Implementation of RFID Technology in Traffic Signs Database Inventory

Road Management Systems – Traffic Signs Maintenance

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Introduction

• The optimization of the road infrastructure management can lead to the decrease of road fatalities and accidents
• Having the updated inventory of traffic signs can be important factor to ensure road safety
• Today, many technologies are used in traffic and transport system, such as VIP or RFID
• Reduction in the number of road deaths in EU28 2011-2015 and valuation at 2015 prices and value, together with the additional savings

Data source: RANKING EU PROGRESS ON ROAD SAFETY, 10th Road Safety Performance Index Report, June 2016 (ETSC)
Traffic Signs Database Inventory

• Online traffic signs database
  
  o Easy and quick access for all end users
  o Contains information about each traffic sign, including their GPS location
  o Easy updating by using RFID technology (by driving on the road) – synchronization of the database and real-time information

• Benefits
  
  o Optimization of road maintenance activities
  o Optimization of road maintenance patrol schedule
  o New info generated by maintenance patrol
  o Useful in legal disputes
Traffic Signs Database Inventory

• Online traffic signs database contains information about each traffic sign:
  • Road / Road section
  • Sign code
  • Dimension
  • GPS location
  • Chainages
  • Photography
  • Retroreflection coefficient
  • Material class
  • Year of production
  • Manufacturer
  • Position relative to the road direction
  • Way of setting
  • Other remarks
  • Etc.
- Traffic signs database developed by Department of Traffic Signalization
About RFID Technology

• **Radio Frequency Identification**
• Have been used for vehicle tracking
• Advantages:
  – Low-cost, low power device
  – Less complicated algorithms than those used in VIP technology

• Components:
  • Tags / transponders
  • Passive
  • Active
  • Reader
  • Antennas
About RFID Technology

• An example of RFID system with testing during the drive
About RFID Technology

• An example of RFID system with testing during the drive
How the system works?

- Collecting data about each sign
- Installation of RFID tags on each sign
- Sign condition assessment
- Central online database
- Vehicle equipped with RFID reader and antenna and portable PC
- Road management
- Maintenance activities and maintenance patrol schedule
Field Research

• 6 tests were done with different combination of various antennas
• Testing various tag types and positioning
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- Field research results
• Looking for an optimal:

  - Distance (reading range)
  - Placing of the tag on the sign
  - Antenna angle
  - Antenna polarization type
  - Vehicle speed
Conclusions

• To improve road traffic safety and road management system, it is necessary to regularly maintain road infrastructure.

• Traffic signs database with data updating via RFID can be simple and efficient tool for an overview of all the signs on each road, and also for maintenance activities schedule.

• RFID technology is relatively cheap and simple to use to collect data on traffic signs or update online data base.
Thank you for your attention!

Questions?