Assessing the impacts of a reindeer warning service

NTSA Seminar 2015
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Background

- Although traffic safety in Finland has improved significantly in the recent years and decades, the number of reindeer accidents has stayed high.
- There are about 4000 reindeer accidents every year on Finnish roads.
- Costs of about 12 million euro in vehicle repairs and 2 million euro in recompenses for reindeer as well as a loss of 100 tons of reindeer meat.
- ITS as a new measure to reduce accidents.
Yearly cycle of accidents

Number of Reindeer Accidents

- 2011 (total: 4586)
- 2012 (total: 4221)
- 2013 (total: 3696)
- 2014 (total: 3774)
- 2015 (total: 496)
Research project

- **Objective:** To assess the acceptance of a real-time reindeer warning service and its potential impacts on driver behaviour and traffic safety
- **Duration:** 2 years, Summer 2013 until Autumn 2015

- **Partners:**
  - The reindeer warning service was created by a small Finnish enterprise called Paikkatieto Online Oy
  - Impact assessment is carried out by VTT Technical Research Centre of Finland
Field tests

- **Test sites**
  - Main road 20 Oulu-Kuusamo
  - Main road 4 Rovaniemi-Ivalo

- **Participants**
  - ~10 local transport companies
  - ~25 professional drivers
  - ~20 local reindeer herders

- **Field phase 1**
  - Summer 2014

- **Field phase 2**
  - Autumn/winter 2014

- **Results of field phase**

- **Stakeholder interviews**
  - Spring 2015

- **Final report**
  - Autumn 2015
Real time and history warnings

- **Real time warnings**
  - Participating professional HGV drivers send and receive messages about reindeer sightings with a simple smart phone application
  - Smart phone located permanently in vehicles
  - In addition, local reindeer herders also send warnings on location of reindeer

- **Website**
  - Possibility to check recent reindeer accident locations via a website
  - Also current real time warnings are shown on map
  - Open to public: [www.varoporoa.fi](http://www.varoporoa.fi) (Finnish only)
Warnings shown on the in-vehicle device and website
Expectations towards the service

- Transport companies and drivers
  - Anticipation, preparing to encounter reindeer
  - Less dangerous situations
  - Increase in safety
  - Less damaged vehicles

- Reindeer herders
  - Less accidents
  - Co-operation
Evaluation approach

- Assessment is based on interviews of the users
  - Identical approach and questions were used as in the VMS slippery road sign study (1)
  - Spontaneous answers, check list of possible effects
- In VMS study, comparison of subjective assessment with results of driver behaviour measurement
- Same approach enables comparison with VMS study

Results from driver interviews

”What effect did the warning have on your behaviour, if any?”

Reported effects of warning

- Driving comfort
- Focus of attention
- Discussion of the message
- Performance of secondary tasks
- Use of controls
- Lateral positioning of vehicle
- Overtaking
- Following distance
- Driving speed

Data shown as percentage of drivers reporting each effect, distinguishing between those reporting spontaneously and those asked to report later.
Driver interviews, results

- Drivers were interviewed twice: after about 6 months and 12 months of use
- In general, the service was assessed good and useful (88 % of drivers satisfied with service)
- Drivers especially appreciated being warned in advance of a potential danger
- 95 % of drivers reported focusing their attention on the road and road environment after receiving a warning
- 59 % reported decrease in driving speed after receiving a warning
- “Didn’t see any harm” – The simplicity of the system was appreciated
Expectations were met – Drivers’ comments

- Increases alertness in traffic
- Enables anticipation
- Useful device
- Easy to use
- Wakes you up
- Increases safety
- Especially important in winter
- No drawbacks

- Timing not always right
- False alarms – reindeer already gone
- Poor battery life
Next steps

- Stakeholder and expert interviews
- Field tests continue until summer
- Evaluation of information collected
- Final report in autumn 2015
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Examples VMS study

Fig. 2. Reported effects of the slippery road condition sign according to weather and road conditions.

Fig. 3. Reported effects of the minimum headway sign in black ice conditions.