Tvärbanan – Bromma Airport

Deicing overhead catenary in order to avoid radio interference

2022-03-03

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SL, Stockholm, Sweden

Region Stockholm

2025

2023

2022

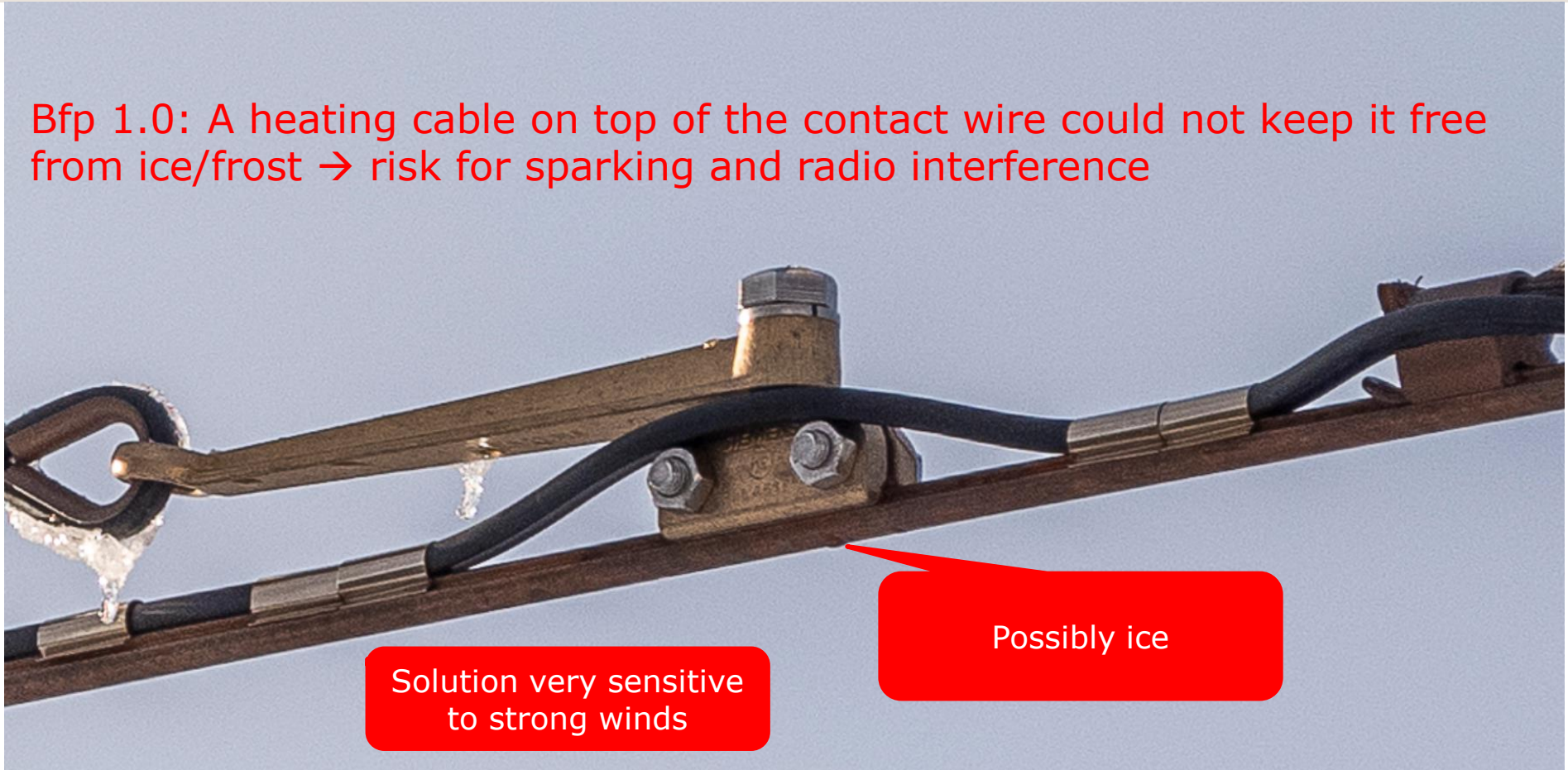
Tramway
Tvärbanan,
Kistagrenen
8 km

The radio communication equipment at the airport is sensitive to interference on the radio frequencies used at the airport

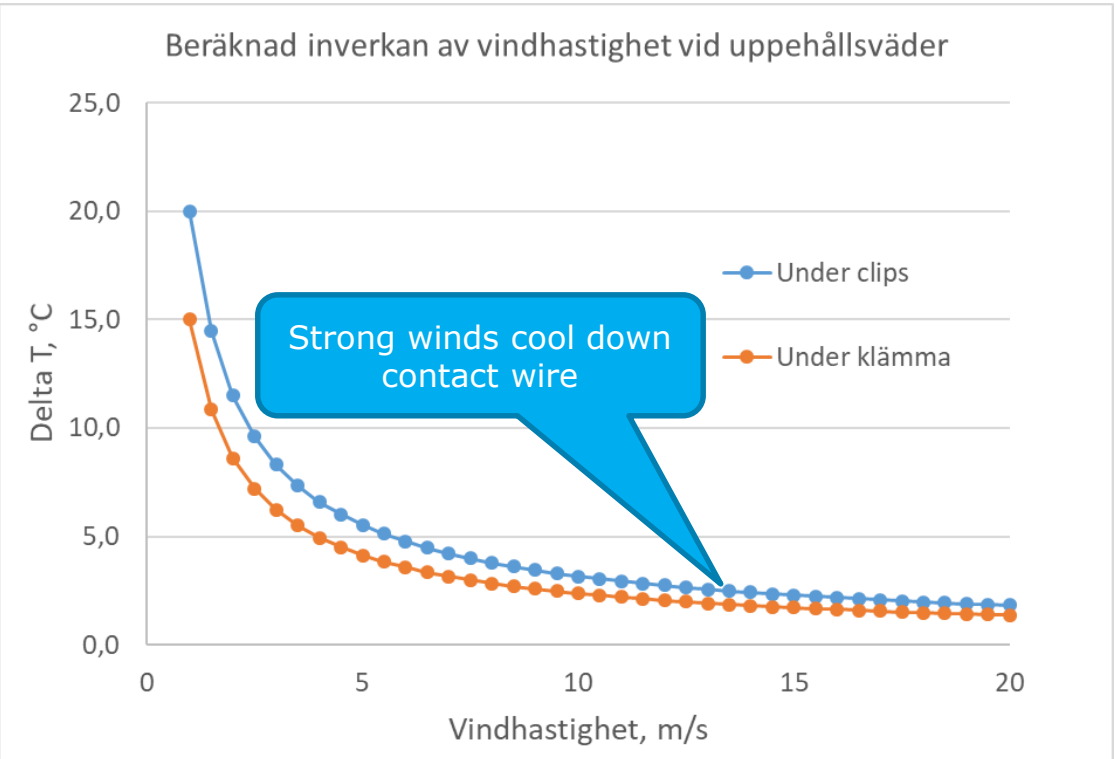
Bfp 1.0

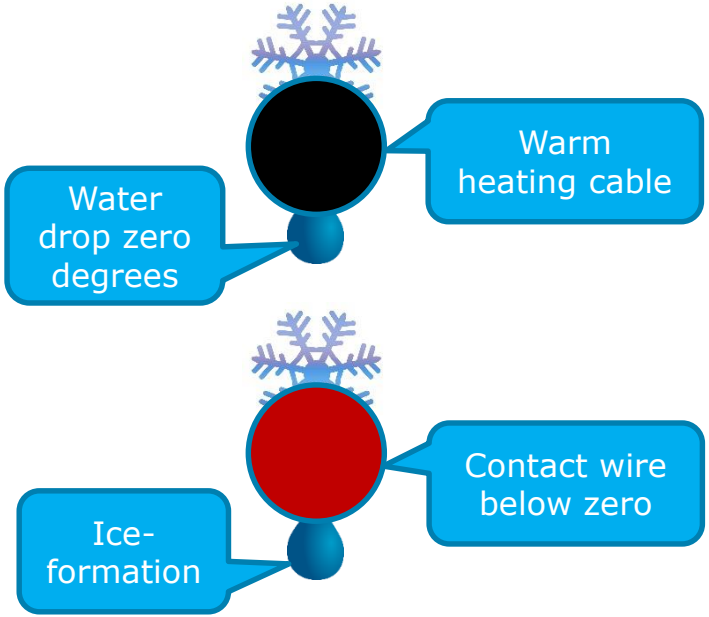
400m EMC-fence

Bfp 1.0: A heating cable on top of the contact wire could not keep it free from ice/frost → risk for sparking and radio interference



Bfp 1.0 design was not sufficient





Traffic starts to Bromma Flygplats

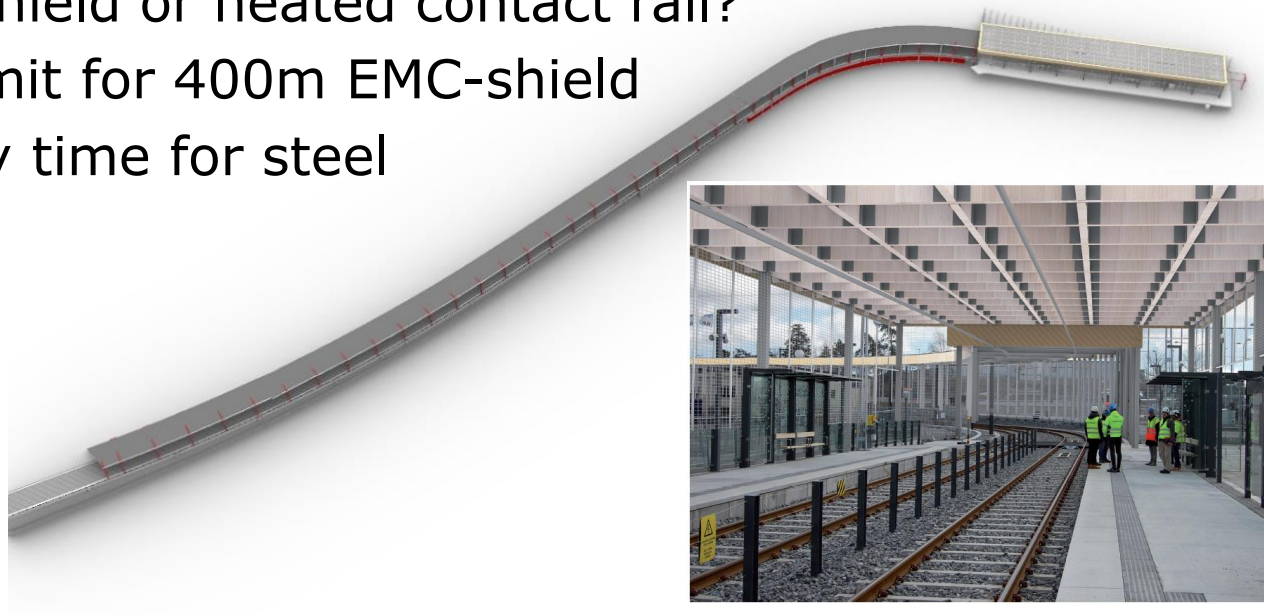
Failed attempts
Dec 2020-
mars 2021
Bfp 1.0

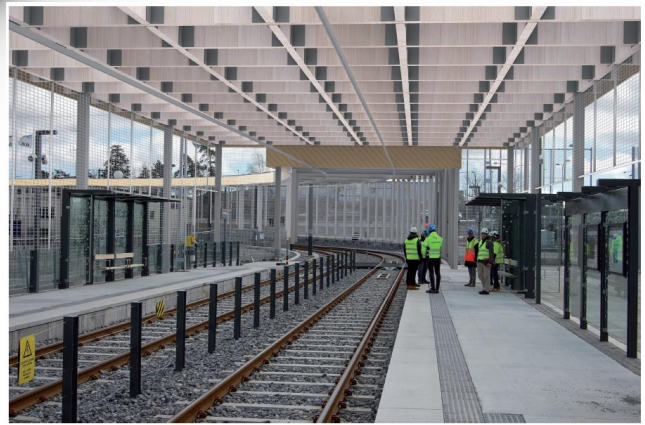
Sommer
operation
Maj 2021
Bfp 1.0

Year-round
operation
Dec 2021
Bfp 2.0

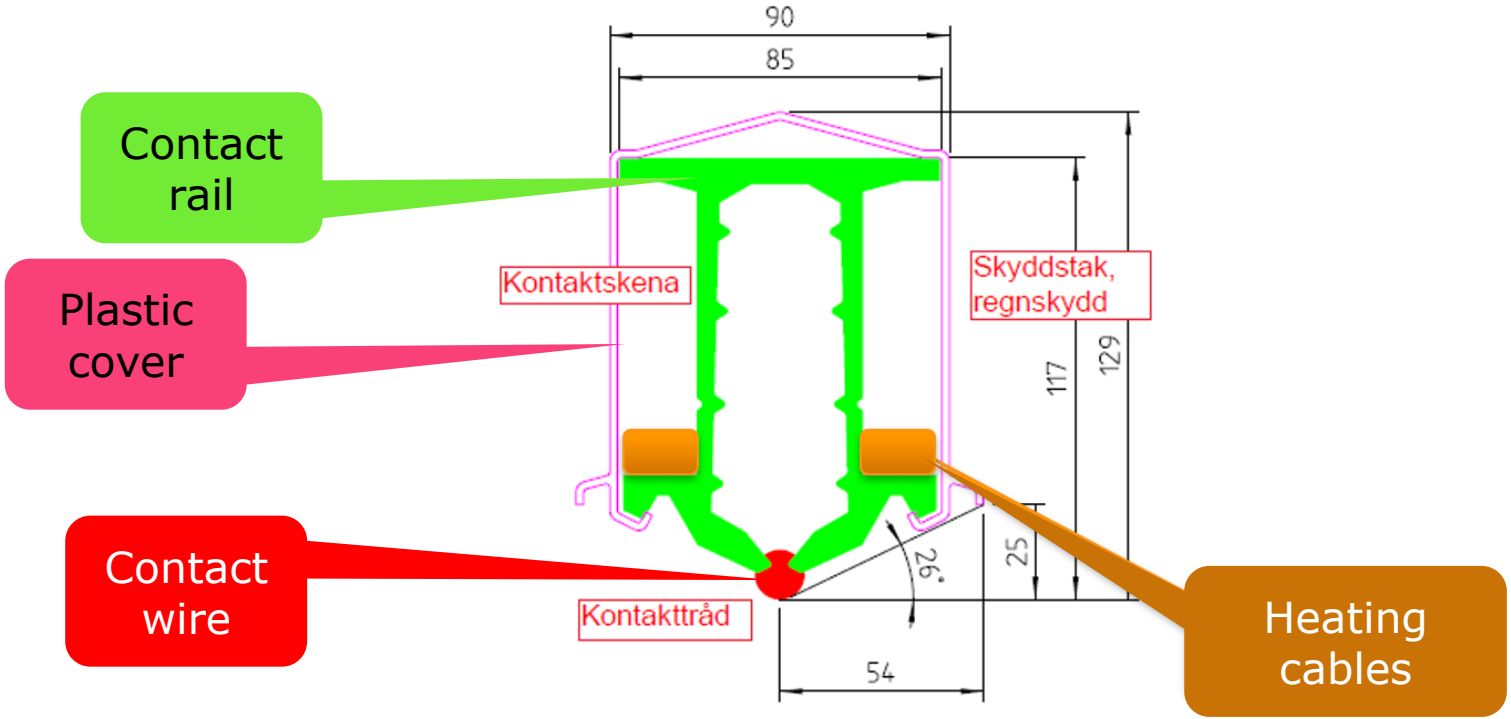
Status maj 2021 - mission impossible?

- A robust solution was needed before the winter
- 400m EMC-shield or heated contact rail?
- Building permit for 400m EMC-shield
- Long delivery time for steel

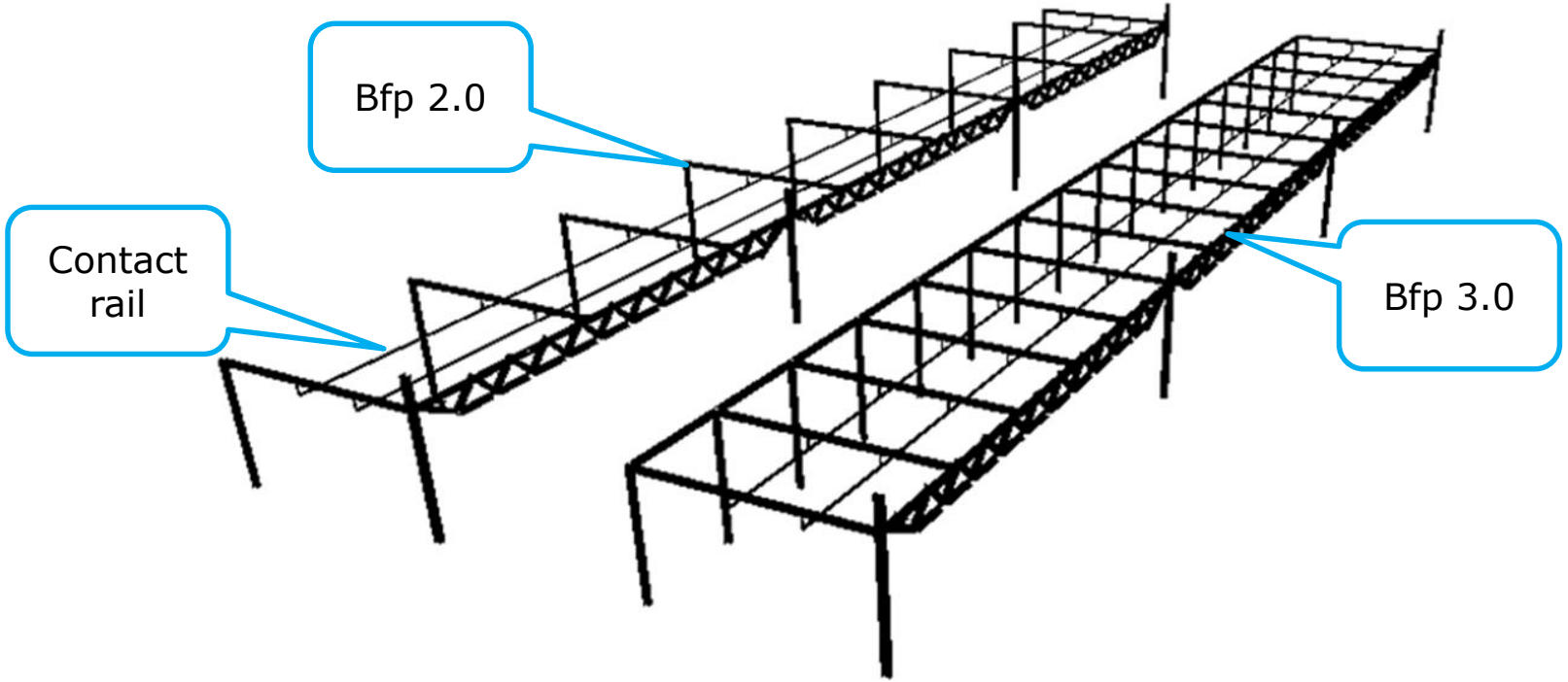




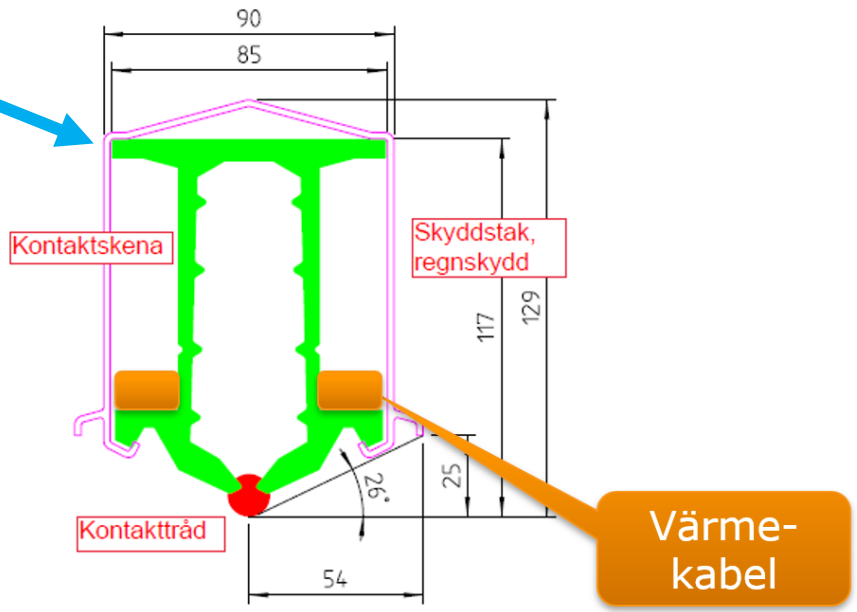
Bfp 2.0: New covered contact rail with double heating cables (240 W/m). Traffic stops if T_{CW}< 2 degrees



Design of steel structure prepared for quick assembly and the worst-case scenario with EMC-shield (Bfp 3.0)

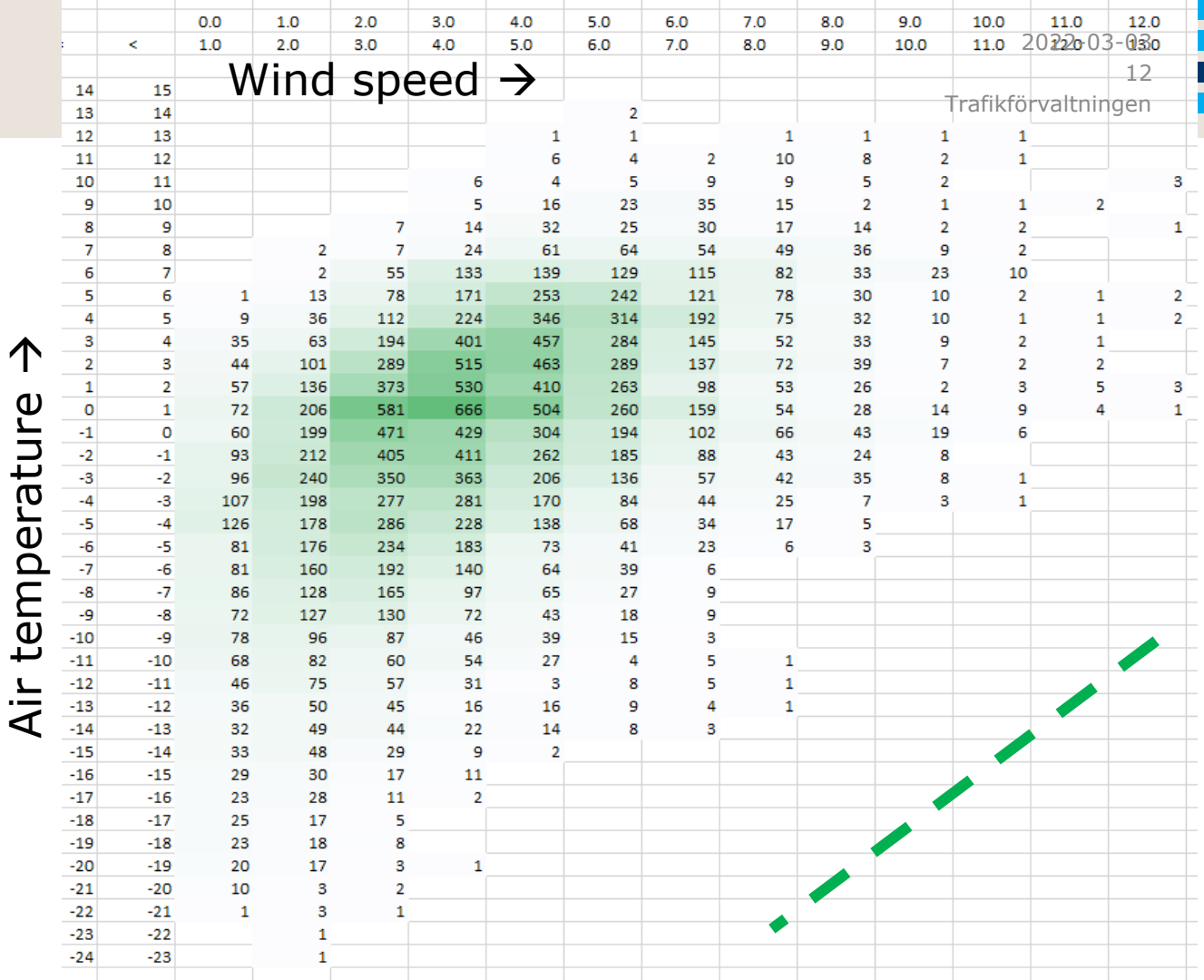


Bfp 2.0: New steel structure for contact rails



Year-round operation since 10 dec 2021

Preliminary test results indicate that new solution Bfp 2.0 is sufficient



	<	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0
		1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0
14	15													
13	14						2							
12	13					1	1		1	1	1	1		
11	12					6	4	2	10	8	2	1		
10	11				6	4	5	9	9	5	2			3
9	10				5	16	23	35	15	2	1	1	2	
8	9			7	14	32	25	30	17	14	2	2		1
7	8		2	7	24	61	64	54	49	36	9	2		
6	7		2	55	133	139	129	115	82	33	23	10		
5	6	1	13	78	171	253	242	121	78	30	10	2	1	2
4	5	9	36	112	224	346	314	192	75	32	10	1	1	2
3	4	35	63	194	401	457	284	145	52	33	9	2	1	
2	3	44	101	289	515	463	289	137	72	39	7	2	2	
1	2	57	136	373	530	410	263	98	53	26	2	3	5	3
0	1	72	206	581	666	504	260	159	54	28	14	9	4	1
-1	0	60	199	471	429	304	194	102	66	43	19	6		
-2	-1	93	212	405	411	262	185	88	43	24	8			
-3	-2	96	240	350	363	206	136	57	42	35	8	1		
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-10	-9	78	96	87	46	39	15	3						
-11	-10	68	82	60	54	27	4	5	1					
-12	-11	46	75	57	31	3	8	5	1					
-13	-12	36	50	45	16	16	9	4	1					
-14	-13	32	49	44	22	14	8	3						
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-16	-15	29	30	17	11									
-17	-16	23	28	11	2									
-18	-17	25	17	5										
-19	-18	23	18	8										
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-21	-20	10	3	2										
-22	-21	1	3	1										
-23	-22		1											
-24	-23		1											