2 Methods for improving road signs / symbols / text to adapt to today’s driver’s requirements

Stefan Egger, III Dre
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Information designer, researcher, speaker

Research projects on road signs/signals
2 international EU funded (3 years each):
SOMS/In-Safety, Safeway2school

7 x Conference co-organizer
Traffic & Transport Information Systems

Member working group AASTB10 of FSV
Recognised Austrian body to develop road signs
Information Design

Enable informed decision making to carry out actions and meet set goals
Definitions for graphical components

Traffic sign
- Image carrier
- Signal aspect

Signal aspect
- Symbol
- Figure
- Background
- Border
- Contrast edge

Elements:
- E.
- E.
- E.
- E.
- E.
Why improve road signs?
Since road signs were "defined", the road environment has changed dramatically.

Increasing cognitive stress is burdened upon drivers.
Why improve? / 1

Increase in speed – 1968 and before: Few cars and roads to maintain speeds of more than 100 km/h

Increase in traffic volume – e.g. Austria: 143,000 cars in 1955 to 4,205,000 in 2006

Increase in network density – No or few motorways in many countries in 1955. E.g. Austria: 1955– 27.6 km; end 2007– 1,696 km
Why improve? / 2

Increase of long-distance travel due to interconnected road networks and suitable cars

Increase of amount of information provided on / alongside roads

To reduce the increased cognitive load, – and increase road safety –
Road signs should be adjusted to human capabilities.
Opportunities for improvement

* ISO 9186 Test procedures *
  fostering understanding of visual information

* MOA Design Method *
  improving visibility

- Reducing uncertainty while transforming information into action
- Earlier recognition and driving action
Improving understanding

ISO 9186 Procedures for the development and testing of graphical symbols
Two psychological test methods

Comprehensibility judgement test
to sort out less appropriate symbols

and

Comprehension test
measuring “understandability” of symbols
Test requirements

- Extensive research for- and collection of symbols on international level
- Symbols to be brought to same visual quality level before testing*
- 50 respondents from 3 different cultures
- Carried out with paper and pencil, monitored (to allow questions and improvement of symbols)

*See MOA Design Method
Comprehensibility judgement test

- To identify the most promising symbols
- omit others
- find 1\textsuperscript{st} indications for further development
Country

In-Safety Comprehensibility Judgement Test 2006

Referent No. 2.2.2

Fog (ahead)

CJT

Improving understanding / 4
Comprehensibility judgement test

“In your opinion, what is the percentage of drivers in your country to understand the symbol?”

Then ask for reasons, taking notes.

After accumulation of results [country wise and total], symbols to reach a decided benchmark are accepted for further visual development* and the next test.

* See MOA Design Method
Comprehension test

- Establishing an understandability score for each symbol
- Identifying the best symbol
- Poss. final indications for improvement
On each page of this booklet is a traffic symbol.

Study each traffic symbol and write down below the symbol what you think that symbol means.

If possible, also write down what you would do if you saw this symbol.

Write down “Don’t know” if you are unable to assign a meaning to the symbol.

An example is given overleaf.
This is an example:

Construct
Comprehension test

"What is the meaning of this symbol? And how would you react as driver when seeing it?"

Take notes..

After accumulation of results [country wise and total], symbols to reach a decided benchmark are accepted for final visual development* and standardisation.

* See MOA Design Method
MOA Design Method

Maximum resilience of a visual signal by minimizing loss of contrast during transmission

or

It’s all about maintaining contrast in every detail
Definitions for graphical components

**Traffic sign**
- Image carrier
- Signal aspect

**Signal aspect**
- Border
- Contrast edge
- Background
- Symbol

**(E)lements:**
- Symbol
- Figure

**Figure**
- Symbol

\[
\text{Figure : E. E. E. E. E. E.}
\]
Every detail of any graphical element is made to be visually discerned (discriminable) over a precisely calculable viewing distance.
MOA Design Method / 2

Contrast-Transfer-Function
Siemens-Star
Design according to Smallest Graphical Detail

**SGD Design**
providing full (100%) discriminability
= Contrast-Transfer-Function is at maximum

= SGD
MOA Math: Calculation of discriminability

Minute-Of-Arc (MOA)

SGD dimension, viewing-distance & time, max. speed, min. visus etc.
MOA Design Method / 5

Calculability of discriminability

MOA $\Rightarrow$ SGD

SGD $\Rightarrow$ MOA
Viewing distance:

MOA Design Method: 100%

UNECE ITC: max. 74%
Comparison of discriminability

1

2

3

University Stuttgart/Fraunhofer Institute (2011)
Prepares simultaneously for conventional signage (vectors) & Enhanced dot-matrix application (screen, VMS)
Current implementation status

- Tern Typeface in Austria, Slovakia and The Netherlands
- Tern Symbols to be implemented in Austrian guidelines
- MOA Design Method became success criterion for new Austrian symbols
• **Tern typeface** legally binding use in Austria (2013) and Slovakia (2014)
• **Tern VMS typeface**: Standard for Full-Matrix-Displays “DRIPS” in the Netherlands (2009)
Visual accessibility

Tern Symbols: Discriminability enhanced
### MOA Design Method

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- **Visual accessibility**
- **Accessibility**

**Tern Symbols:** Discriminability enhanced
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**Tern Symbols: Discriminability enhanced**
To reduce the increased cognitive load and increase road safety:
Improvement of signs & symbols through:

* ISO 9186 Test procedures *
  fostering understanding

* MOA Design Method *
better discrimination & precise effectivity calculation

- Reducing uncertainty while transforming information into action
- Earlier recognition and driving action
Thank you!

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The MOA Design Method
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