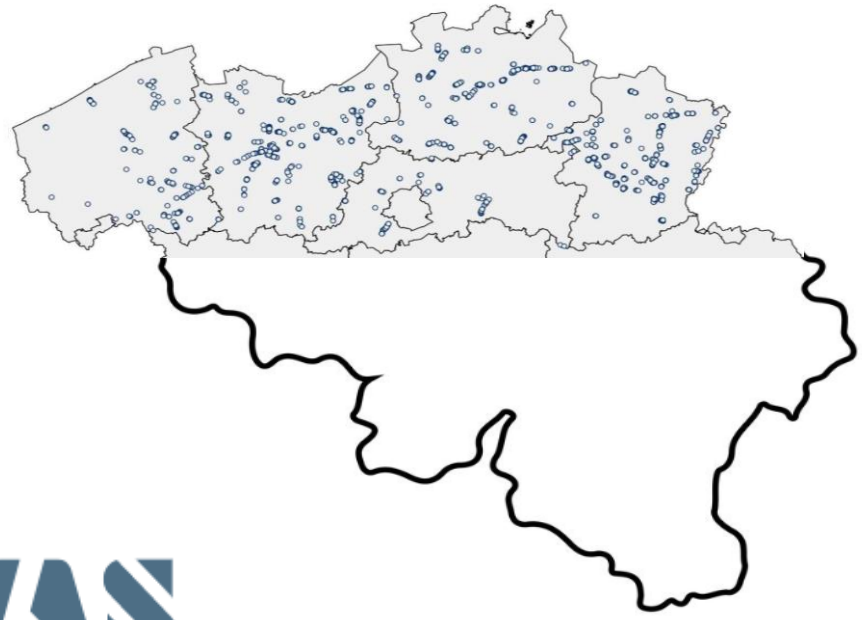


ZIPpole crashes www.zippole.com/experiences



Scientific study >10 years use of HE poles in Flanders, Belgium

- 1st study to address mitigating effect of passive safe poles in ROR crashes
- multinomial and mixed logit models
- Input:
  - national Belgian crash data with injuries
  - geocoded list of 5800 passive safe HE* poles
  - damage data of road furniture



LNEC LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL

VIAS institute

*HE are High Energy absorbing poles, CE marked according EN12767

Scientific study >10 years use of HE poles in Flanders, Belgium

- **Run off road crashes involving traditional poles increase the risk of severe injury by 87%**
- **HE passive safe poles increase the chance of minor injury by 128%**

Conclusion:

application of HE passive safe poles results in reducing the severity of pole crashes

Study published in Journal of Safety Research in October 2024

Summary

ZIPpole
EN12767, 100HE3/ 100HE-C from 6 to 12m, fixed in the ground
EN12767, 100NE2/ 100NE-C up to 12m, not fixed in the ground

ZIPpole3XL
EN12767, 100HE1/ 100HE-E from 6 to 18m , fixed in the ground

- safe in all impact directions and on all heights of impact
- different installation methods
- bending moment capacity of 20.000 Nm for ZIPpole and 40.000 Nm for ZIPpole3XL
- 25 years warranty against corrosion for ZM310 coating according EN10346


ArcelorMittal

Magnelis®

ArcelorMittal Belgium N.V. provides this guarantee to

Safety product N.V.
Beverlosesteenweg 100
3580 Beringen
Belgium

hereafter referred to as the "Client"
relating to the quality of its Magnelis® ZM 310-type coated flat carbon steel. Subject to the conditions of this document, this guarantee covers the non-perforation and non-rupture due to corrosion of Magnelis® steel sheet coated with 310 g/m² on both sides according to European standard EN 10346, used for ZIPpoles placed in locations with a normal atmospheric corrosivity category (C2 ... C4 as per EN ISO 12944-2:2017), for a period of 25 years, from the date of shipping by ArcelorMittal, under the conditions specified in the Magnelis® Guarantee.

Magnelis® - 26 May 2020

Bart Staelens, Head of Segment & Product Sales Steering
Laurent Ploeman, Head of Operational Marketing
ArcelorMittal Belgium N.V. — The Client

25 year guarantee
for use for Fabrication of
ZIPpoles (up to 12 m)
and ZIPpoles 3XL (6 to 18 m)

Covered by CE certificates 1148-CPD-20080603 and 1148-CPD-20110714

SAFETY-PRODUCT

LETS STAY IN TOUCH...

» carolien.willems@safety-product.eu

» www.zippole.com

» www.safety-product.eu

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