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The effect of short-notice changes in the trackwork plan on the train traffic

DARIA IVINA, PHD STUDENT. LUND UNIVERSITY, K2

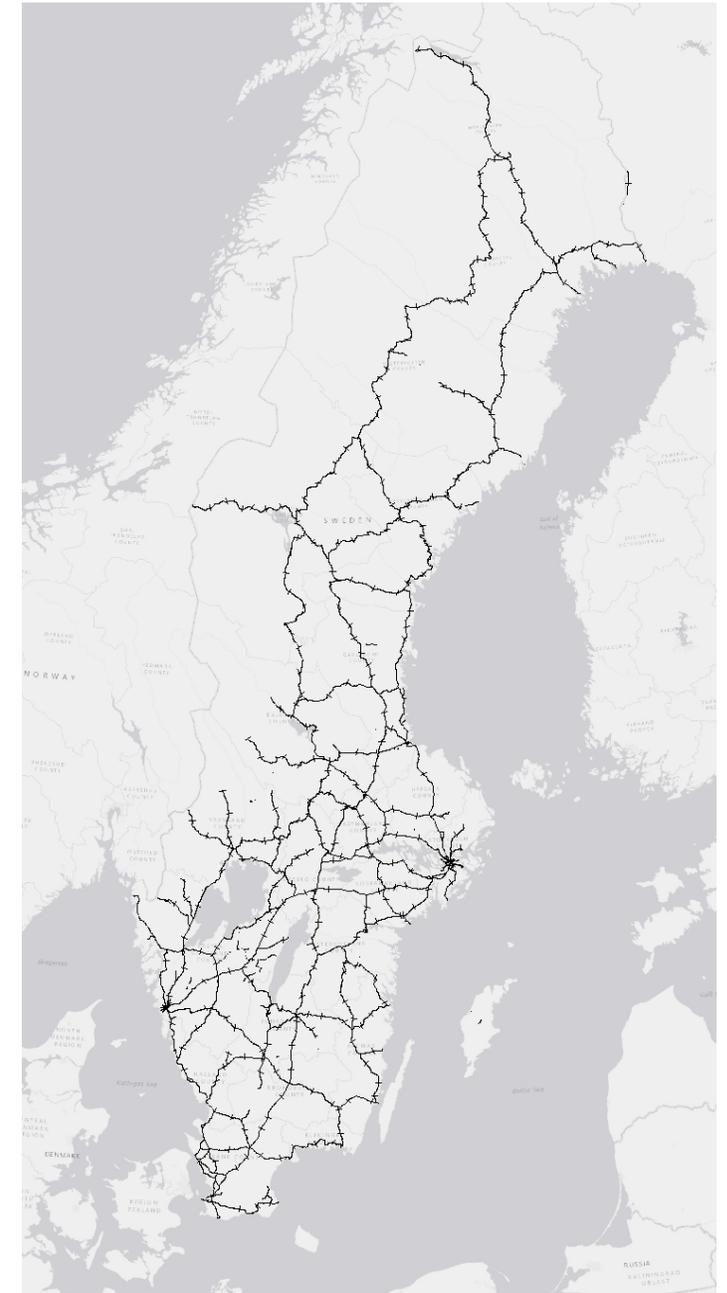
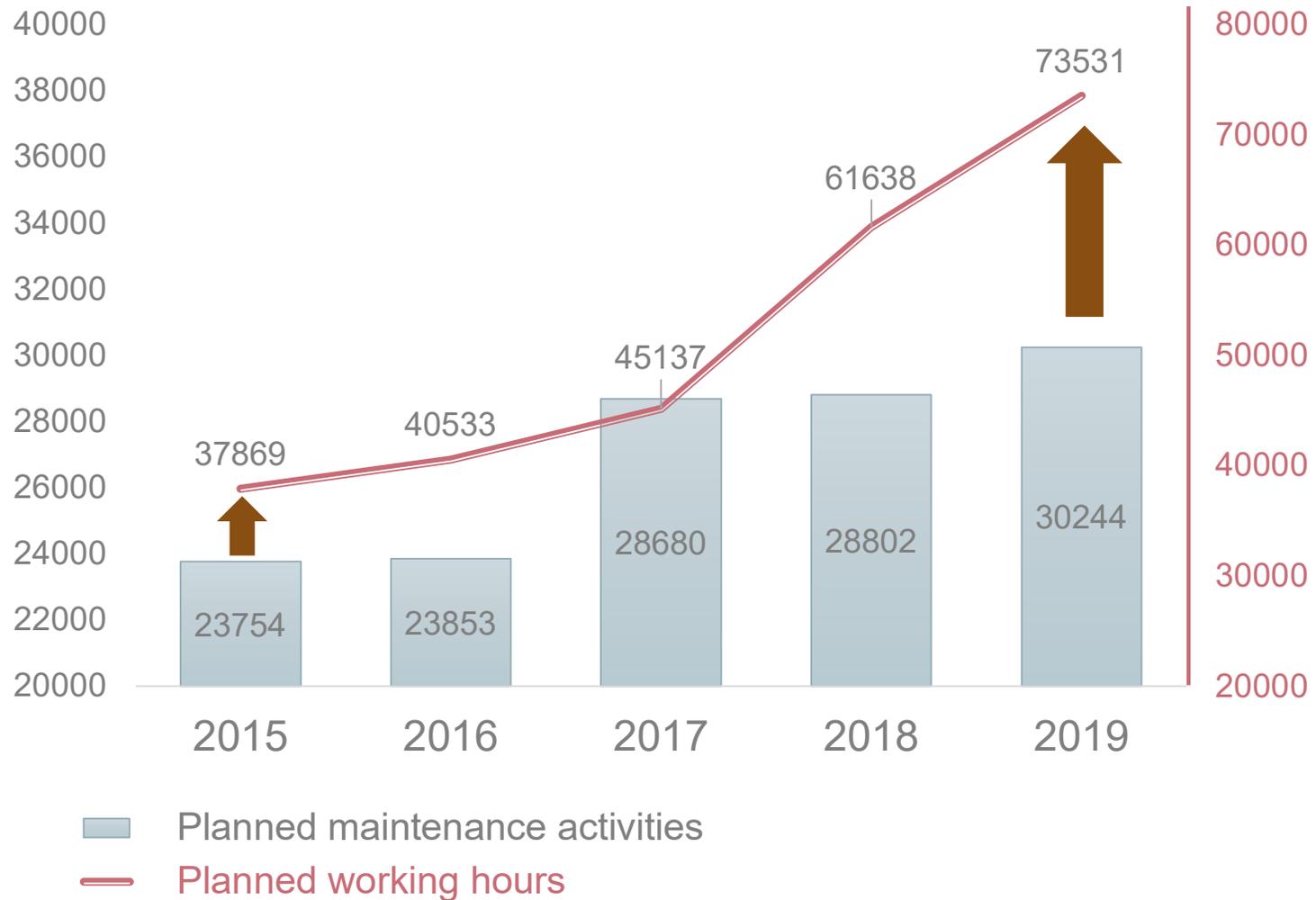
Study made as a part of BANDAT project supported by Trafikverket



2020.04.23



Railway maintenance in Sweden



Track work process and data access (BANDAT)

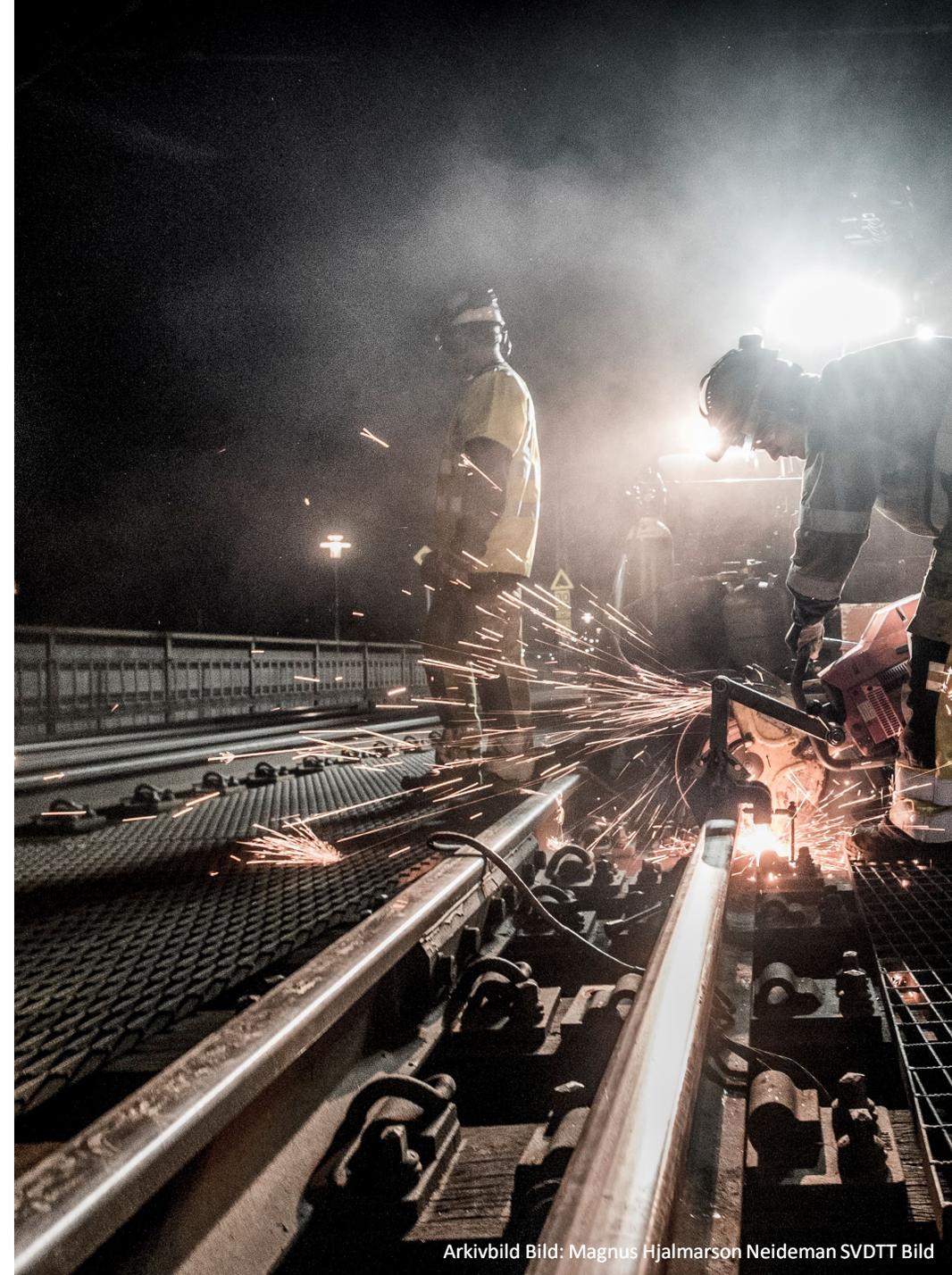
Project timeframe: May 2019 – April 2022

Performer: Lund University

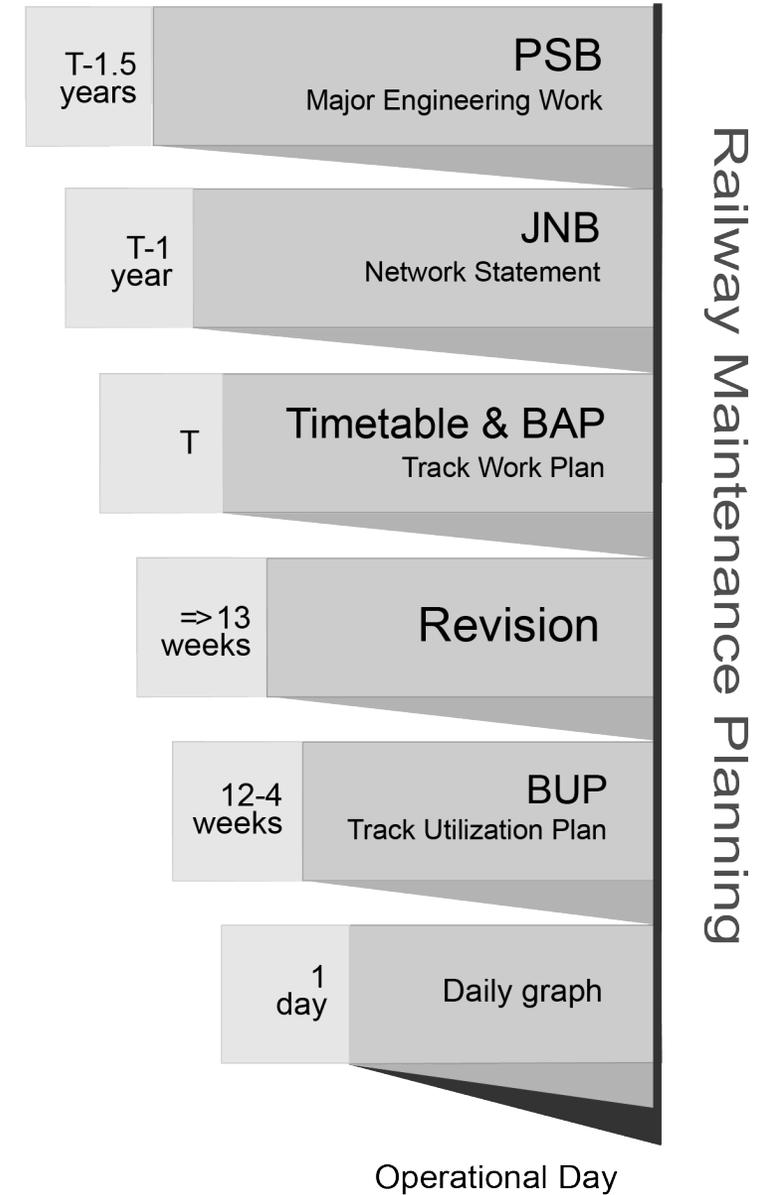
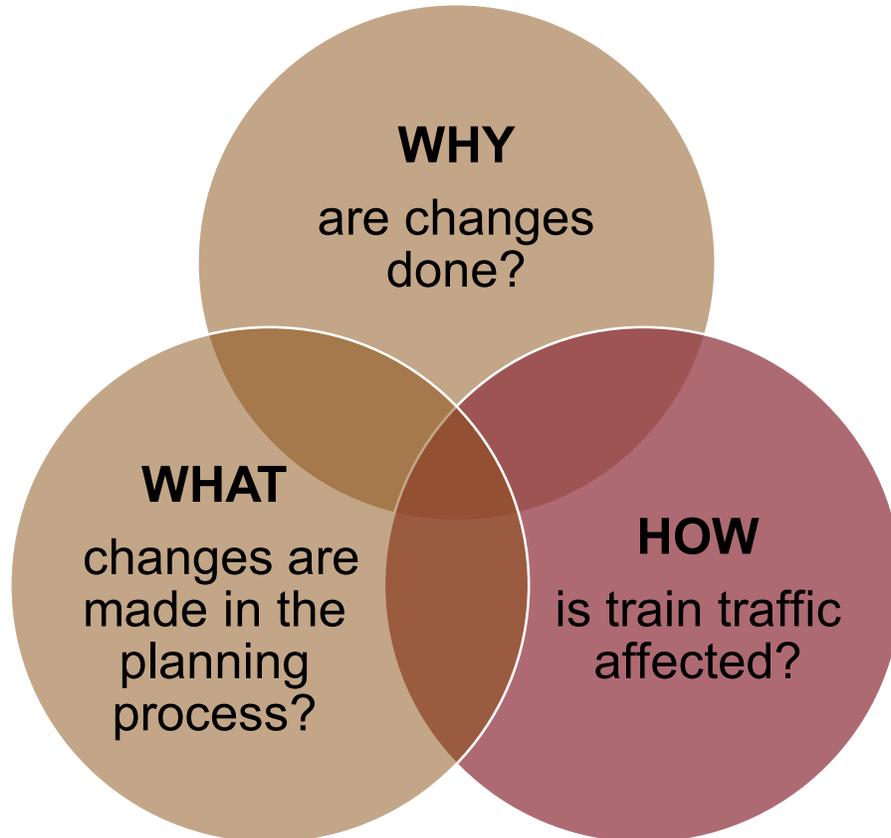
Project group:

- Daria Ivina, Lund University
- Carl-William Palmqvist, Lund University
- Nils Olsson, Norwegian University of Science and Technology
- Lena Winslott Hiselius, Lund University
- Lars Brunsson, Trafikverket

Sponsor: Rose-Marie Renberg



Research questions



HOW

is train traffic
affected?

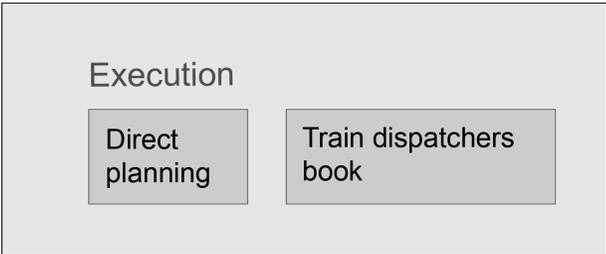
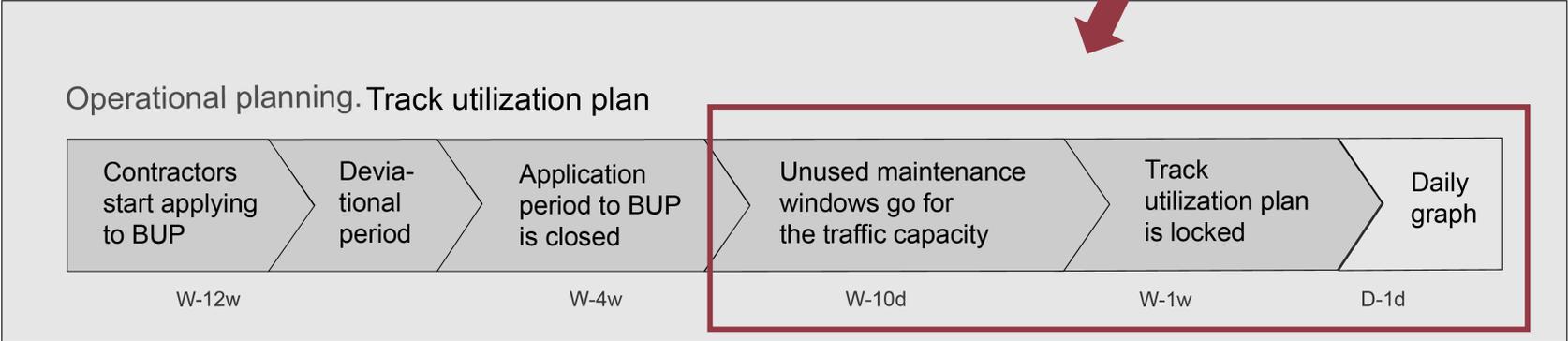
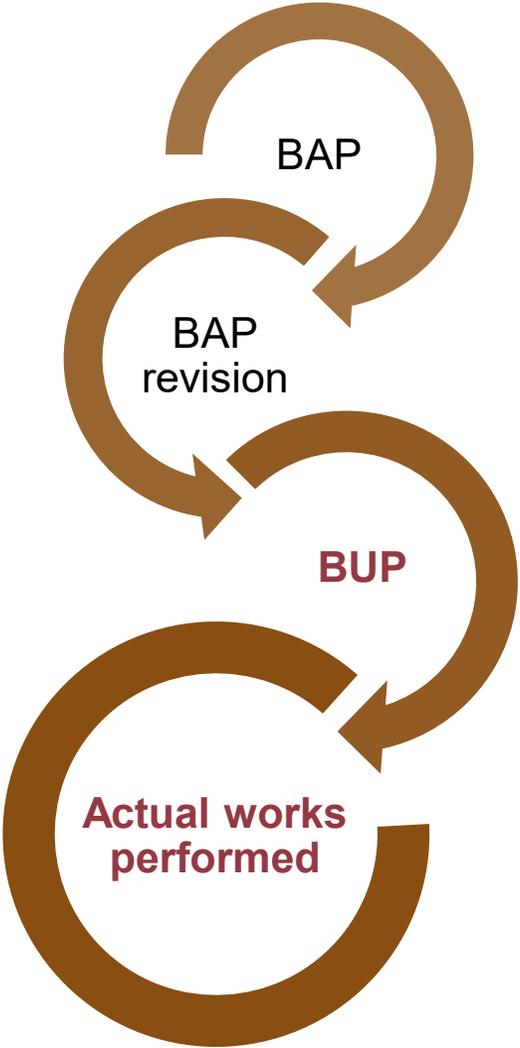
capacity restrictions

- Track closure
- Single track operation
- Speed restrictions
- Maintenance operational track occupation

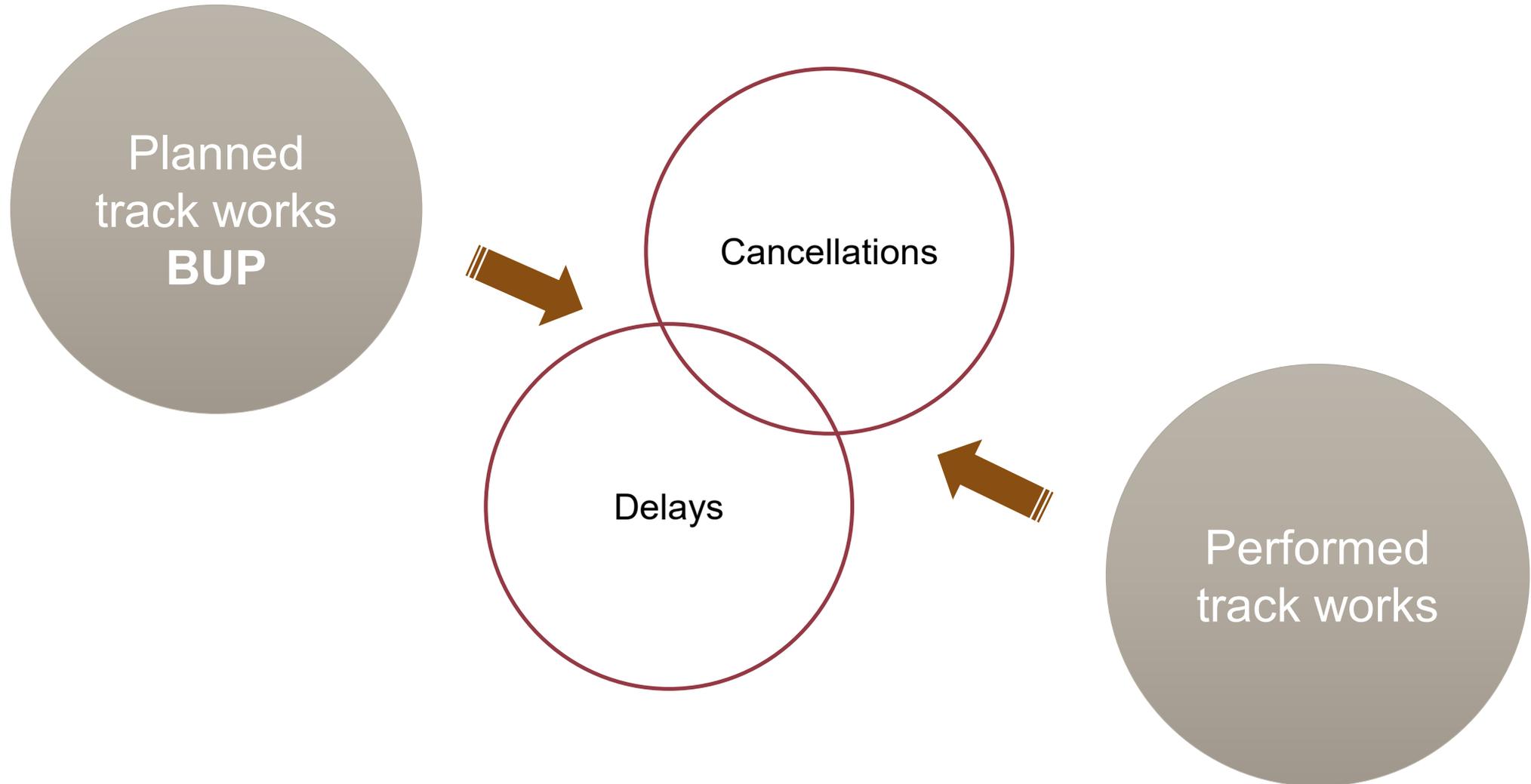


Train Delays and Cancellations

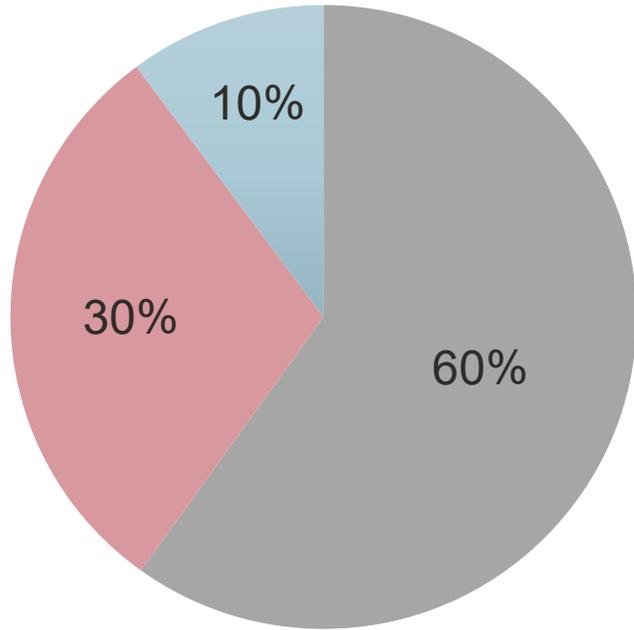
Short-notice changes



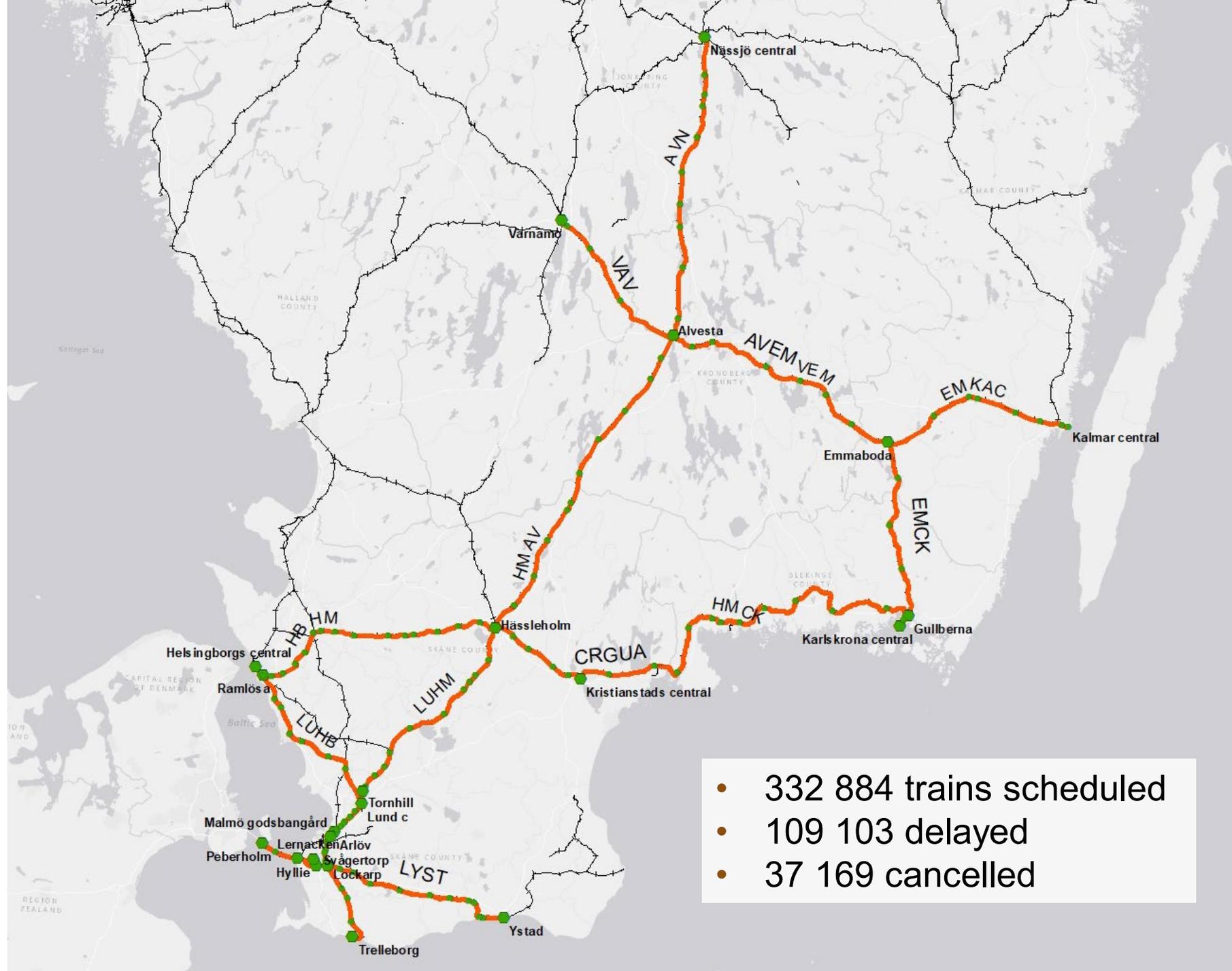
Study design



Observations



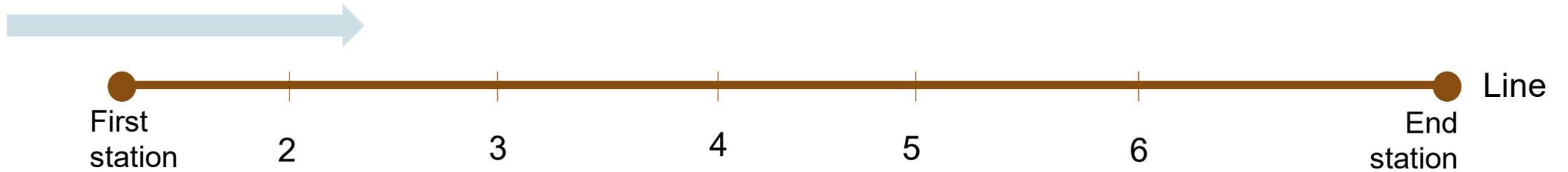
- On time
- Delayed > 1min
- Cancelled



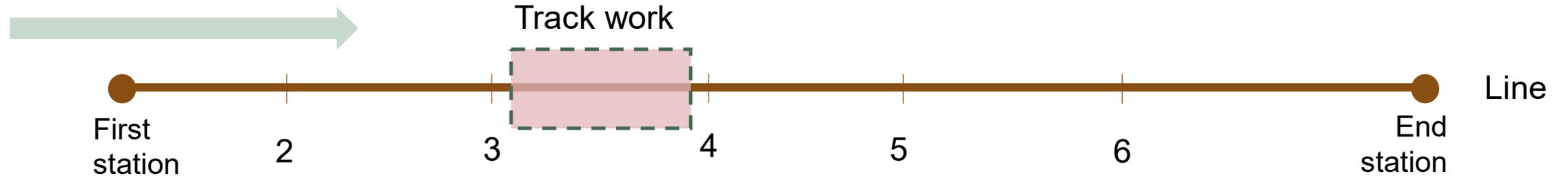
Method

$$\text{Probability of delay increase (cancellation)} = \frac{\text{Number of delay increase (cancellation)}}{\text{Number of observations}}$$

Train 1 - **No overlap**

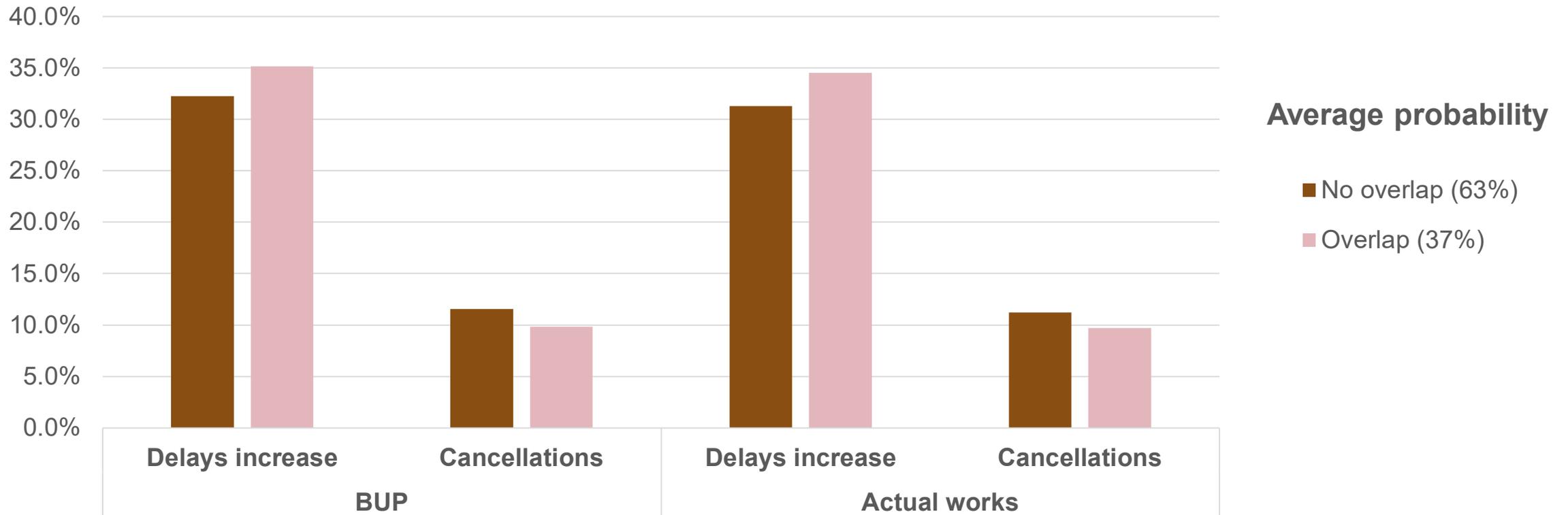


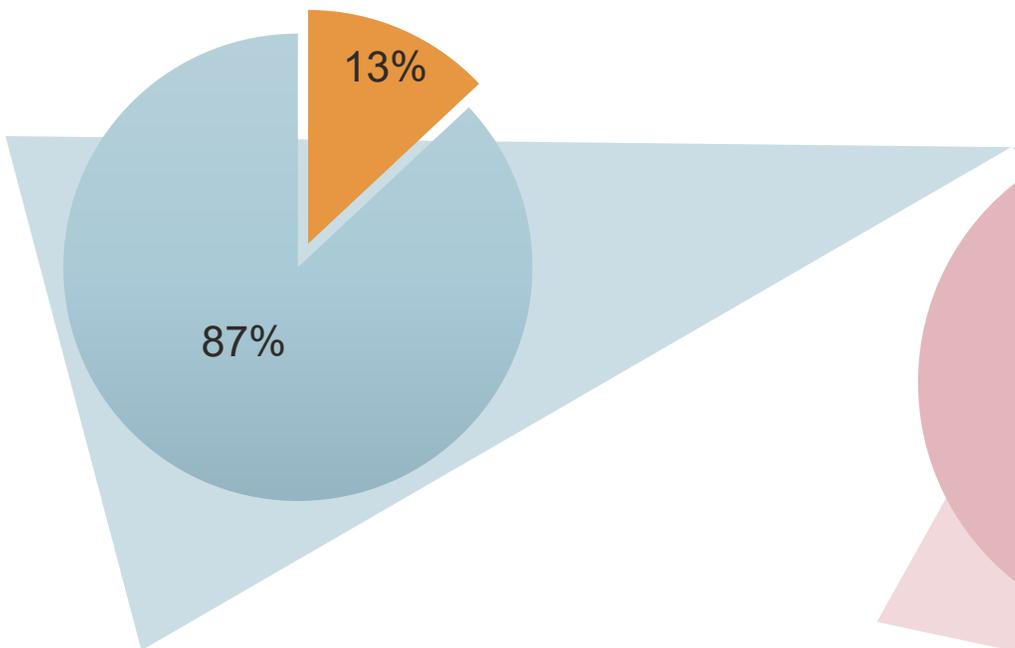
Train 2 - **Overlap**



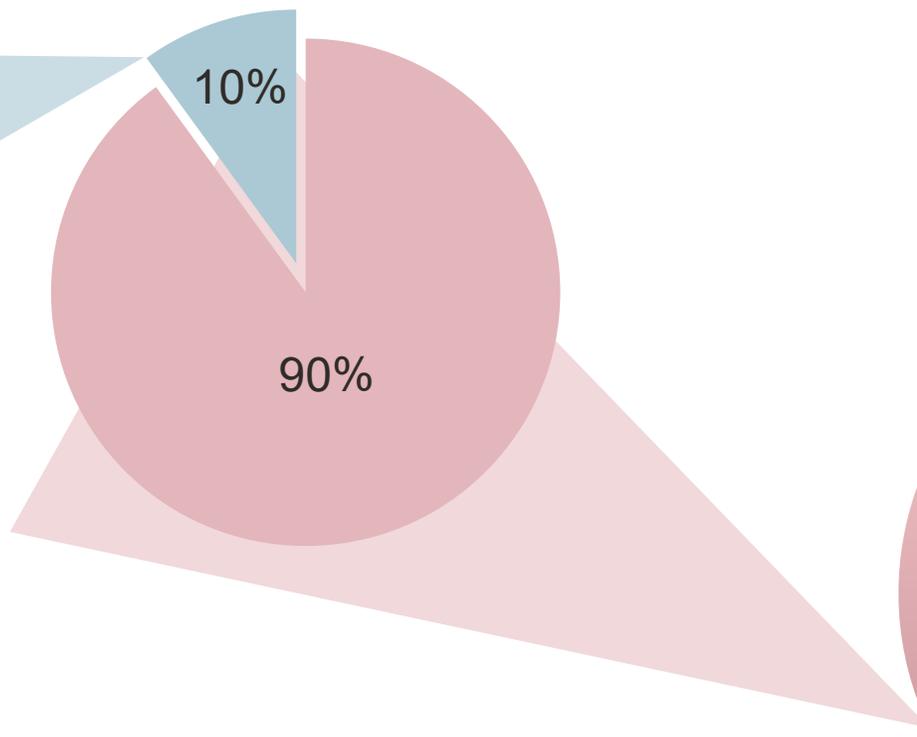
Results

Overlap/No	BUP		Actual works	
	Delays increase	Cancellation	Delays increase	Cancellation
No overlap (63%)	32.2%	11.5%	31.3%	11.2%
Overlap (37%)	35.1%	9.8%	34.5%	9.7%
Difference	2.9%	-1.7%	3.2%	-1.5%

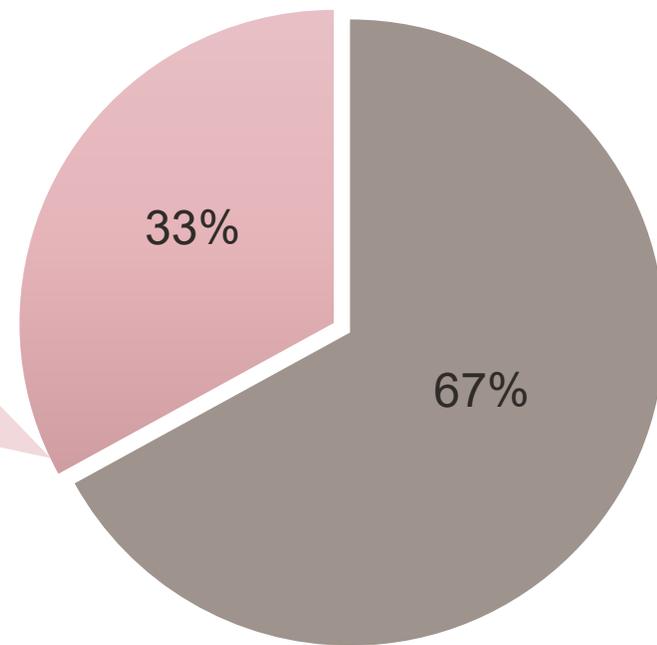




- Short notice changes
- Works signed in BUP



- Delays other reasons
- Delays due to trackwork



- On time
- Delayed > 1 min

Conclusion

- Probability of delay increase higher if there is a track work on the line while train is passing
- Short notice changes result in 1.2 % of all train delays
- The total share of train delays due to track work is 10%, 13% out of which caused by short time notice changes in the Track Utilization Plan (BUP)
- Track works actually performed, caused higher probability of train delay by 0.3%, compared to planned in BUP

Planned study continuation

Increase the number of observations

Provide more specification of the sample data:

- Freight vs passenger trains
- Delayed vs not delayed while entering the studied line

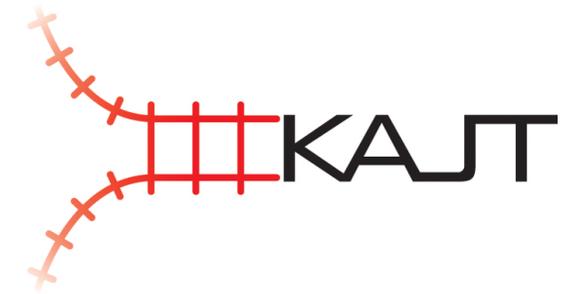
Tack för er uppmärksamhet!



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daria.ivina@tft.lth.se