NorSIKT – Nordic System for Intelligent Classification of Traffic

A NordFoU project

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"Key figures":

- Project period 2010-2012-2013
- Budget 700 000 Euro

Participating countries:
- Norway (leading country)
- Sweden
- Denmark
- Finland
- Island

Project organisation:
- Steering group
- Koordinating group
- Working groups
Background

• Methods and equipment used for data collection is not very standardized

• Comparative statistics between countries are difficult

• Each country has its own technical platform and the market for data collection equipment in each country is limited
Objective

The main objective of the NorSIKT project is to standardize the system for classification of motor vehicles in the Nordic countries in order to:

- Determine new joint Nordic method for converting data between different classification methods
- Create a larger Nordic market for measuring equipment and road traffic monitoring systems
- Reduce the cost of collecting road traffic data
Main activities

- State-of-the-art in the Nordic countries
- Overview of available data collection equipment
- Instrumentation of test sections, testing procedures and testing different technologies
- Nordic classification method
- Specifications for data collection equipment
State-of-the-art

The State-of-the-Art report shows that the current situation varies greatly between countries.

However, similarities have also been identified:
- all countries apply some form of vehicle classification
- all countries are using loop sensors in some context
- length-based classification parameters are dominant but axel configuration is also being used
Classification system

The main principle in the classification system is to found the definition of vehicle categories on legal vehicle classification system in each country using the main categories of vehicle types.
<table>
<thead>
<tr>
<th>Motorfordon för persontransport</th>
<th>Motorfordon</th>
<th>Koppplade fordon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moped/Knallert</td>
<td>Moped class I/EU-moped</td>
<td>Öppet flak</td>
</tr>
<tr>
<td>Motorcykel</td>
<td>Light motorcycle</td>
<td>Semi-trailer open flatbed</td>
</tr>
<tr>
<td>Personbil</td>
<td>Passenger car class I</td>
<td>Påhängsvagn</td>
</tr>
<tr>
<td>Personbil class II/Husbil</td>
<td>Passenger car class II/Motor home</td>
<td>Påhängsvagn stängt flak</td>
</tr>
<tr>
<td>Lätt lastbil/Len buss</td>
<td>Light goods road motor vehicle</td>
<td>Semi-trailer closed flatbed</td>
</tr>
<tr>
<td>Tung lastbil/Varubil</td>
<td>Heavy goods road motor vehicle</td>
<td>Påhängsvagn skåp</td>
</tr>
<tr>
<td>Tung lastbil med släpkärra</td>
<td>Heavy goods road motor vehicle</td>
<td>Semi-trailer box</td>
</tr>
<tr>
<td>Dragfordon med påhängsvagn</td>
<td>Lorry/Truck with drawbar-trailer</td>
<td>Semi-trailer tank</td>
</tr>
<tr>
<td>Modul system</td>
<td>European Modular System</td>
<td>Påhängsvagn boskap</td>
</tr>
<tr>
<td>Tung lastbil med efterfordon</td>
<td>Lorry with &quot;After vehicle&quot;</td>
<td>Other semi-trailers</td>
</tr>
</tbody>
</table>

Ö= Övriga motordrivna fordon

Other road motor vehicles
<table>
<thead>
<tr>
<th>Benämning – Title</th>
<th>Definition – Defined</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bil – Car</strong></td>
<td>A road motor vehicle with three or more wheels or runners or tracks that is not a motorcycle or a moped. Cars are divided into passenger cars, goods road motor vehicles and buses.</td>
</tr>
<tr>
<td></td>
<td>Cars do not exist as separate group in the Eurostat classification system. &quot;Cars&quot; subgroups as passenger cars, good roads motor vehicles, buses and coaches are defined in Eurostat.</td>
</tr>
<tr>
<td><strong>Buss – Bus, Motor-coach</strong></td>
<td>A car designed primarily for the carriage of passengers and equipped with more than eight seats in addition to the driver’s seat. The locations may consist of both seating and standing. Buses are divided into light buses and heavy buses.</td>
</tr>
<tr>
<td></td>
<td>En bil som är inrättad huvudsakligen för personbefordran och är försedd med fler än åtta platser utöver förarplatsen. Platserna kan bestå av både sitt och ståplatser. Bussar delas in i lätta och tunga bussar.</td>
</tr>
</tbody>
</table>
How does a bus look like?
Challenges

What type of car is this:
Test procedures

- Three large test sites have been constructed
  - Norway
  - Sweden
  - Denmark

- The test plans includes both the standard equipment in the Nordic countries and alternative technologies

- Statistical methods are being used both to determine the sample size (number of vehicles) and to objectively compare different type of registration equipment’s ability to classify vehicles
Technologies being tested

- Inductive loops (dual loop)
- Inductive loops in combination with pietzo electric cables
- Rubber tubes
- Magnetic sensors (magnetometer)
- Micro wave radars
- Laser beams (infrared)
- Radars
**Finnish radar tests:** [http://www.nordfou.org/projekter.html#p5](http://www.nordfou.org/projekter.html#p5)
Nordisk System for Intelligent Klassifisering av Trafikk
(Nordic System for Intelligent Classification of Traffic)

Norwegian test site (Klett)
Nordisk System for Intelligent Klassifisering av Trafikk
(Nordic System for Intelligent Classification of Traffic)

Swedish test site (Amsberg)
Danish test site (Farum)
Error types

To quantify the accuracy of the measurements, each vehicle category has to be considered individually.

While defining the error as the probability that a random vehicle is assigned to an incorrect category, two types of errors can be identified:

- The vehicle is assigned to an incorrect category or not assigned at all (error type A)
- A different type of vehicle is incorrectly assigned to the category under consideration (error type B)
Test design and conducted tests

- Reference equipment
  - ANPR (Automatic Number Plate Recognition)
  - Video recorder
  - Radar
  - Laser (EMIT)

- Measuring equipment
  - Varies on each test site
  - Tested equipment classify vehicles in different ways – a “translation” key has been defined for each equipment

- Conducted tests:
Nordisk System for Intelligent Klassifisering av Trafikk
(Nordic System for Intelligent Classification of Traffic)
Nordisk System for Intelligent Klassifisering av Trafikk
(Nordic System for Intelligent Classification of Traffic)

Results - Meteor 3000
Results - Datarec Loop Monitor
Preliminary conclusions

- **Total number of vehicles**
  - Number of missing vehicles is in general very low

- **Classification capabilities**
  - Every tested equipment has errors of both types
  - There is no obvious “winner”
  - There will be done some changes in the classification table

- **New tests planned this summer/autumn:**
  - Repeated tests at Klett, Amsberg and Farum
  - Radar test in Norway
Thank you for your attention