RFID in Rail

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TRAFIKVERKET - Swedish Transport Administration

- Is the biggest owner of infrastructure
  - railways
  - roads
- A network of RFID detectors
  - railways
Swedish Transport Administration
- On the right track with RFID
• **Maintenance**
  - Combine measuring values from Wayside Train Monitoring System (WTMS) with correct vehicle (locomotives and wagons).

• **Logistics**
  - track and trace vehicles (locomotives and wagons).

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**Hot Box/Hot Wheel detection**

**RFID reader**
RFID
Radio transmission of data between reader and tag/transponder
RFID detector

- detect vehicles/wagons without transponders/tags
- direction
- distance between axles
- speed

RFID reader/antenna
app. 3 m from nearest rail

Axle/Wheel sensors
Rail traffic in Sweden

60-70% of all wagons in Sweden, from other European countries

Need:
• European standard for RFID system
• Standard for information exchange
Standards

International Organization

- Open standards and solution
- Member demands
- Neutrally
- Non profit organization
- 1.3 million customers
- Offices in 108 countries and active in 145 countries
- Board members from global companies
- ISO certified

Started 1977
Changed name 2006
Standards

- **Air interface – ISO**
  - ISO 18000-6 C/UHF gen 2

- **Tag standard – GS1**
  - EPC – GIAI96

- **Information exchange – GS1**
  - EPCIS – What, Where, When and Why

EPC = Electronic Product Code
EPCIS = Electronic Product Code Information System
Tag position

- Two tags per wagon
- Left mounted
- Height 0.5-1.1m
Tag structure

Transponder/tag

Tag number

- EPC - GIAI 96

User memory

Company Prefix, A/B + EVN (vehicle number)
1/2 + 12 digits
Filter value 1 for railway vehicle

EPC = Electronic Product Code
RFID IT-system

Data exchange

Biztalk server

EPCIS
- What
- Where
- When
- Wy

Tags
Readers

Middleware

Monitor, Filter
Upgrade and Configure

Database

Data exchange
Biztalk server
EPCIS – Information Exchange

TRAFIKVERKET
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Port Information System

Trafikverket’s Information System

EPCIS Information
What
When
Where
Why

Terminal Information System
Benefits

- Owner of the infrastructure
- Railway companies
- Customers of cargo transports
- End customers and private persons
Benefits

- Proactive vehicle maintenance
- Less traffic disruption
- Track and trace vehicles
- Correct train composition
- More effective shunting of freight wagons
- Better use of resources
- Lower freight costs
- Reduced environmental impact, CO2
RFID in Europe

- InnoTrans in Berlin 2010 and 2012

- RFID in Rail meeting in
  - Stockholm, February 2011
  - London, October 2011
  - Nuremberg; September 2013

- EPCIS in Rail
  - Oslo, February 2014
  - London, November 2014

- Sweden, Finland, Norway, France, UK, Austria, Switzerland, Germany, Netherlands, Czech republic, Russia, Slovakia, Spain, Denmark
"European Guideline for the Identification of Railway Assets using GS1 Standards"

• Guideline for vehicle identification
• Guideline for MRO identification (maintenance, repair and overhaul)
• Guideline for EPCIS in Rail
Deployment in Sweden

180 RFID detectors
end of 2014

approx. 4000 taged vehicle
RFID – intermodal transport chains

Common standards for more than just railway

EPCIS Information
- What
- When
- Where
- Why

Example, Service Providers etc
Green Corridors between Sweden and the European Continent

Intermodal transport with RFID tagged wagons and sea transport to Zeebrugge
Rail transports between Sweden and the European Continent

Volvo train,
- 240 container wagons

Paper transports
- to be establish
Smartrack – Norwegian pilot
Intermodal transport with RFID tagged containers and wagons

Smartrack, (Norway-Sweden-Norway)
RFID - Conclusions

- Common European RFID standards
- Track and trace
- Logistics
- Maintenance
Thank you!

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