

**Safe Systems Summit**

Redefining Transportation Safety

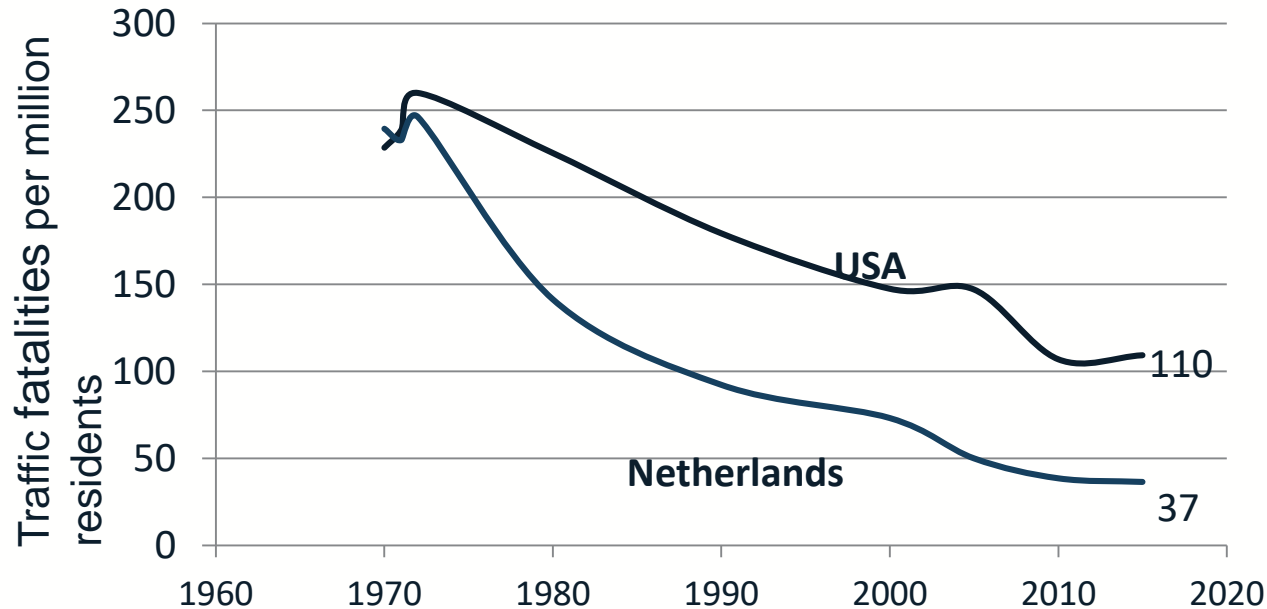


# Systematic Safety: The Principles Behind Europe's Vision Zero

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# If we'd improved as Netherlands did, we'd be saving 20,000 lives per year

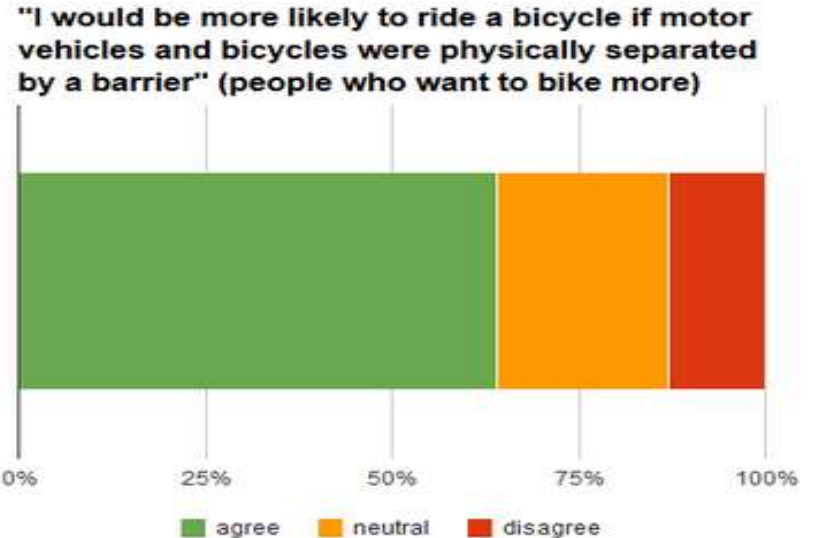


For vulnerable road users, unsafety is *worse* than what death / injury statistics show.

*Where people have a choice, unsafety manifests itself in making walking & cycling extinct.*

## Systematic safety =

- fewer deaths & injuries
- people are comfortable riding a bike and letting their kids walk to school.



Source: People for Bikes

# Fundamentals of Systematic Safety as practiced in Netherland

- Three values
- Three relevant properties of humans
- Five principles

# Value # 1: Safe Mobility is a Civil Right

**Meanwhile, the nearest safe crossing is 0.3 miles away!**

8 ft wide platform makes this bus stop  
“accessible”, per ADA



## Value # 2: The road system owner is responsible for ensuring road safety



2011: A boy was killed while crossing this street with his mother. How did the County respond? They charged the mother with vehicular homicide – and she was convicted!

1788 Austell Road, Marietta, Georgia (Google Maps)

Value # 3: Traffic safety programs go beyond black-spot treatment, eliminating safety risks before they cause serious injury or death.

*Reacting to historic crashes: necessary, but not sufficient*

*Stop looking only for dangerous locations, and instead identify dangerous situations (such as crossing 4 lanes)*



This crossing was treated after a pedestrian was killed there. What about the other 20 crossings just like it?

# Large-scale, systemic intervention in NL

- **30 km/h zones**: National subsidy resulted in 75% of urban streets covered in less than 10 years.
- **Roundabouts**: NL installed 10,000 before US installed 1,000, and made roundabout the preferred, default intersection type
- **Side street crossing tables**: Introduced around 2005; thousands have since been installed.





Why Do Traffic Injuries Happen?

## Three properties of humans

- a. Humans are vulnerable
  - Implications for *speed* and for *separation*
- b. Humans make mistakes
  - How to lower risk of error?
  - ... counter the temptation to err deliberately?
- c. Humans are impatient
  - They want to go fast, to pass slower road users

*These human properties lead to 5 Systematic safety principles ...*

# Principle #1 of 5: Speed Control & Separation

Critical vulnerability	Maximum lanes	Maximum Speed	Treatments
People cross anywhere	Unlaned local street	20 mph	<b>20 mph zones:</b> Speed humps (also OK: STOP signs, neighborhood traffic circles)
Bikes in mixed traffic			
People cross at unsignalized crosswalks	1+1 lanes	25 mph	<b>Crossing islands</b> which create reverse curves
Cars may collide at right angles	Multi-lane (with traffic signals)	30 mph	Program traffic signals to <i>limit speeding opportunities</i> (actuated control, short cycles, limit coordination to short zones)

# #1 Means of Speed Control on Arterials: Road Diets

*Because passing = speeding*

Multilane roads are inherently dangerous – keep them out of your cities wherever you can!

Road diets are a 3-for-1

- Speed control
- Simpler crossings
- Space for bike lanes



# Making a “Crossable Collector” using crossing islands with a reverse curve



Dudley Street in Boston, reimagined with crossing islands

# Principle #1: Speed Control & **Separation**

Separate bikes where speed > 20 mph or ADT > 1,500

- **Advisory lanes** are OK for 25 mph, no centerline
- **Bike lanes** are OK with 1+1 lanes, 25 mph
- **Cycle tracks** (physical separation) otherwise



*Humans are impatient – they want to pass. Advisory lanes make passing calmer, more predictable.*

# Principles of Systematic Safety

Principle	Related to:
1. Speed Control & Separation	Humans are vulnerable
2. Simplicity, Visibility, and Predictability	Humans make
3. Forgivingness and Restrictiveness	mistakes
4. Functional Harmony	A road can't serve (well) high-speed and low-speed functions
5. State Awareness	Driver state (impaired, novice)

More information: See my video, [Systematic Safety: The Principles Behind Vision Zero](#)

# Large-scale, systemic interventions needed in US cities

- **Road diets.** Eliminate / avoid 4+ lanes wherever possible.
- **Crossing islands.** At unsignalized crossings, ADT > 8,000 ADT.
- **Safe crossings at bus stops.**
- **Traffic signals for speed control.** Coordination should be a subordinate goal. That means prefer actuated, short cycles
- **Cycle tracks.** On all multilane roads, and 30 mph roads with parking
- **20 mph zones.** Speed limit AND traffic calming treatments.
- **Roundabouts:** Make single-lane roundabouts the preferred, default intersection type