

Experimental service for high-resolution slipperiness risk forecasts in Finland

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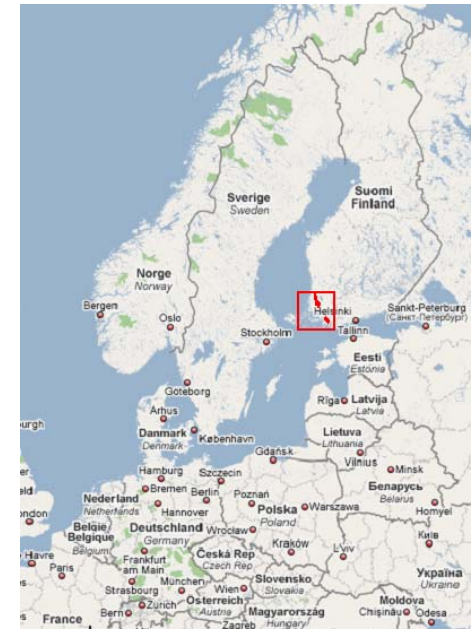
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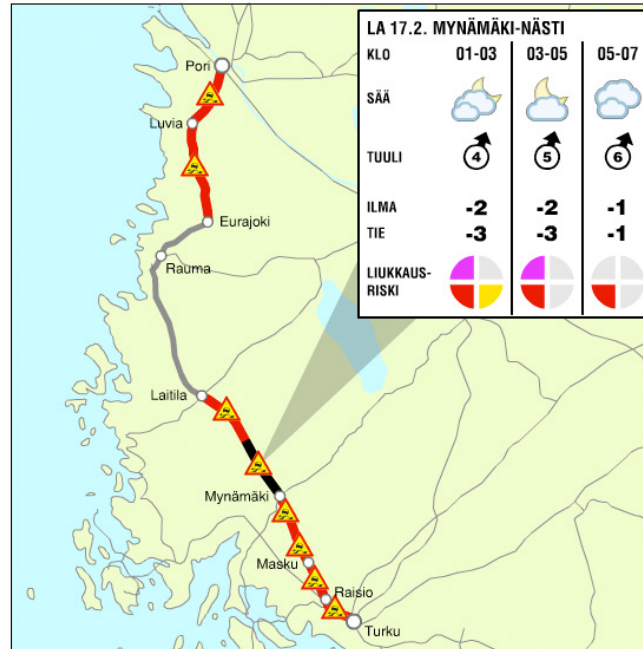
Background

- Weather forecasting models have improved considerably, and now it is possible to develop forecasts and warnings for road stretches with 10 km spatial resolution.
- Finnish Road Administration and Foreca Ltd developed a road condition pilot service in February-April 2007 for Main road 8 between Turku and Pori
- 140 km long road was divided into 11 stretches
- Road is coastal and known to have rapid changes in road conditions



User interface

TIE 8 TURKU - PORI LIUKKAUSRISKIENNUSTE (PILOTTI)



Kartalla oleva liukkausriskiennuste on ennuste seuraavalle kuudelle tunnille.

Liikuttamalla hiirtä tien päällä saat tarkemman ennusteen, joka sisältää:
 -Sääennusteen [lisätietoa]
 -Ilman lämpötilan [lisätietoa]
 -Tienpinnan lämpötilan [lisätietoa]
 -Tuuliennusteen [lisätietoa]
 -Tarkemman liukkausriskiennusteen

Liukkausriskiennuste kertoo sään muutoksesta johtuvan tien pinnan keliriskin lähitunteina.

Värien selitteet:



Tien kunnossapitotoimenpiteet vähentävät tai poistavat ennustetun riskin toimenpideajan puitteissa, joka vt 8 välillä Turku - Pori on yksi luntti.

Mobiiliversio löytyy osoitteesta
mobile.foreca.com/vt8

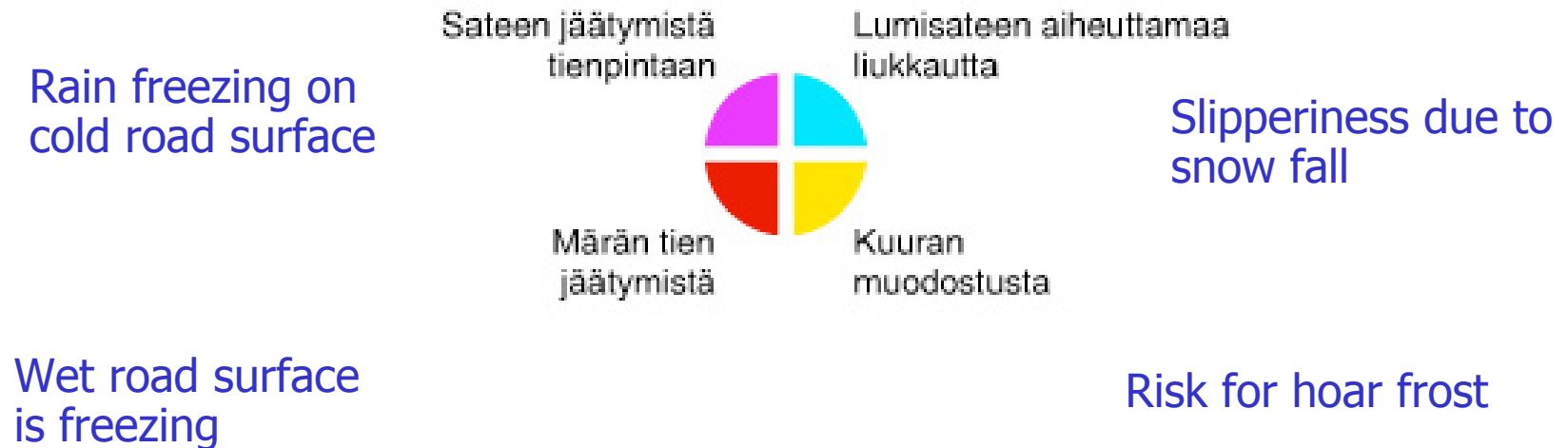
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Päivitetty: 17.2.2007 01:37

- Users were very fond of the service made with Flash/xml-techniques. Lots of information but shown in a clear way.

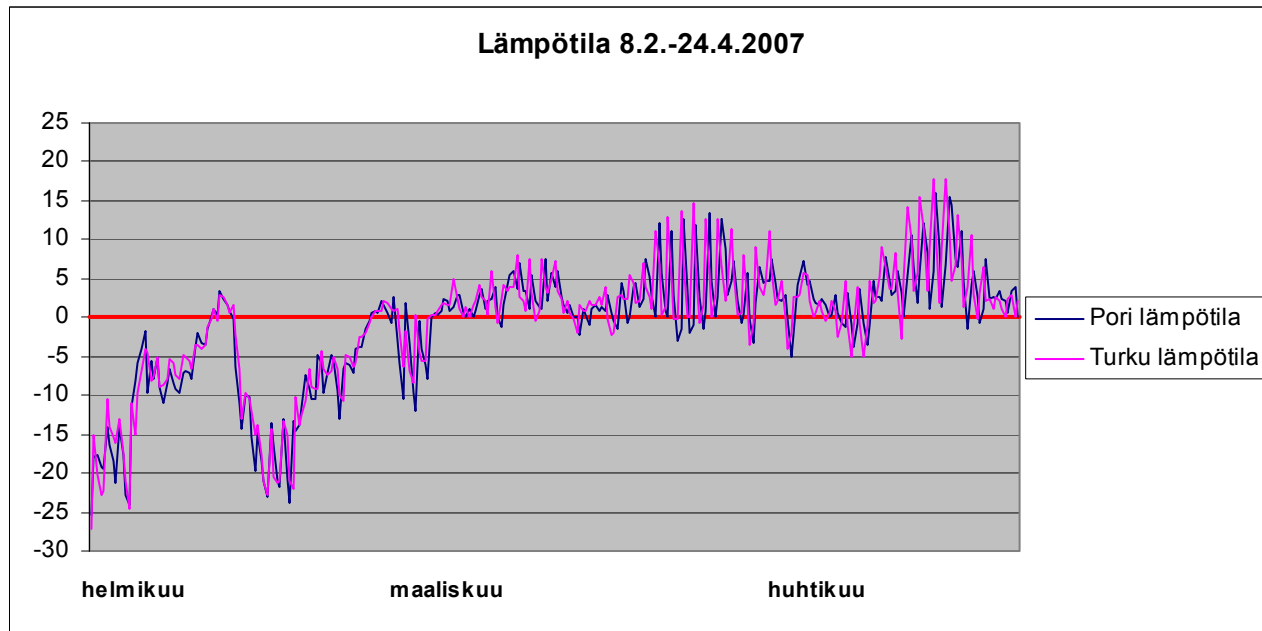


Road condition warnings



- Colour codes tell if a warning is issued for a certain 2 hour period

Weather during the pilot



Temperature in Turku and Pori during the pilot

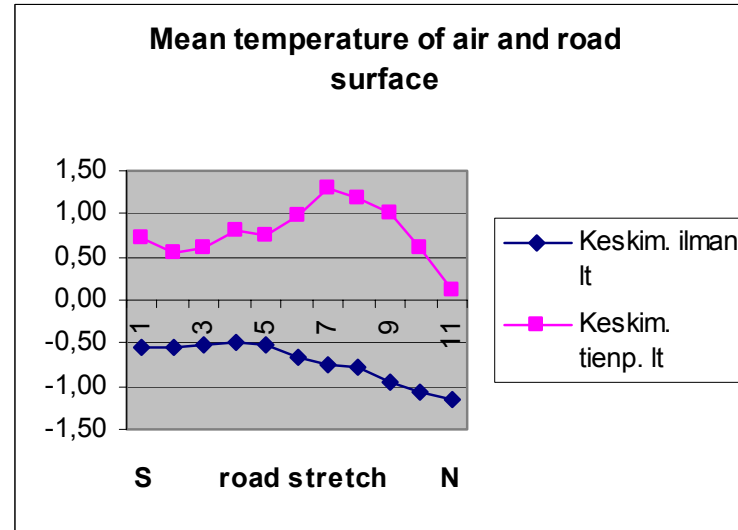
- End of winter 2007 was mostly mild with two periods of cold weather in February

Forecast statistics

Road stretch from south to north	Av. air temp	Av. road temp	Hoar frost	Snow fall	Road freezing	Freezing rain	Hoar frost	Snow fall	Road freezing	Freezing rain
	°C	°C	kpl	kpl	kpl	kpl	%	%	%	%
1 Turku-Raisio	-0,54	0,71	418	444	197	3	7,08 %	7,52 %	3,34 %	0,05 %
2 Raisio-Masku	-0,54	0,54	419	457	191	0	7,10 %	7,74 %	3,24 %	0,00 %
3 Masku-Kaitarainen	-0,53	0,61	397	453	168	0	6,72 %	7,67 %	2,85 %	0,00 %
4 Kaitarainen-Mynämäki	-0,49	0,8	370	467	181	0	6,27 %	7,91 %	3,07 %	0,00 %
5 Mynämäki-Nästi	-0,53	0,74	515	511	288	9	8,72 %	8,66 %	4,88 %	0,15 %
6 Nästi-Laitila	-0,67	0,99	416	462	231	2	7,05 %	7,83 %	3,91 %	0,03 %
7 Laitila-Ihode	-0,75	1,29	326	437	188	0	5,52 %	7,40 %	3,18 %	0,00 %
8 Ihode-Rauma	-0,78	1,17	382	361	191	0	6,47 %	6,11 %	3,24 %	0,00 %
9 Rauma-Eurajoki	-0,94	1,01	273	384	198	0	4,62 %	6,50 %	3,35 %	0,00 %
10 Eurajoki-Luvia	-1,06	0,61	468	433	279	0	7,93 %	7,33 %	4,73 %	0,00 %
11 Luvia-Pori	-1,16	0,12	610	438	336	0	10,33 %	7,42 %	5,69 %	0,00 %
Total	-0,73	0,78	4594	4847	2448	14	7,07 %	7,46 %	3,77 %	0,02 %

- Statistics show that there is variability between road stretches
- About 7% of warnings were generated due to hoar frost or snow fall
- Freezing road or rain were very unfrequent

Mean temperature

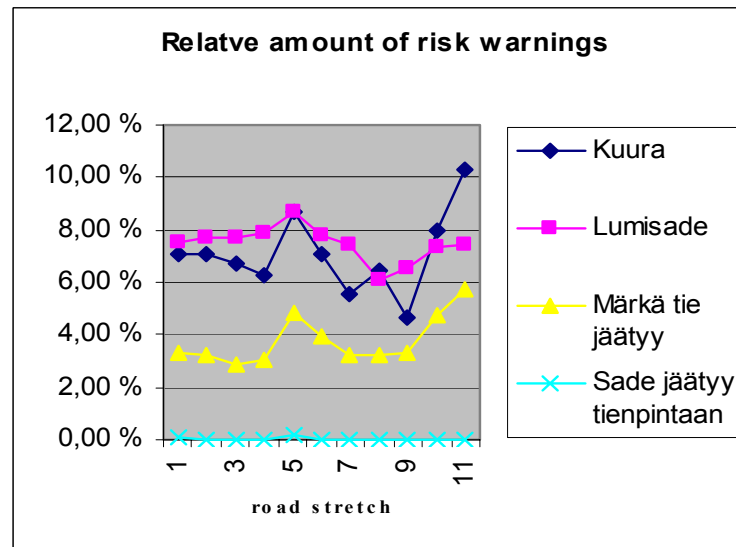


Mean air temperature

Mean road surface temp

- Mean temperature gets logically colder towards North
- Road surfaces are warmest along the road stretch Laitila-Ihode

Road condition warnings



Hoar frost

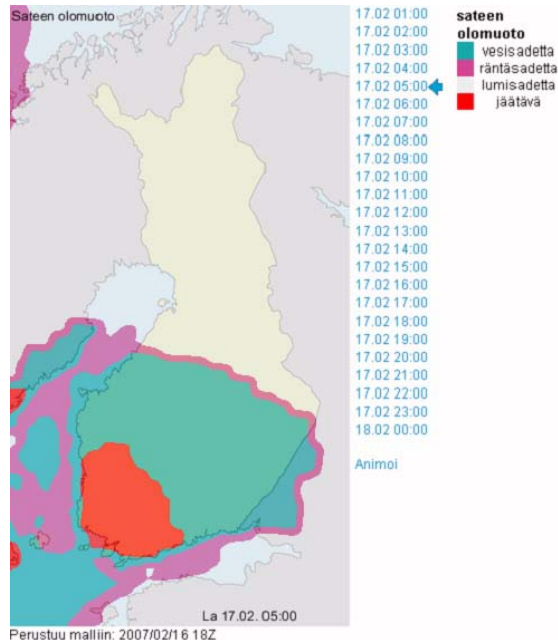
Snow fall

Wet road freezing

Rain freezing on road

- Warnings for hoar frost increase towards Pori (north)
- Lots of warnings also along Mynämäki-Nästi stretch

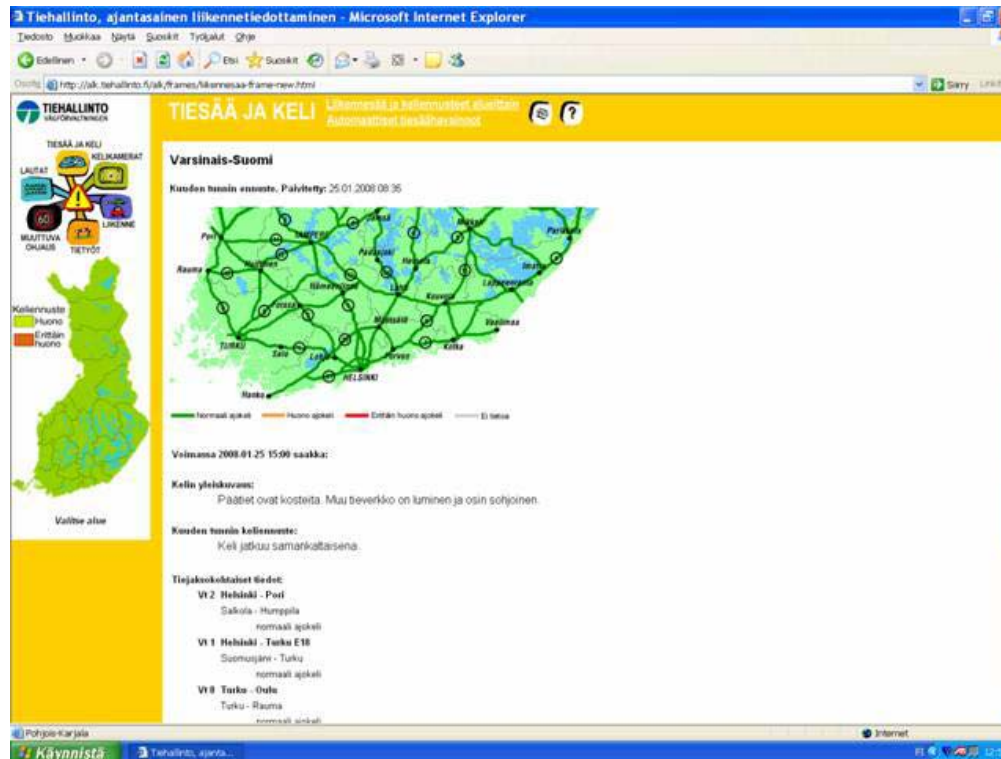
Frozen road or rain



- Case 17th February, 2007. Red area: Service predicted well area of freezing rain

- Cases with freezing rain are rare. Fortunately, as they are most dangerous to road transport. Model predicted well the two cases during pilot tests

Conventional web service

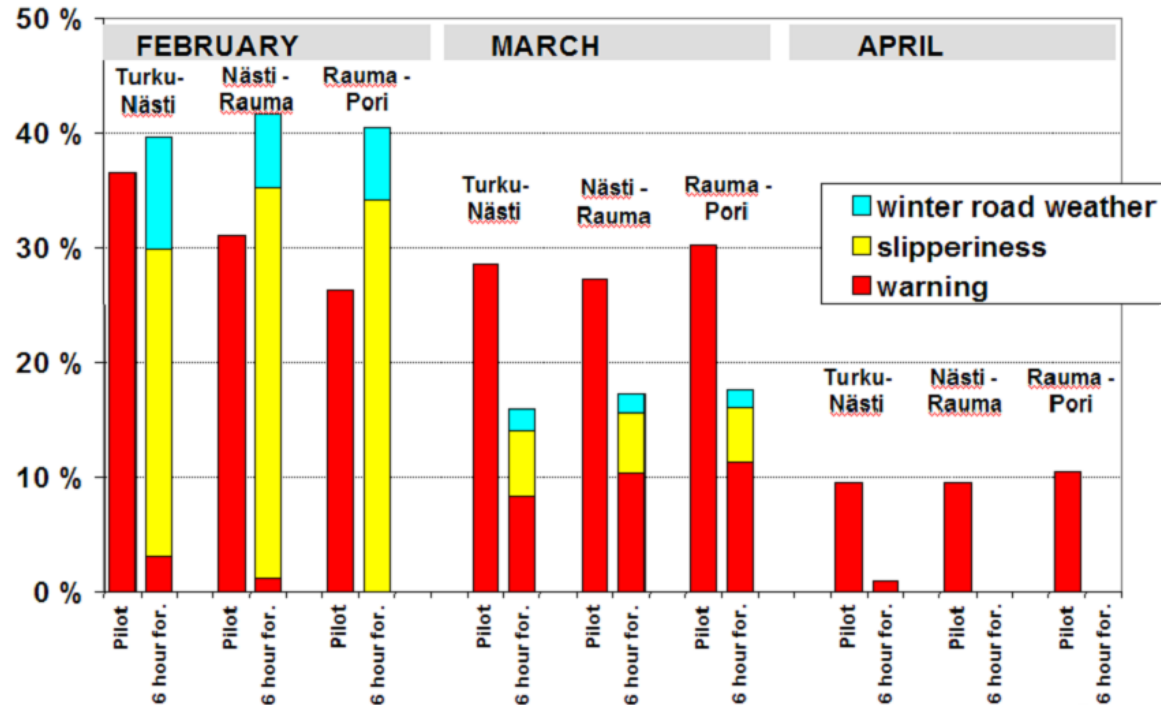


- Six-hourly road weather forecast on FinnRA's web service. The main roads are coloured green, yellow or red depending on the risk level due to road conditions



Comparing the risk warnings

Hours with warnings in relation to all hours



- Pilot and conventional warnings compared. Red columns on the left show all Pilot warnings combined. Columns on the right show the conventional road condition warning with three severity levels.



Conclusions

- Road condition pilot functioned technically well
- Users liked the looks and the user interface of the service
- Model resolution was good enough for 10 km road stretches
- Warnings were justified in most cases, but sometimes the variability from one hour to next was disturbing
- Warning generation limits should be developed to avoid unnecessary warnings when risk for slipperiness is low
- Warnings should include measure of the intensity of risks