University of Zambia | 7–18 April 2025

Safe speeds

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AFRO SAFE ACADEMY


Safe vehicles
Post-crash response
Safe infrastructure
Safe speeds
Safe road users
Road safety management


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A story of a chain saw


STOP
SLOW
FAST
Story by S. O. Hansson


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FAST
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SLOW
FAST
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0
20
40
60
80
100
120
140
160
180
200
Km/h
Km
BUGATTI

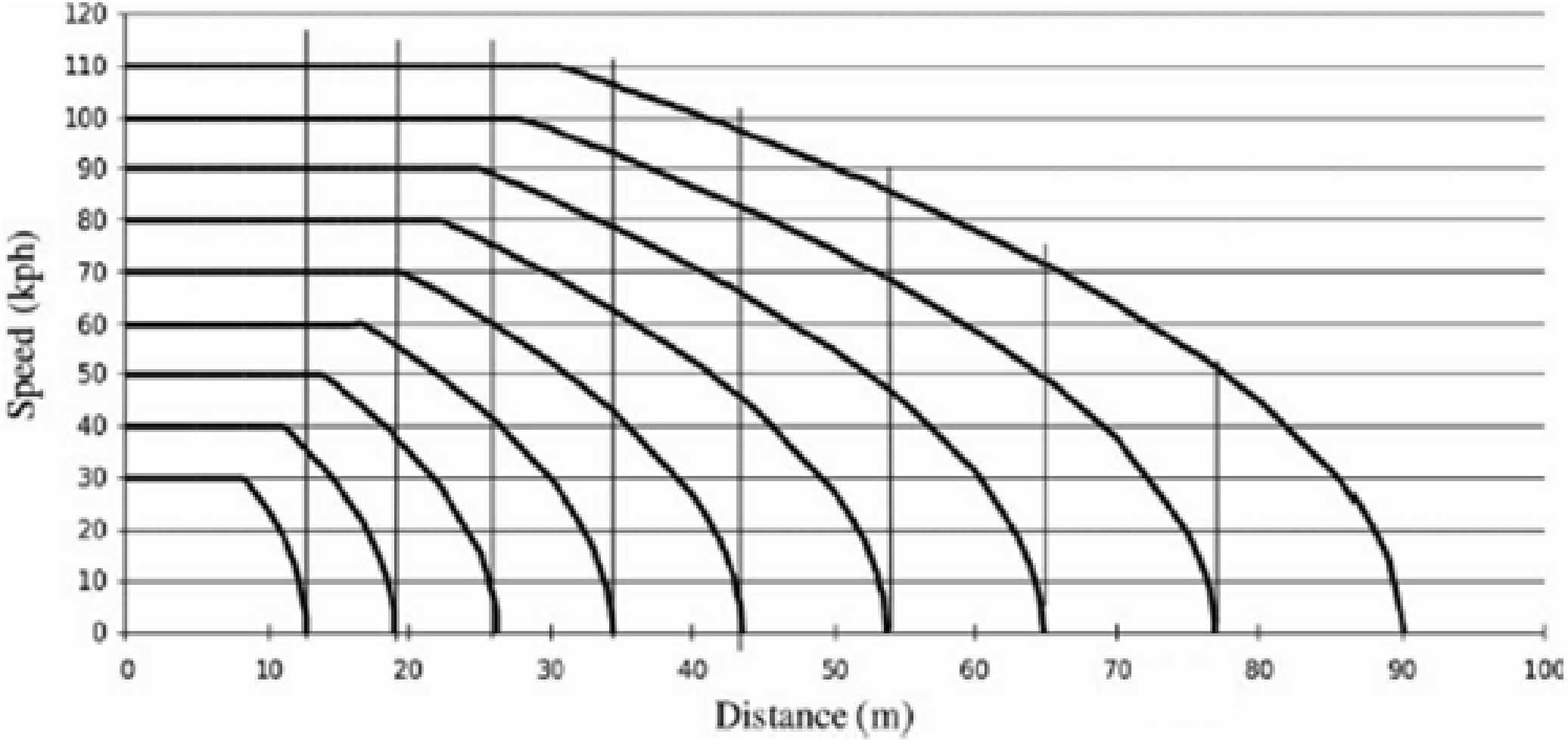
DN 970830
Dubbel

Dubbel helsida

Why speed is dangerous?

Speed as a function of the distance when the driver becomes aware of an obstacle and starts to brake

Reaction time: 1 sec (friction coefficient μ = 0,8)



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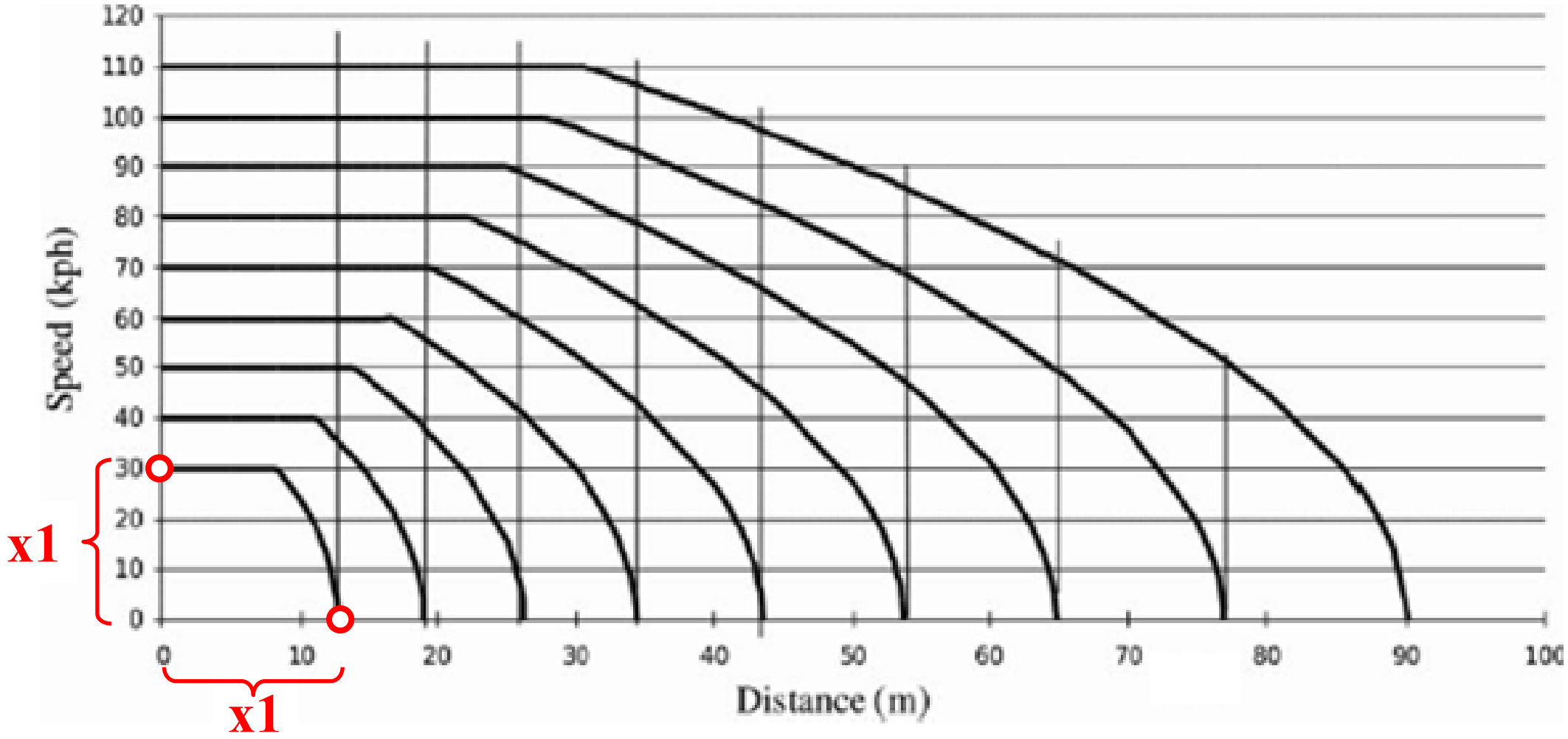

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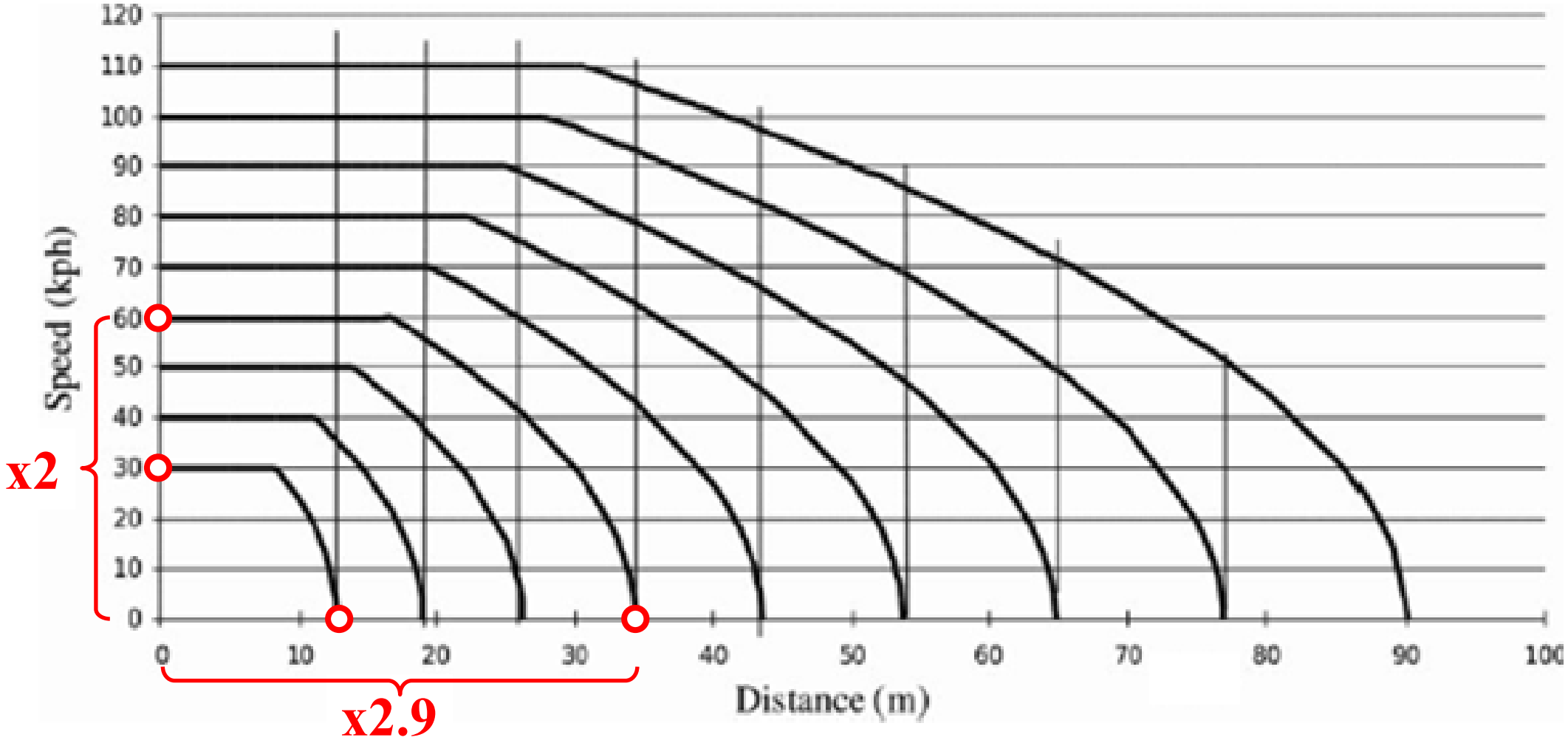

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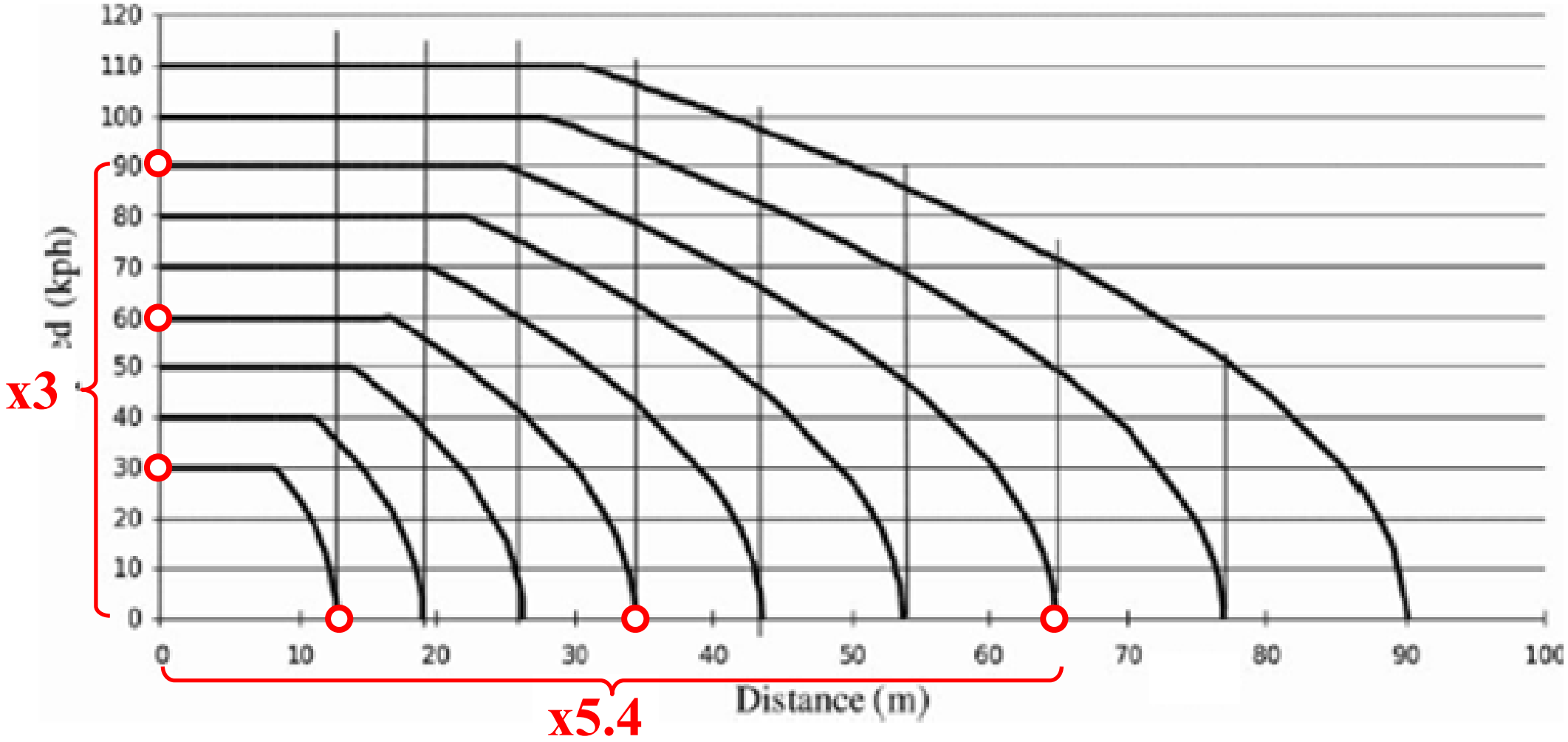
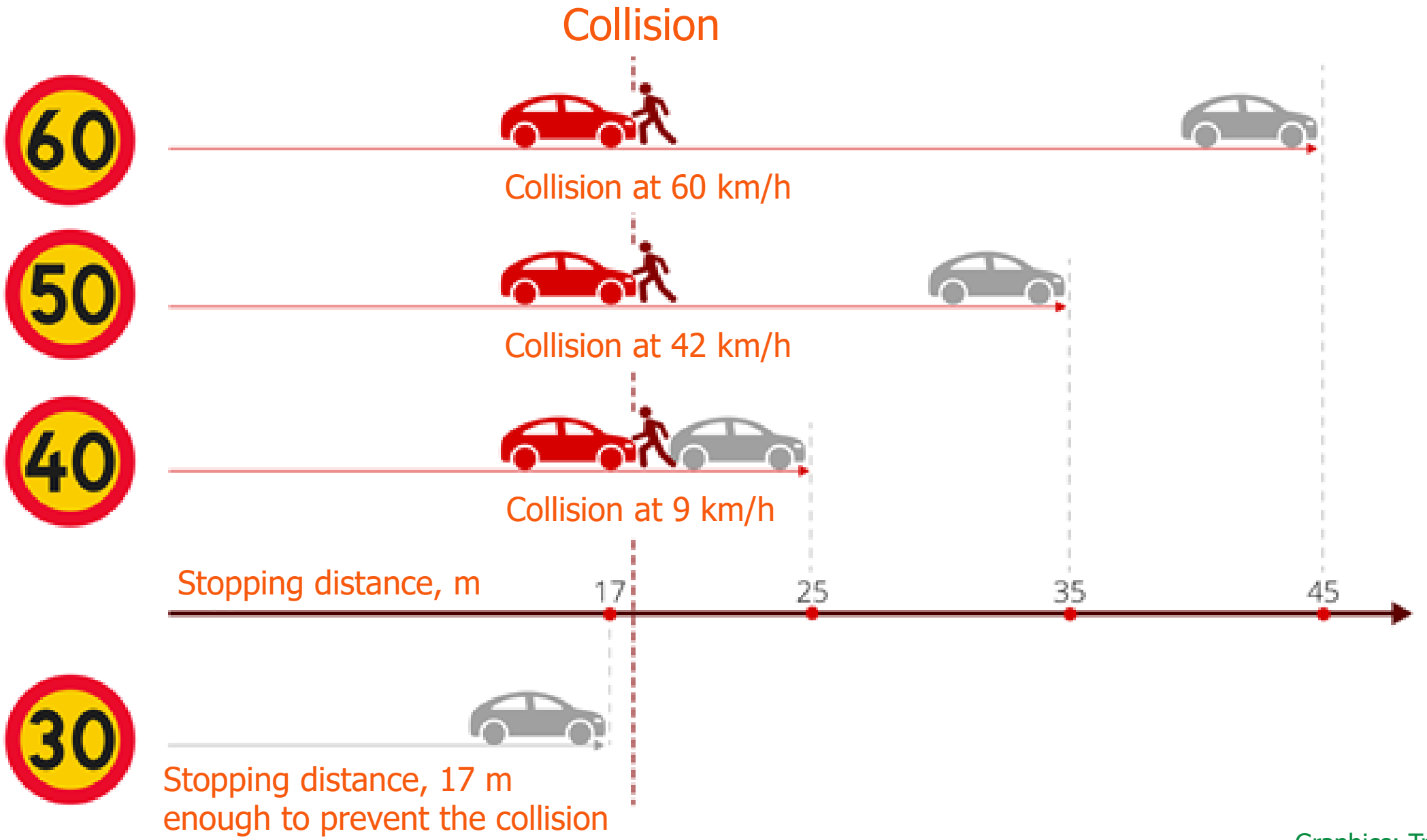


Collision energy



Graphics: Trafikverket

Law of energy conservation

Potential energy

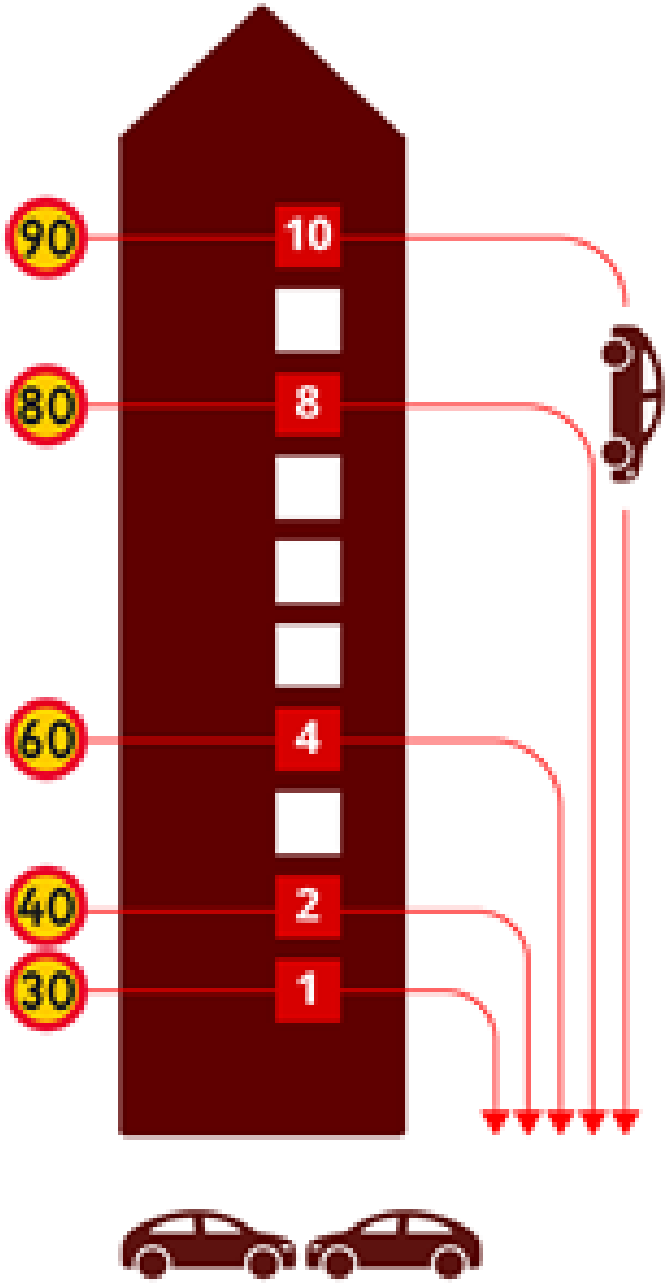
Kinetic energy

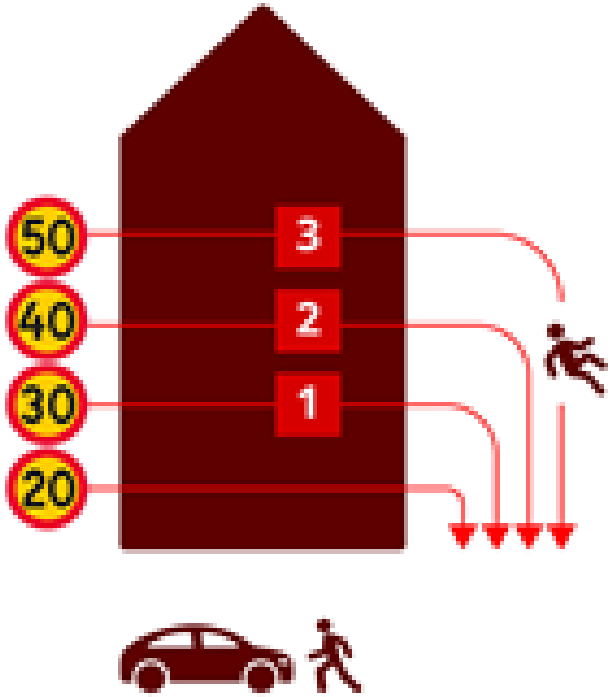
Deformation

The energy cannot ‘disappear’, it can only change form.

Graphics: Vägverket

Collision energy





Graphics: Trafikverket

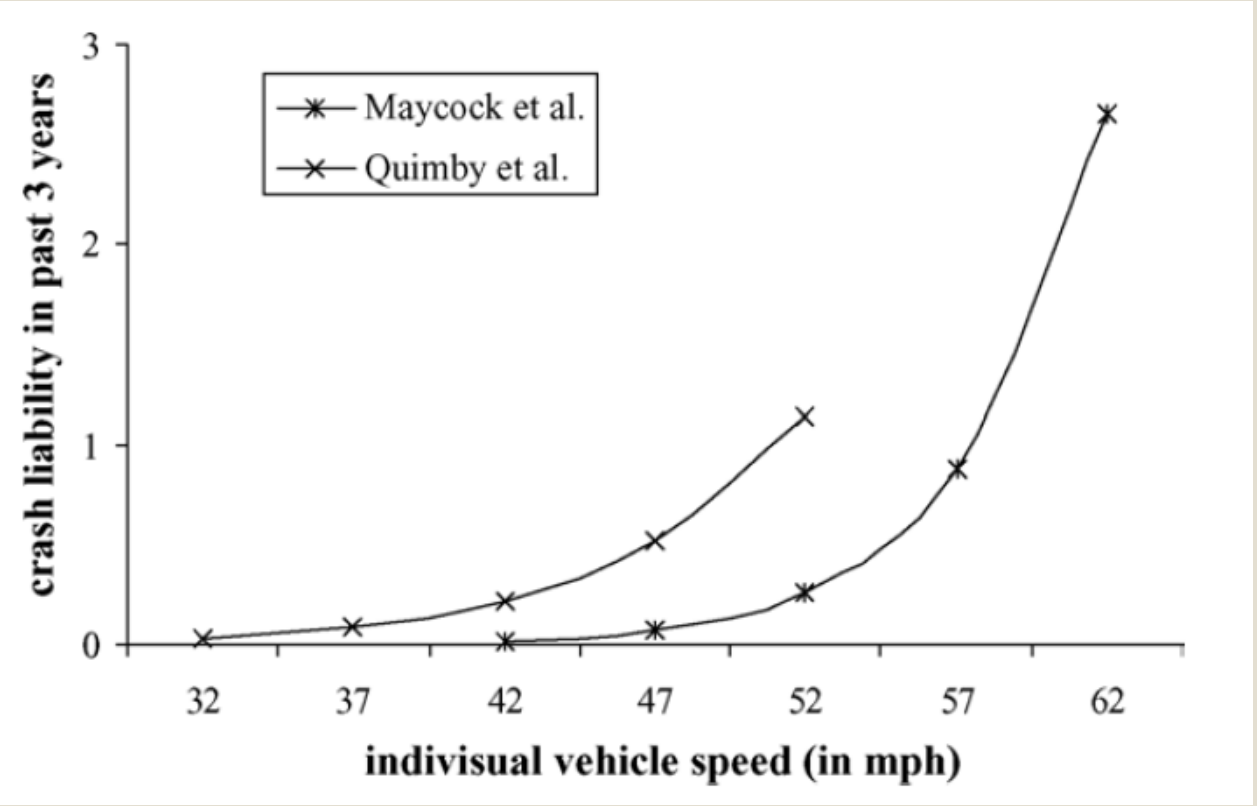
50 km/h

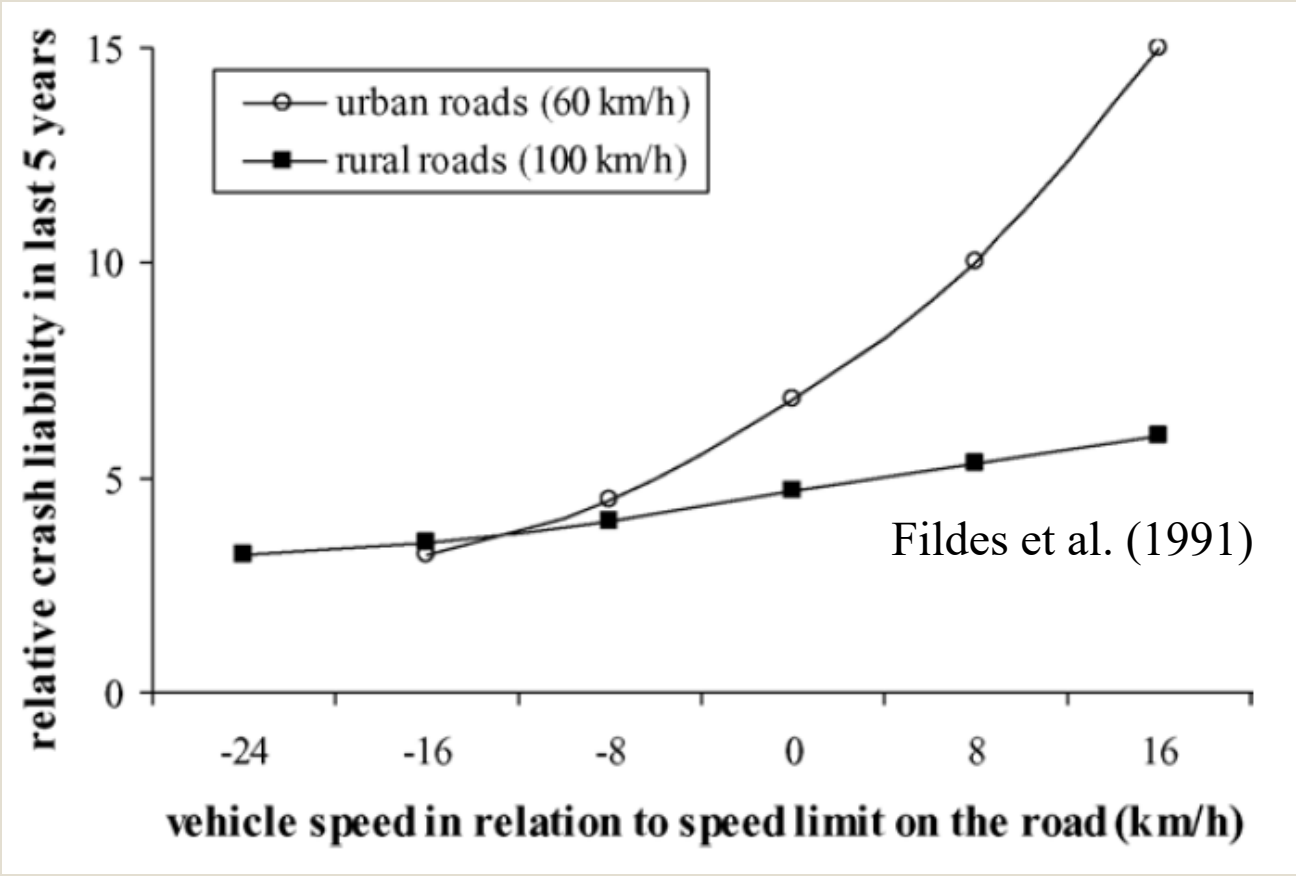
70 km/h

90 km/h


90
90 km/h

Individual speed





Aarts & van Schagen 2006

Average speed: Power model

$$\frac{Fatal\ accidents_{\ after}}{Fatal\ accidents_{before}} = \left(\frac{V_{after}}{V_{before}}\right)^4$$

Nilsson 2004

Average speed: Power model

Average speed: 80 km/h → 88 km/h (+10%)

Fatal accidents: increase by $\left(\frac{88}{80}\right)^4$ =1.46 (+46%)

Nilsson 2004

Average speed: Power model

Average speed: 80 km/h → 96 km/h (+20%)

Fatal accidents: increase by $\left(\frac{96}{80}\right)^4$ =2.07 (+107%)

Nilsson 2004

Deviation from average speed

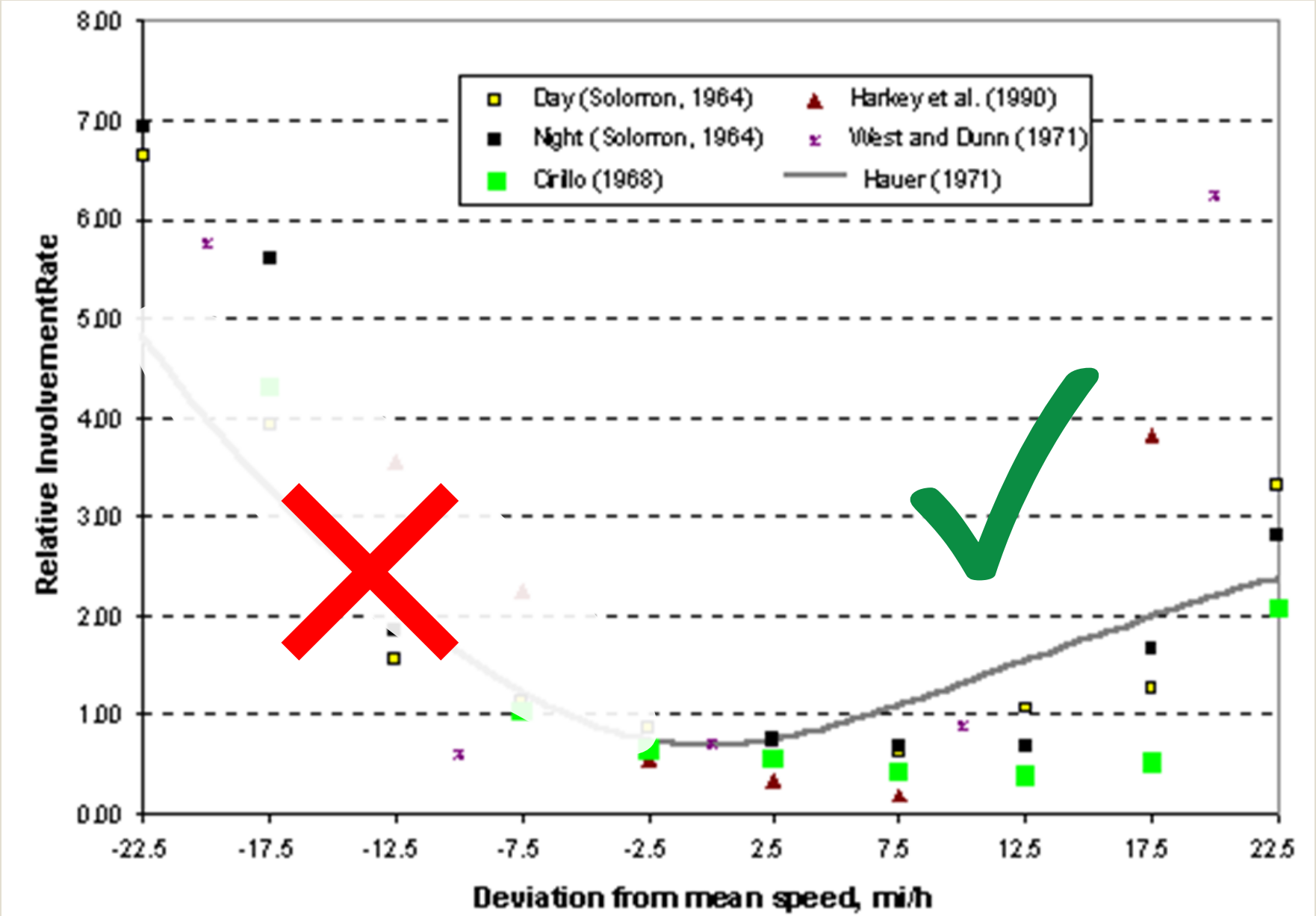
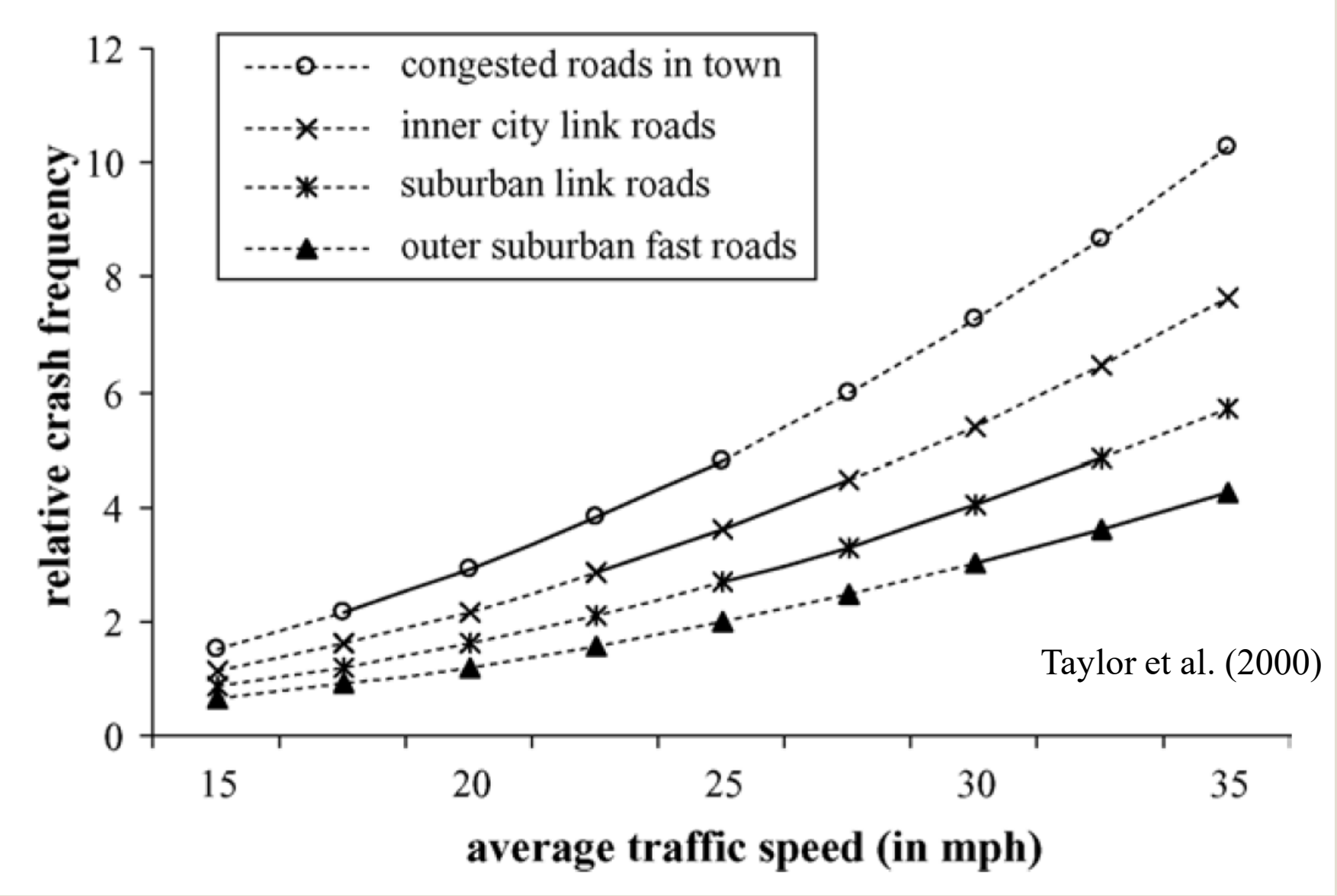


Figure 4. Crash involvement and overtaking rates relative to average rate and speed.

FWHA, source?

Average speed: road types

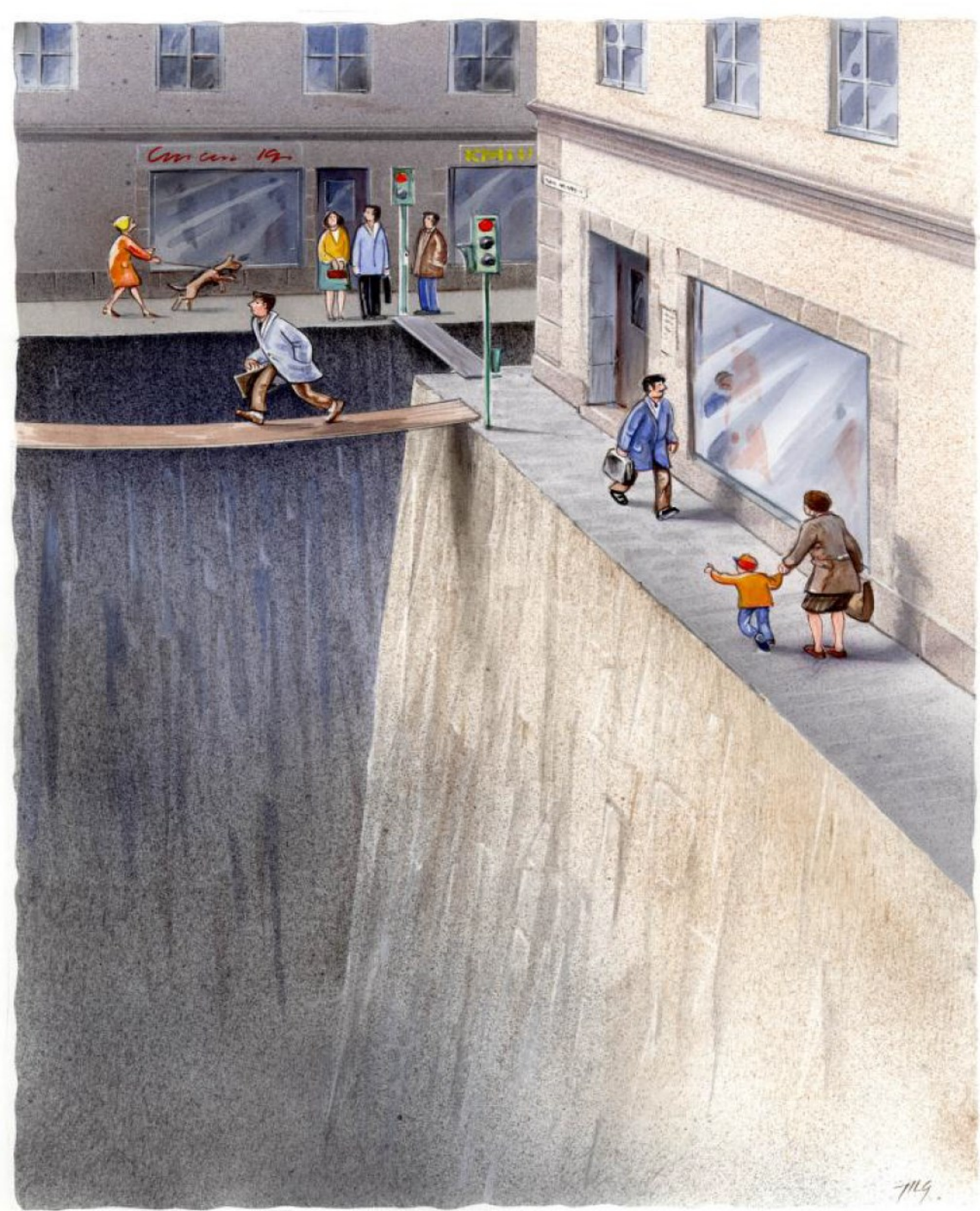


Aarts & van Schagen 2006

Speed limit vs. road safety standard

Speed management in Safe System

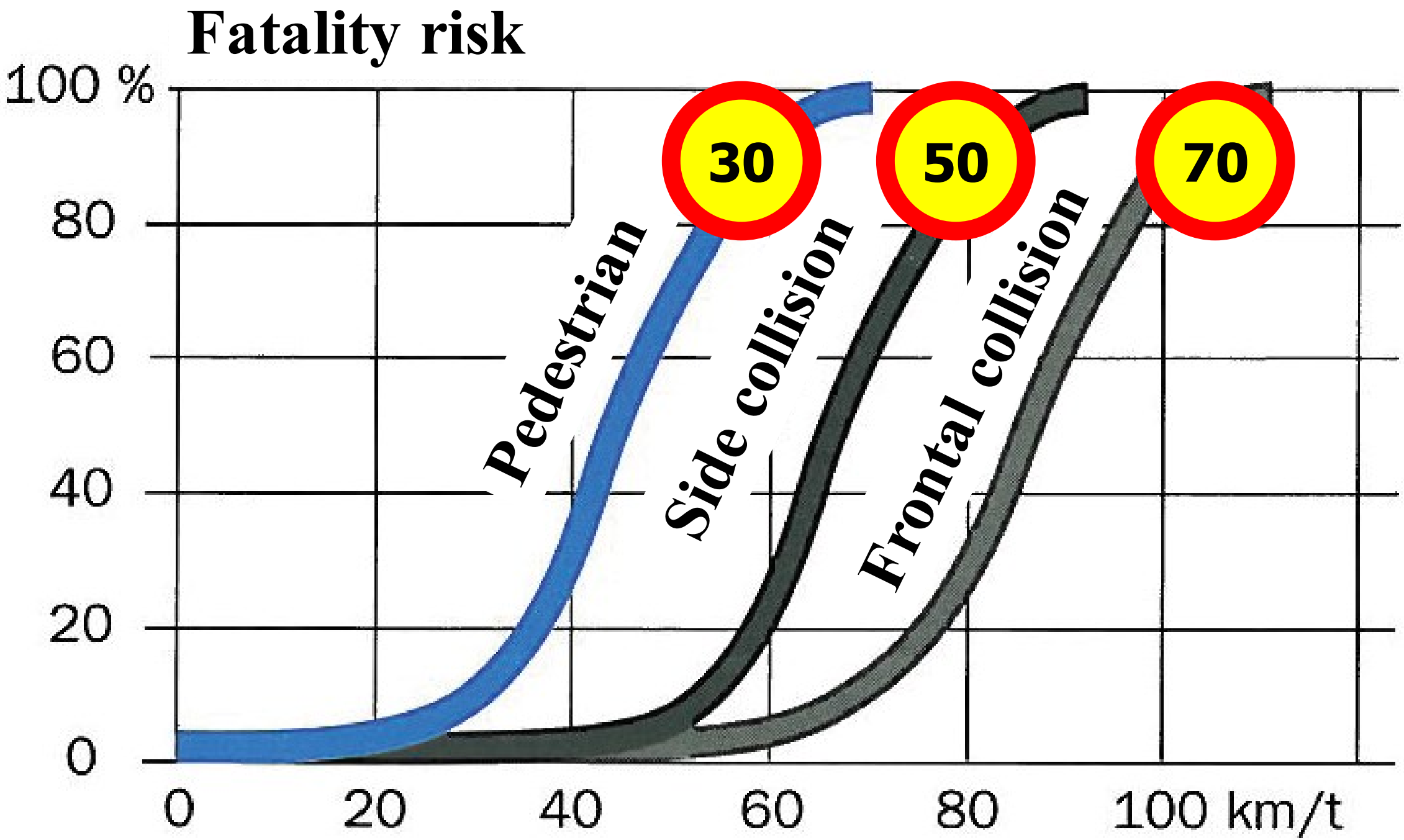

3m



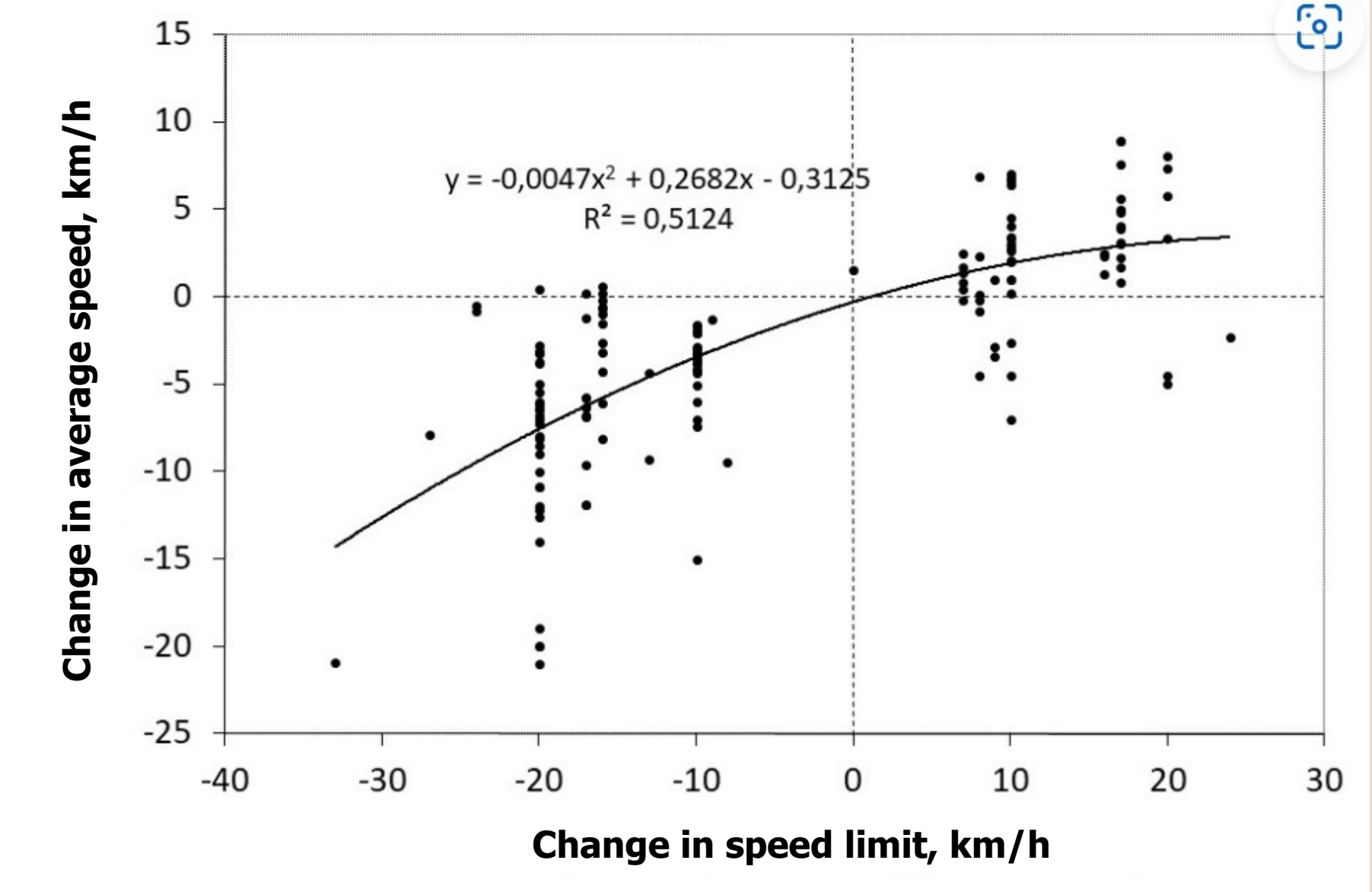

idea: Lars Ekman


idea: Lars Ekman


23 34
VÄXJÖ 174
VIMMERBY 49
KISA 9


Fatality risk
100 %
80
60
40
20
0
0
20
40
60
80
100 km/t
30
50
70
Pedestrian
Side collision
Frontal collision

Speed limit change: not enough!



Trafikksikkerhetshåndboken, 2019


ONE
LANE
ROAD
ARTERIAL
ROUTE


30
Speed adaptation zone
Zero emission zone

Where to start?

Where to start?

Explicit speed limits on all roads / road types

Speed limits clearly signed and communicated

Ambition to lower speed limits (esp. in urban areas)

Enforcement

Speed limits for vehicle types (cars, trucks)

Regulations for professional traffic

No one to be killed in traffic

VISION ZERO

TOGETHER WE SAVE LIVES

Graphic: Trafikverket

Thank you!

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AFRO SAFE ACADEMY

www.ictct.net/afrosafe

References

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Elvik, R. (2009), 'The Power Model of the Relationship between Speed and Road Safety, Update and New Analyses' (Oslo, Norway: Institute of Transport Economics), TØI rapport 1034/2009, https://www.toi.no/getfile.php?mmfileid=13206.

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