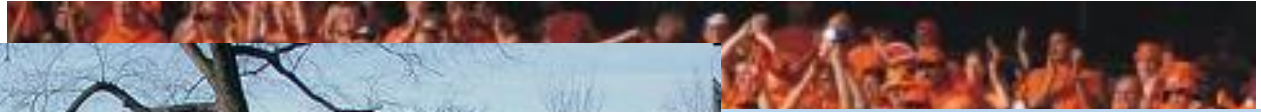


Typically Dutch!





Cycling in a sustainably safe system

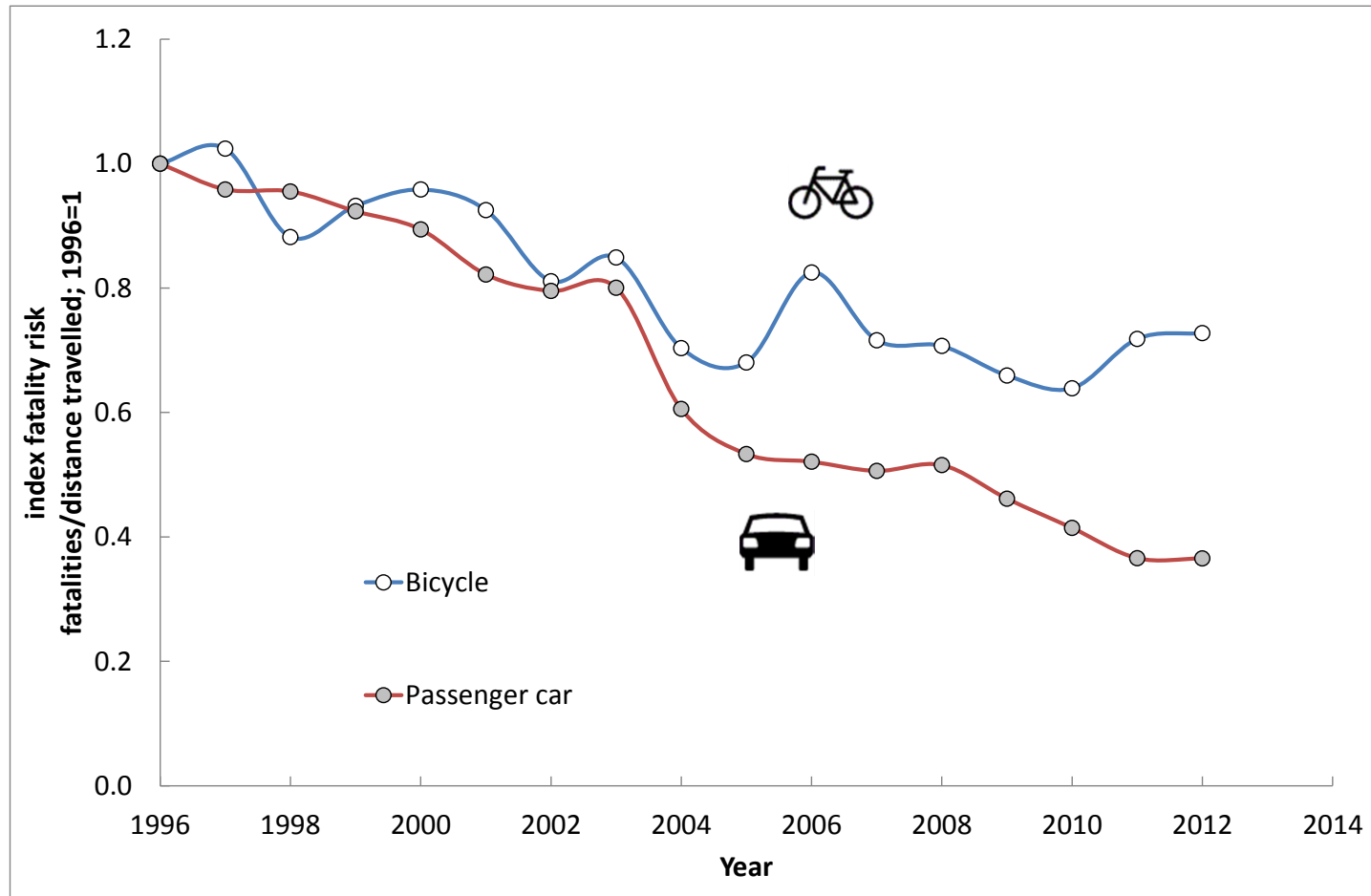
Henk Stipdonk

henk.stipdonk@swov.nl

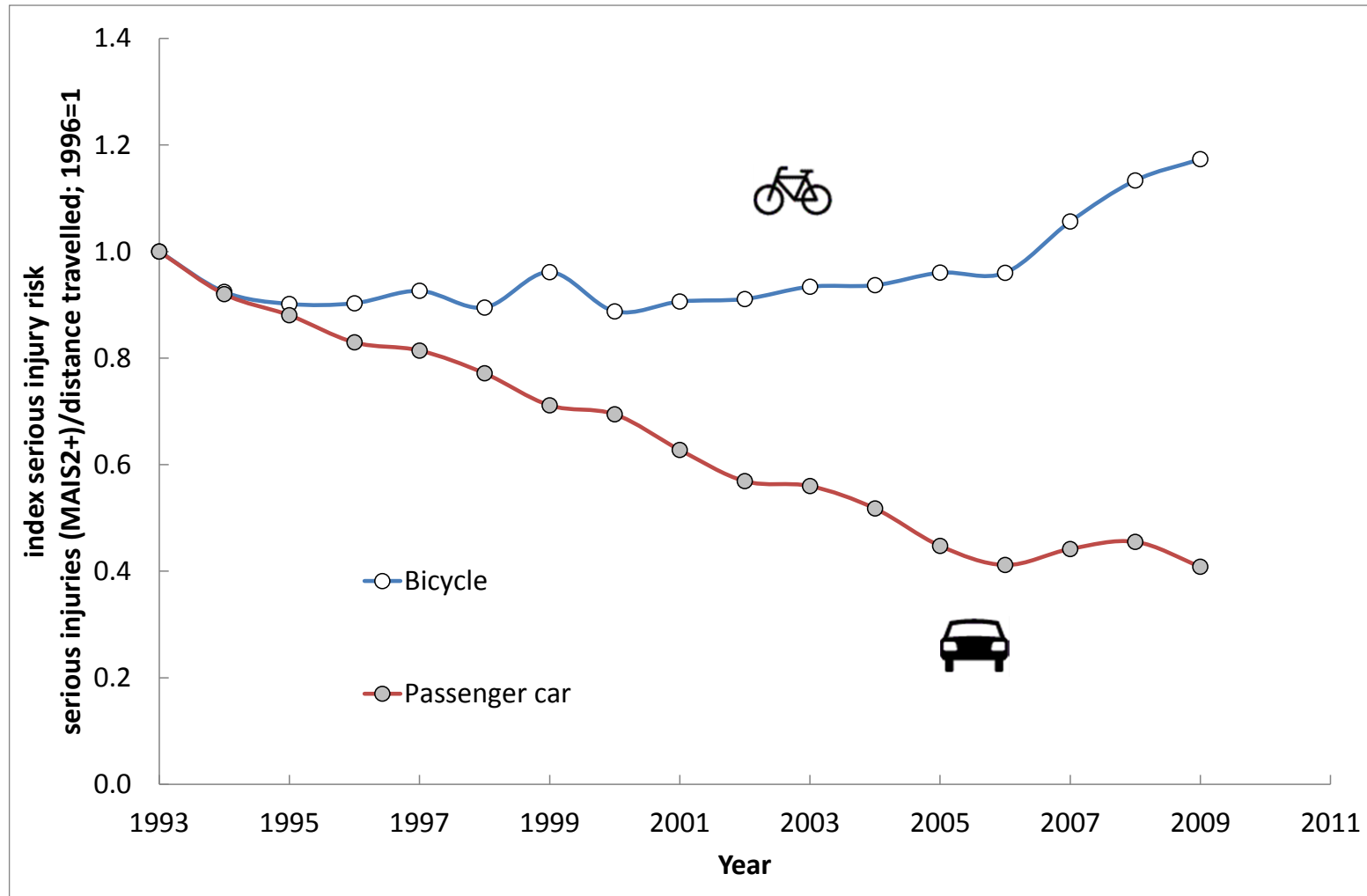


PROBLEM (DO NOT COPY)

Index road fatality risk



Index serious road injury risk



Fatalities: mostly because of motorized traffic

Crashes VRU & cars

- Mostly serious
- Happen mostly in built up areas
- Often at intersections



Serious Injuries: mostly because of falls

- Senior cyclists
- Poor infrastructural design
- Poor maintenance
- Cycle lanes that are too busy.
- Electric bicycles
- Alcohol use among cyclists



Sustainable safety (safe systems approach)

Integrated

- Education
- Infrastructure
- Vehicle design
- Enforcement

Proactive not curative

- Functionality
- Homogeneity mass&speed
- Predictable vehicle course, recognizable road types
- Forgiving environment/users
- State awareness road user

System approach: Safe speeds*

Conflict types	Safe speed (km/h)
Possible conflicts Cars unprotected road users	30
Intersections conflicts right angles between cars	50
Possible frontal conflicts cars	70
No frontal and lateral conflicts	100

* Tingvall, C. & Haworth, N. (1999). Vision zero - an ethical approach to safety and mobility. In: 6th ITE International Conference Road Safety & Traffic Enforcement: Beyond 2000.

Thus

- Make man the measure of all things
- Use human factors/ cognitive ergonomics/ physical tolerance to design the systems.
- Bend the tool, not the person
- Make system forgiving for human (fatal) errors
- Change environment instead of man

Infrastructure Measures that work

Segregation of VRU and Motor vehicles

- Mix only at low speeds
- Separate otherwise

- 30 Zones - 15 %
- Cycle path - 24 %
- 60 Zones - 32 %*
- Roundabout - 30 %*



An example of a safe road (30km/h)



Bicycles measures



MEN / JUNIOR



- Bicycle Lights: ??
- Reflection on tyres: 4%
- Helmets: debate
- Reflection front: 4%
- Crash pants?
- Three wheel bikes?



Enforcement



- Bicycle Lights
- Alcohol use drivers/
cyclists
- Speeding
- Red light running?

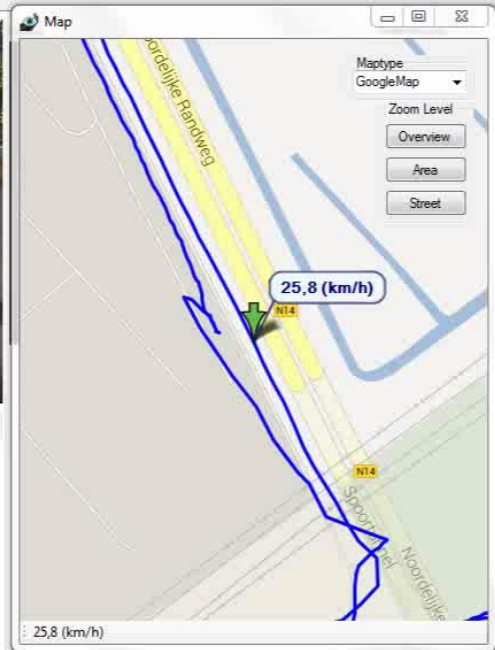
Bicycle innovation: Balance Bike



- Arend Schwab et al,
TU Delft

Bicycle innovation: Instrumented bicycles





Video Controls

6 Ps **Paused** x20

1s < Play > 1s

6s <Zf >>> >>> Zf 6s

Choose Participant and Trip

2013 20130808_1313_C

Miscellaneous

SpeedGraph

Graphs

Map

SwitchVids

Rotate vids

RinScreen

Information

Current timecode: 892.659

Current speed: 26.07188

Current steer angle: -0.4511055

-50 0 50

Trip length: 0h33m26s

Coded Events

View currently coded events View previously coded events

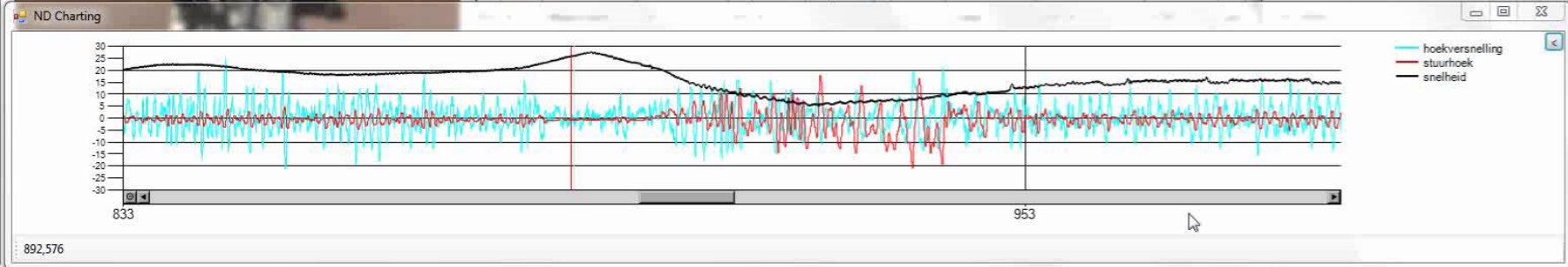
time	label	additional	begin_ev	end_ev	duration	relatedevent	relEv_timecode	relEv_ID	sch
389.583374	Helling op heen		389.583374	424.563782	34.9804153				Sche
549.5112	Algemeen	grote slinger	549.5112						Sche
610.720154	Recht heen		610.720154	672.262634	61.54248				Sche

Coded Events

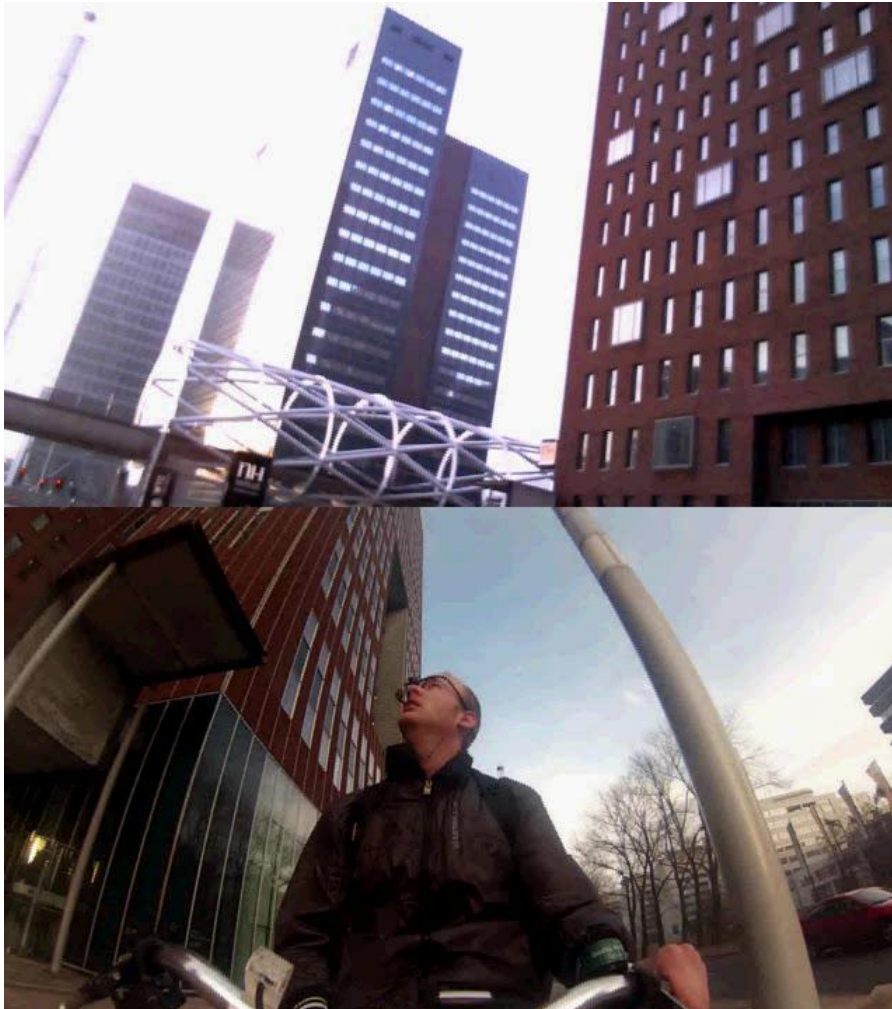
Delete selected event

Go

Filter events:



Experiments with eyetracker, but: always be careful when experimenting.



Conclusions

1. Cycling is healthy but unsafe
2. Just as car safety, bicycle safety is a multiple problem
3. Plenty of effective measures
4. Implementation is the problem
5. Innovations

But most importantly

LOVE CYCLING

