



What are the railways/countries planning next?

Banedanmark/Denmark



Roughness measurements in Banedanmark (BDK) – implications for efficient environmental noise reduction

- A mobile method for estimation of rail roughness level on a large scale, suitable for countrywide surveys
- Data provides useful data for track maintenance both in terms of environmental noise and rail quality
- Data is stored in BDK 's track measurement database
- BDK has conducted a statistical analysis to see how roughness levels correlate to other types of rail control measurements
- BDK has developed a tool to rank track sections according to e.g. rail quality, traffic and population density to most effectively out from a socioeconomic perspective to reduce the amount of environmental noise from the track and to document the effect of noise reduction measures



Roughness measurements in BDK – implications for efficient track maintenance

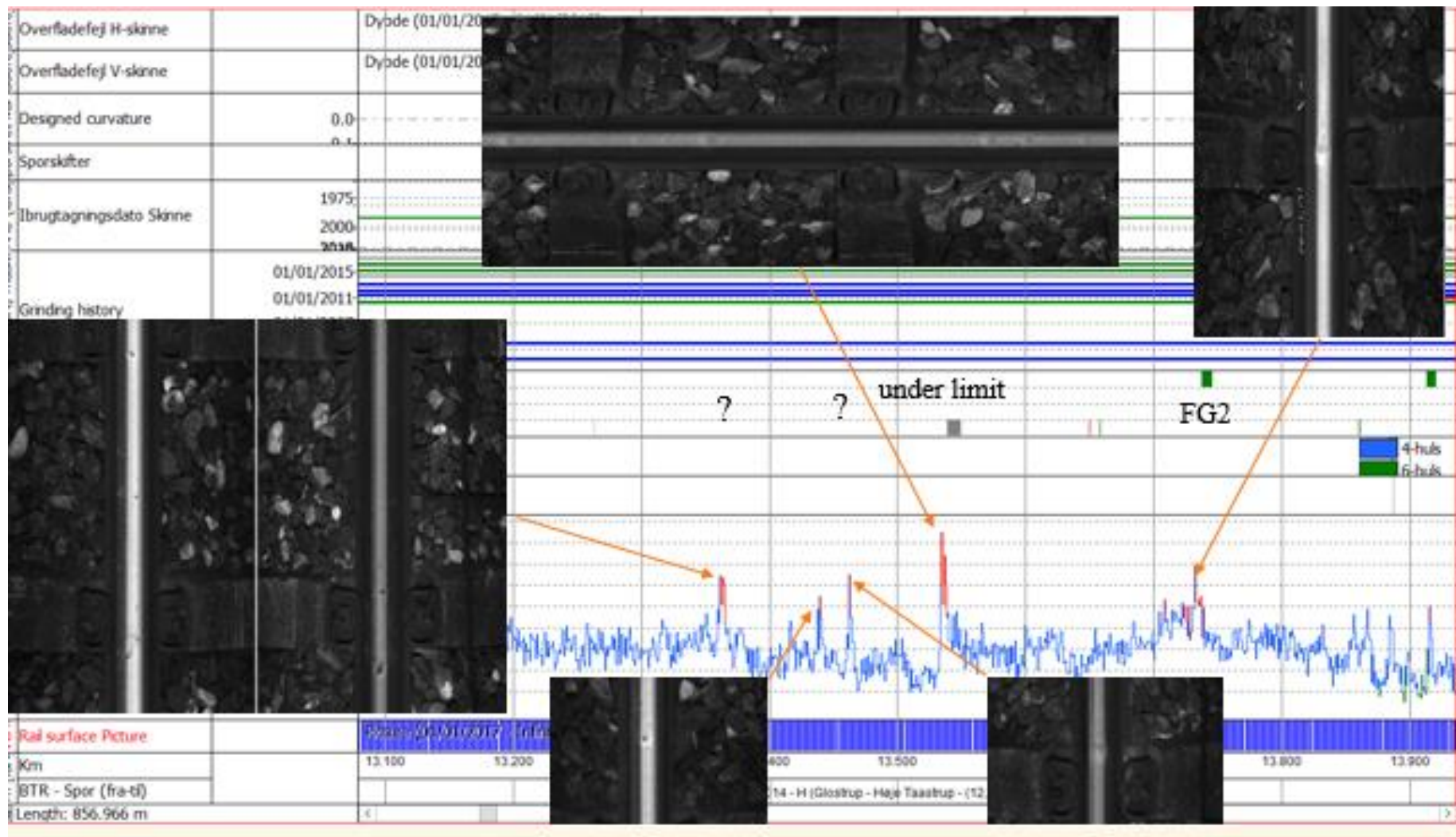
- BDK has used the data on a case by case basis to:
 - identify previously undiscovered rail defects, including ones in an early stage of development
 - identify zones with bad rail surface quality
 - identify bad quality welds and isolation joints
 - plan, prioritize and assess the quality of large-scale maintenance works such as grinding and milling
 - complement and validate the information provided by other track measurement methods.
- Peaks in the roughness data shows to correlate well with the presence of defects, welds and isolation joints, and its magnitude seems to reflect the severity of the problem



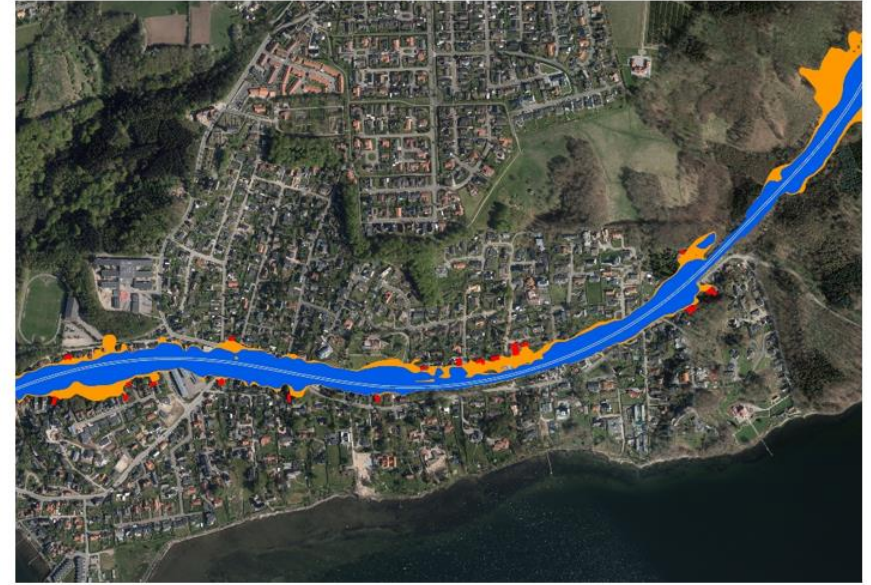
Roughness measurements in BDK – implications for efficient track maintenance

- Likewise, high roughness levels over large lengths correlate with bad rail surface (including, but not limited to, corrugation), bad quality of maintenance (grinding and milling in particular) or a large time elapse since the last maintenance intervention.
- BDK has given the measurements a significant role in planning the large-scale maintenance operations of grinding and milling
- Future plans include ranking the quality of switches and crossings based on their surface roughness profile.

Unreported rail defects

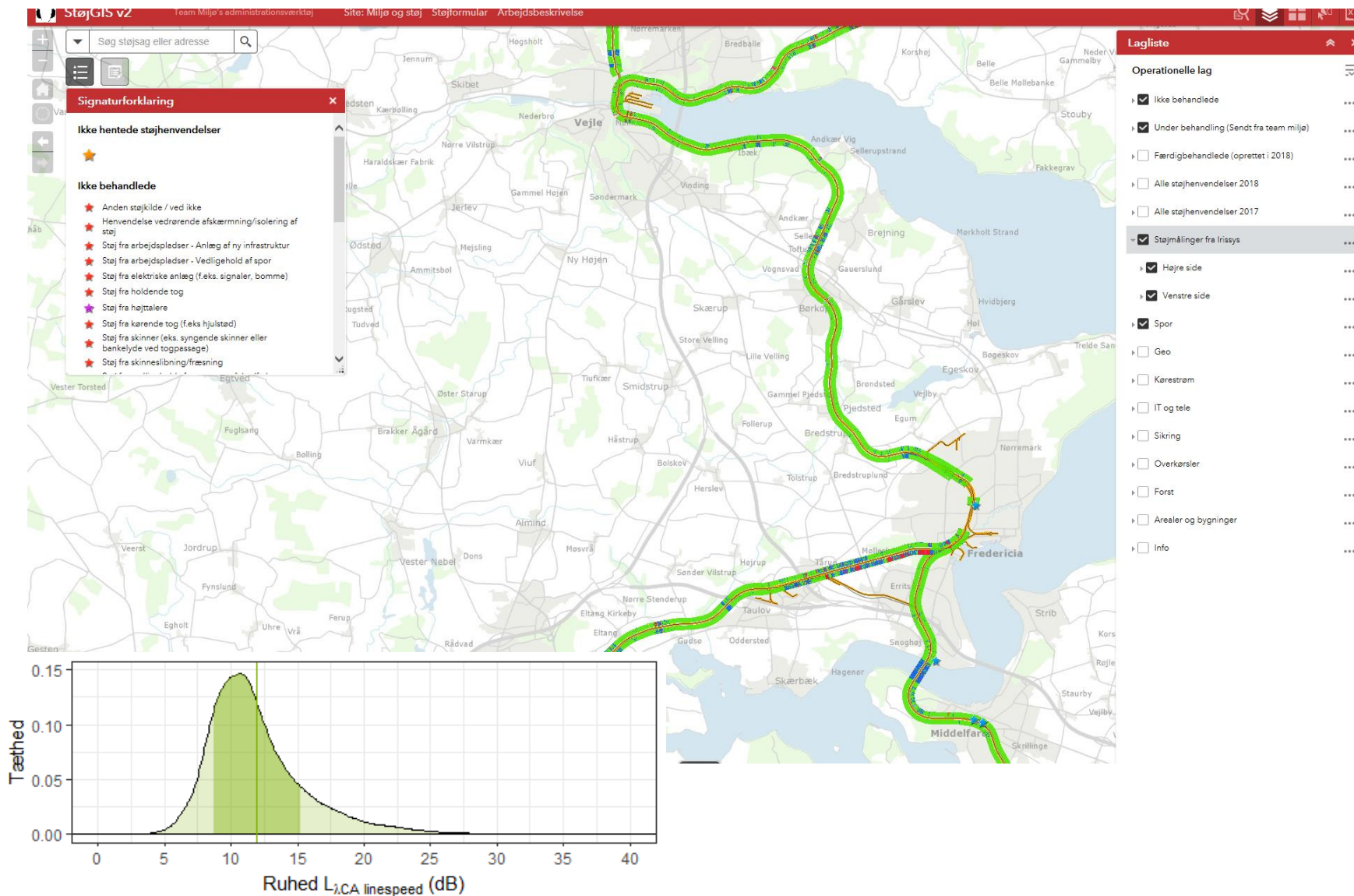


Roughness measurements in BDK – EU noise mapping END



I eksemplet her fra Bredballe viser de nye målinger at der 37 % flere boliger end hidtil antaget, der er støjbelastede

De nye målinger gør at Banedanmark kan planlægge, prioritere og dokumentere indsatsen mod nabostøj langt mere effektivt end før



Table



ruhed100m

	AVGR	MAXR	N5AVG	N1AVG	BTRSPOR	M fra	M til	R avg	R max	T pers	T gods	T hast	R korr	B dens	P avg	P max	P econ
▶	16.13	26.79	2	1	102004-SPOR 1.hsp	4200	4300	16,13	26,79	24,2	0,1	90	13,36254	375	2,97872	0	1120
	13.95	15.92	0	0	842016-SPOR H	16600	16700	13,95	15,92	19,1	0	100	12,52234	327	3,41463	0	1120
	11.38	14.26	0	0	012002-SPOR V	4000	4100	11,38	14,26	42,2	0,1	180	17,61133	573	3,48432	0	2000
	12.93	21.46	2	0	832006-SPOR H	6000	6100	12,93	21,46	24,5	0	120	13,87778	291	3,83561	0	1120
	13.43	22.72	2	0	842012-SPOR H	12200	12300	13,43	22,72	19,1	0	100	12,00234	278	4,01433	0	1120
	12.02	15.79	0	0	832006-SPOR H	6400	6500	12,02	15,79	24,5	0	120	12,96778	263	4,24242	0	1120
	13.84	16.55	0	0	842016-SPOR H	16800	16900	13,84	16,55	19,1	0	100	12,41234	258	4,32432	0	1120
	13.73	17.07	0	0	012002-SPOR V	3900	4000	13,73	17,07	42,2	0,1	180	19,96133	547	4,37956	0	2400
	15.52	31.19	6	2	102005-SPOR 2	4809	4900	15,52	31,19	24,2	0,1	90	12,75254	249	4,48	1	1120
	11.79	14.16	0	0	104010-SPOR V	11900	12000	11,79	14,16	15,6	0,1	120	12,77361	249	4,48	0	1120
	14.57	24.35	2	0	833000-SPOR 2	6600	6700	14,57	24,35	24,5	0	120	15,51778	333	4,49101	0	1500
	11.75	14.99	0	0	012002-SPOR H	3900	4000	11,75	14,99	42,2	0,1	180	17,98133	524	4,57142	0	2400
	13.48	19.12	2	0	833000-SPOR 2	6500	6600	13,48	19,12	24,5	0	120	14,42778	321	4,65838	0	1500
	14.09	19.24	1	0	012002-SPOR V	3600	3700	14,09	19,24	42,2	0,1	180	20,32133	514	4,66019	0	2400
	14.41	20.10	1	0	012002-SPOR V	3800	3900	14,41	20,1	42,2	0,1	180	20,64133	513	4,66926	0	2400
	13.48	18.42	0	0	832006-SPOR H	5500	5600	13,48	18,42	24,5	0	120	14,42778	313	4,77707	0	1500
	14.22	26.68	2	1	842008-SPOR H	6200	6400	14,22	26,68	40,1	0	100	12,80234	322	4,80886	0	1120