Real-time maintenance monitoring system

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0. CONTENT

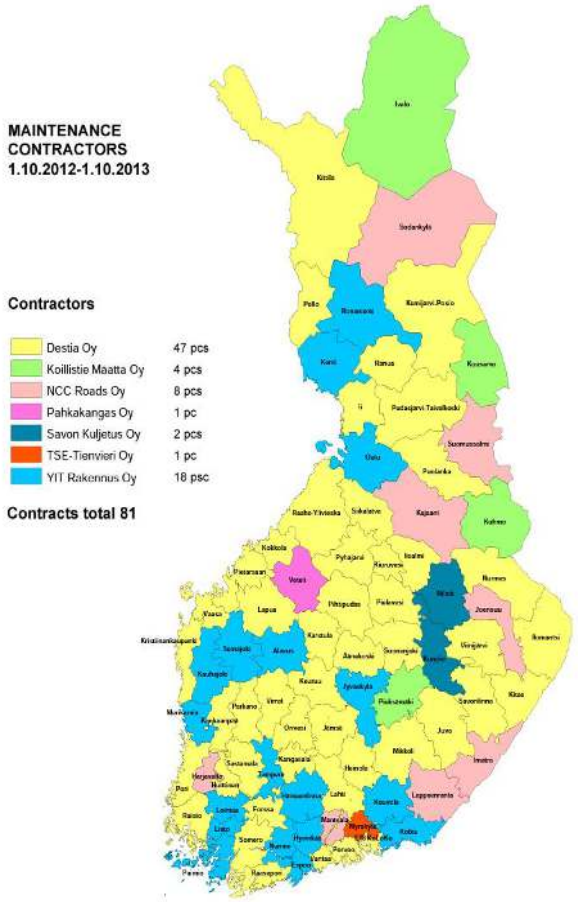
1. INTRODUCTION

- Finland's public road network about 78,000 km.

- 81 maintenance contract districts (500 to 2,300 km of road).

- 3 Different maintenance categories

- Each district has a supervisor (road inspector). Traditional supervision methods involve spending many hours on the road.



1. INTRODUCTION

- The number of road inspectors has decreased-> efficiency of supervision needs improvement.

- New systems, more efficient use of current systems and new operating methods could be the keys to improved efficiency.

- New way to handle information (not only phone or email)

- Feedback is forwarded to supervisors and contractors.

2. IMPLEMENTATION OF THE REAL-TIME SYSTEM

-In 2009, new ways to monitor regional maintenance contracts.

- Was need to know/see where maintenance work was ongoing.

- The Finnish Transport Agency is using system for the monitoring of basic things (contract information, maintenance activities and the actual work), but Information couldn't viewed on a map.

- At that time, there were companies that offered coordinate-based work monitoring systems for contractors -> system could be purchased as part of the contract (get requested information from the contractor's system)

-In 2009 a requirement to use a real-time maintenance monitoring system in contracts was included. It was not necessary to make all data in the system available to clients.

Table 2. Requirements for the real-time system [3].

2. IMPLEMENTATION OF THE REAL-TIME SYSTEM

Table 1. Information to be included in the real-time system [3]

Winter maintenance	Summer maintenance
Ploughing or slush removal Salting Spot sanding	Sweeping Mechanical mowing Mechanical brush clearing
Line sanding	Grading of gravel roads
Smoothing of the road surface Cleaning of traffic signs	Dust binding on gravel roads
Lowering of snow banks	
Prevention of damage cause water	

Table 2. Requirements for the real-time system [3].

Technical representation	The latest completed maintenance activity should be clearly displayed on an interactive, zoomable map.
	Maintenance activities should be indicated in different colours.
	A list of the start and completion times and locations of activities should be provided.
	It should be possible to specify limits for the list and map on the basis of road addresses, date, time and activity.
Time-related requirements	The information must be available for viewing by the client within two hours of the start of the work.
	If telecommunications are not reasonably available within two hours, the information must be available in the monitoring system within six hours.
	In summer maintenance, reporting is not required until the following week day.
	The work information must be kept available for viewing for at least 12 months after the completion of the work.
	The information must be available in the archive database for the entire duration of the contract and for three years after the completion of the contract.

3. DIFFERENT SYSTEMS

- Contractor’s own system or service from system provider. Contractors want to tailor commercial systems

- Saving data / achievement from all vehicles

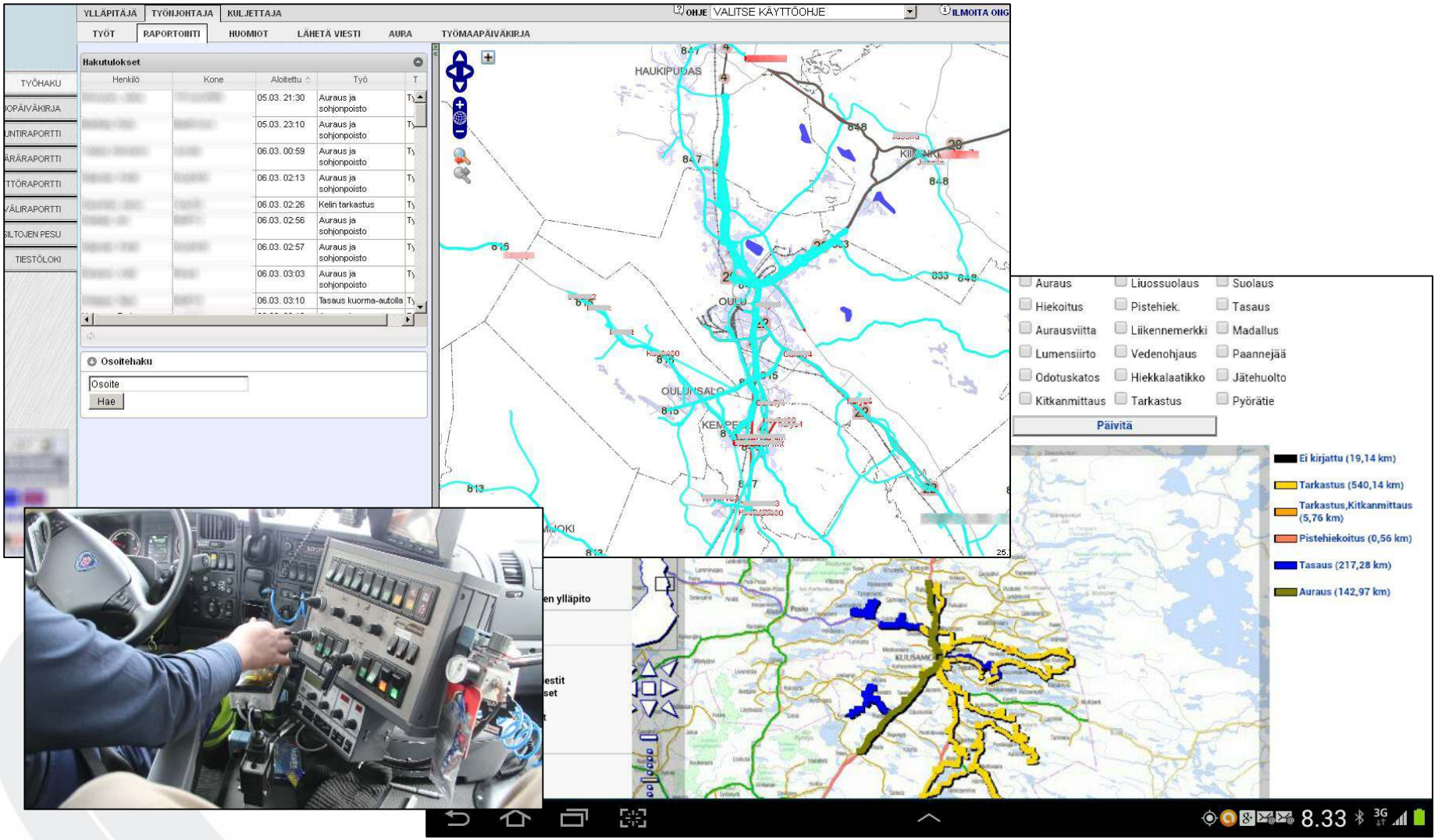
- Terminals devices (for example integrated systems, laptops, tablets, navigators, cell phones)

- Vehicles/devices positioning (gps)

- Data connection (fixed, wifi, 3G)

- Only some of all data transmitted to subscriber

3. DIFFERENT SYSTEMS



4. BENEFITS

- Real-time systems have a number of positive effects at every user level
- Quality management at every level
- Increased transparency between parties involved
- Processing of damages (insurance companies etc.)
- Improved accuracy and efficiency of operations
- Less customer feedback
- No need for separate reports, information directly from the site

4. BENEFITS

- A supervisory tool

- Less manual work, location known

- Fast reporting

- Inspections more efficiently (quality, feedback, overall picture, fewer site visits, communication to another)

5. DISADVANTAGES

- Some feels delays is too much for a real-time system,

- Temporary disturbances occur in systems and telecommunication.

- Inaccuracy and insufficiency of data

- Service providers are sometimes slow in developing software to match the needs of the field.

- Rapid technical device development

- Training of new users

- The system does not always provide information on the actual quality of work (such as the quality of mowing)

6. EXPERIENCES

-In general, more positive effects than negative ones.

- The systems have had a positive effect on contractors' operating methods and management methods.

- After a while, people will not even remember that they had to learn to use a new system. System has become part of their basic routine at work.

- These systems which make daily work easier

- According to contractors, the system makes the management of equipment and subcontractors easier for work supervisors.

- Early feedback on the quality of work has generally improved

- Now real-time systems are part of regional maintenance contracts.

7. OPPORTUNITIES

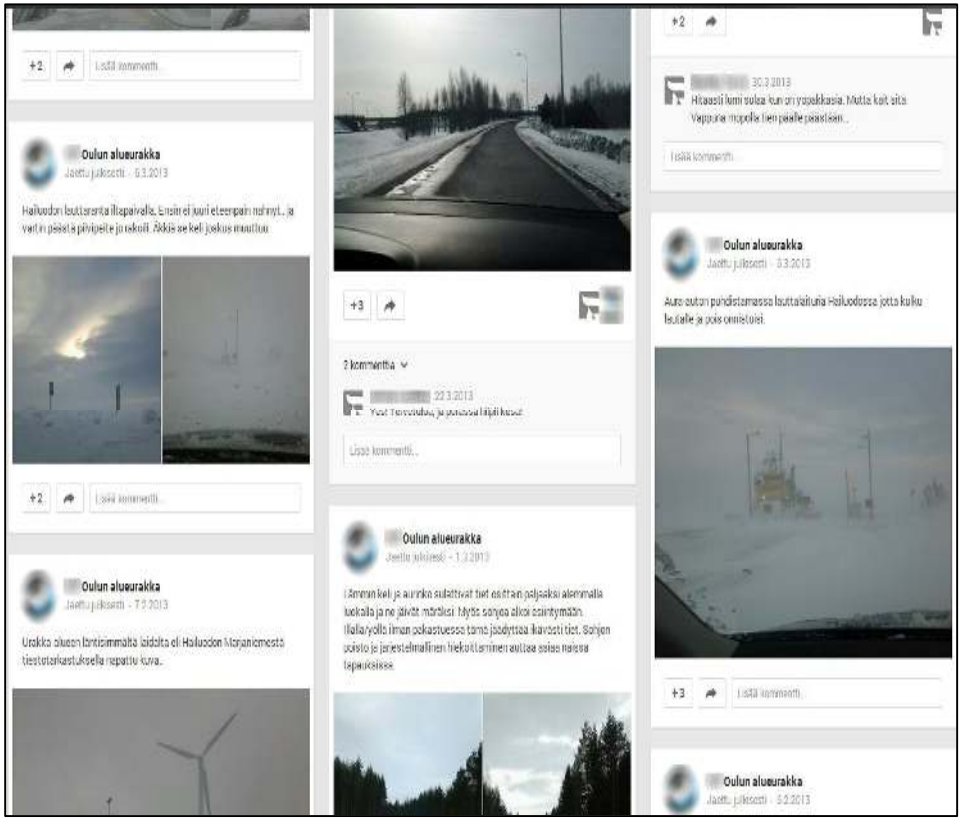
- Road administration want information also in their own systems -> further processing of data for different purposes

- Smart phones and tablets are technically advanced today

- 3G, 4G connection -> more mobility

- Social media, such as Google+ and Facebook

7. OPPORTUNITIES



8. REVIEW

- Real-time systems are a good accessory for maintenance contracts.

- The benefits are greater than the disadvantages.

- Many find that we have not seen the final system yet.

- The systems have generated new operating models for work and management.

- Social media is an interesting direction into which the use could be expanded.