

***Road user friendly road design
- drivers point of view***

Presentation

by

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***“Road User Ability and Behaviour
– the basis for a road user friendly road design”***

Main Idea:

- **Collect existing research based knowledge about physical and mental abilities of road users – overview for practical use**
- **Development of Explanatory Model for road user behaviour**
- **Identify knowledge gabs - describe the needs for additional research**

Part I: Workshop

**Practitioners and Researchers – Psychologists and Engineers
Drivers and pedestrians – focus on elderly road users**

Part II: Physical abilities – litteratur studies

Part III: Mental abilities - litteratur studies

**Part IV: Explanatory Model for road user behaviour
A frame for understanding**

Part V: Types and location of road user information – Case demonstrations

Part VI: Identification of knowledge gabs

TÖI - Norway

Trafitec - Denmark

VTI - Sweden

Gabriel Helmers - Sweden

Nordic Road Directorates – Norway, Sweden, Finland, Denmark

9 summary reports are available in Nordic languages:

www.nmfv.dk/vejgeometrigruppen

**A summary article in English will be published in the magazine
*Nordic Road & Transport Research***



Explanatory model for road user behaviour

How do we function as road users?

Consequence for road design ?

Problem:

Road users do not always behave as intended →

Accidents occur

Solution:

To understand and explain how we function as road users

To answer the question: WHY problems occur →

A new explanatory model is needed – a frame for understanding

- **Fundamental considerations must be formulated**
- **Explanatory model is not TRUE or FALSE**
- **A GOOD model will lead to effective solutions**

Road user behaviour in an evolutionary perspective

- **Survival of the fittest (Darwin)**
- **Our senses, brain and moving ability have developed to comprehend the surroundings - as a respond to the environment**
- **A condition for survival: increasingly improved ability to move around**
- **When we move we act very rationally and effectively: Greatest possible benefit for the least possible effort**

Immediate holistic perception of the world around us

- **The visual information about what surroundings look like is "embedded" in the rays of light, which reflects from surfaces and objects and meet our eyes**
- **The brain automatically register the information and we form immediate impressions of the world around us (no interpretation)**

(Gibson´s new theory of perception, 1986)

Driving, Walking, Cycling are skills,

- **we have learned to master after a great deal of practice**
- **we carry out without thinking on what we are doing**
- **Which, once learned, mostly are performed automatically**
- **Road users have excess capacity - thinking of other things**

Safety margin and full control

- **Drivers always adjust behaviour trying to obtain full control**
- **Drivers feeling full control also feel they have a safety margin**
- **If the safety margin seems to be unnecessary high, speed will be increased – and if it seems to be too low, speed will be reduced instead.**

Drivers have 3 main tasks:

Automatic driving (control task):

Position control, Speed adaption

Guidance:

overtaking, lane change, curves, assessments of manoeuvres

Navigation:

**Planning the journey, select the right route to reach destination,
Understanding symbols**

Gibson 's "Affordance" concept → Self-Explaining roads

We immediately perceive:

- **Offers to utilise (Benefits)**
- **Offers to avoid (threats)**

Road design must be Self-explaining: road users immediately Perceive benefits and threats and how to drive on the road

- **Expectations** - should be confirmed
 - standardisation is needed
- **Orientation** – landmarks are needed
- **Changes in road Environment**
 - our world is stable - changes occur very slowly
- **Drivers' ability to see and read road signs**
 - only if drivers need information
 - visible and readable in appropriate distance
 - number of informations must be limited



- **Driving in the wrong direction by mistake**
- **Condition: road lanes carry one way traffic**
- **Problem related to Motorways**
 - **exits are by mistake used as enterings**

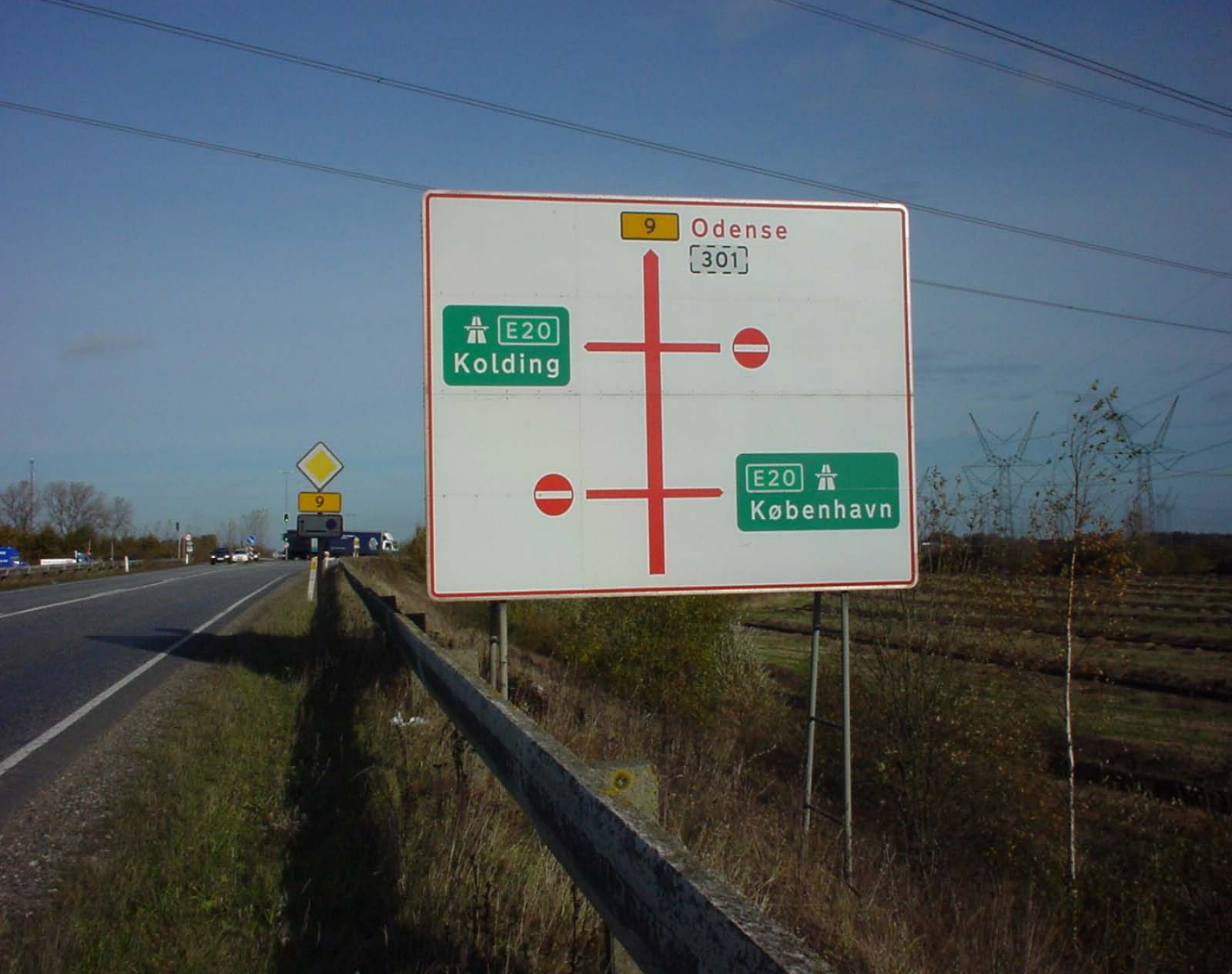
- **Guide the driver by making it easy for the driver to find out how to drive, where to drive and find the right way**
- **Secure a clear and unambiguous information from the road design and the symbolic info as a whole**

"Fish trap" principle:

**Enterings must always be clearly visible
and designed to "Invite" the driver to enter**

**For Exits it must be the opposite – difficult to see ("hidden"),
difficult to enter, giving signal of "refuse"**





“Driving straight ahead” principle:

It should always be OK (right) to drive straight ahead

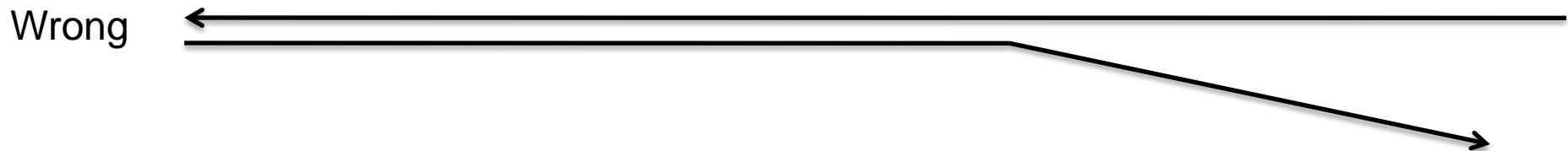
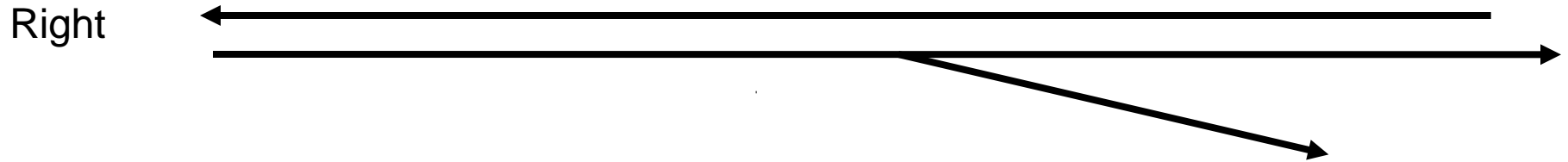
Driving straight ahead principle – right!



Driving straight ahead principle – wrong!



It should always be right (OK) to drive straight ahead



This is the end of the show

Thank you for your attention

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