The Effect of Operations Control on Reliability

Case: RandstadRail

Niels van Oort
Public Transport Consultant / PhD Student

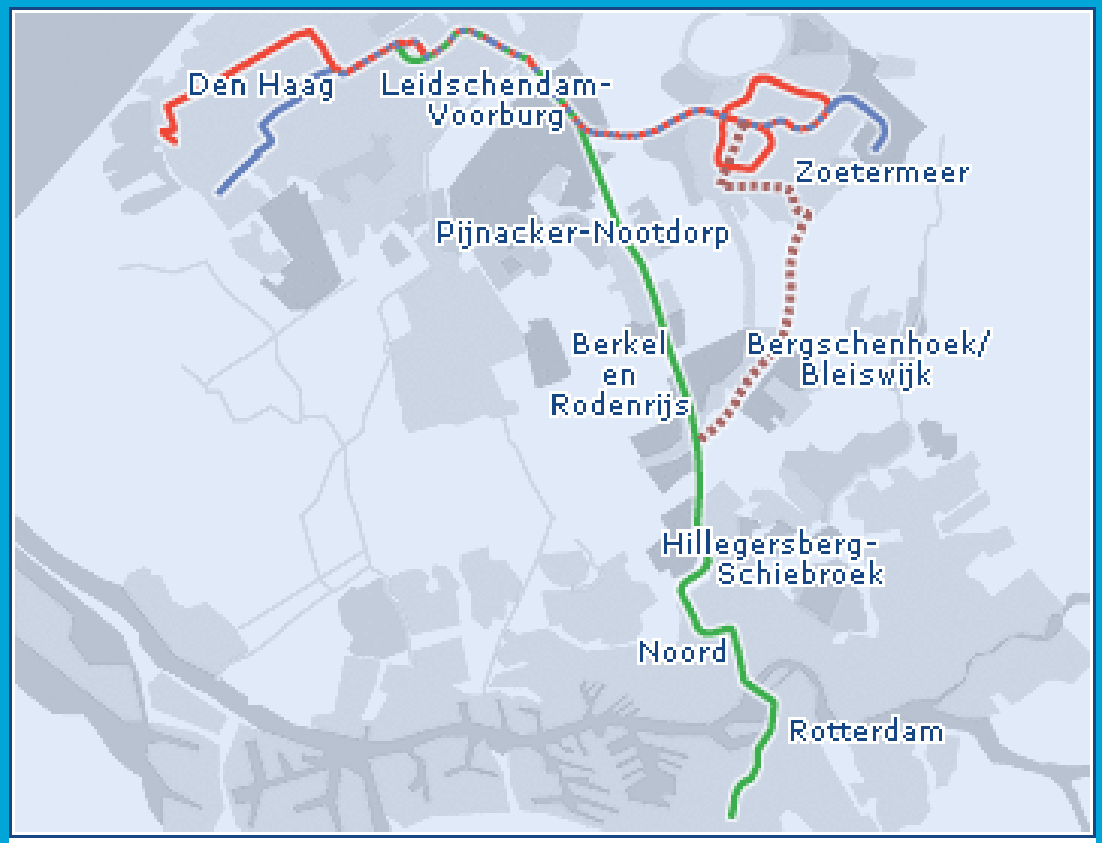
Rob van Nes
Associate Professor

HTM
Urban public transport

TU Delft
Delft University of Technology

Outline

- RandstadRail
- Controlling operations
- Actual effects of controlling



RandstadRail

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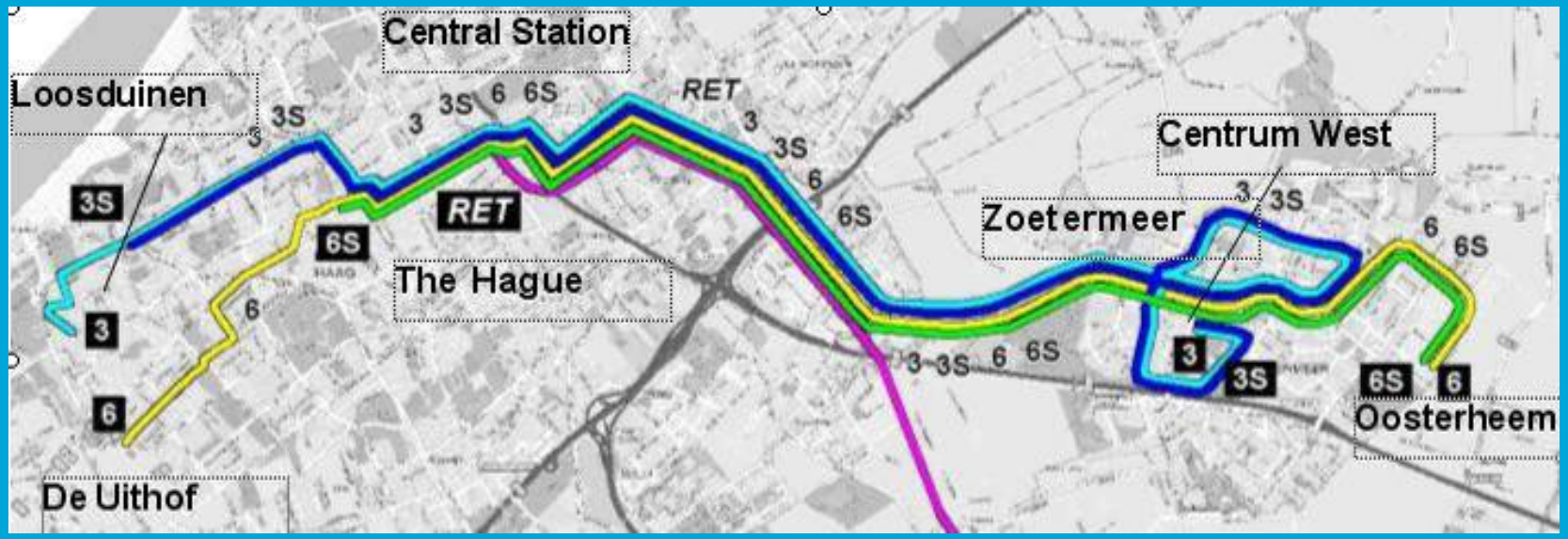
RandstadRail



94.000 boardings per day

Two lines; 33 and 27 km | 41 and 31 stops

5 min headway per line per direction

50 Low floor vehicles

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RandstadRail (2)

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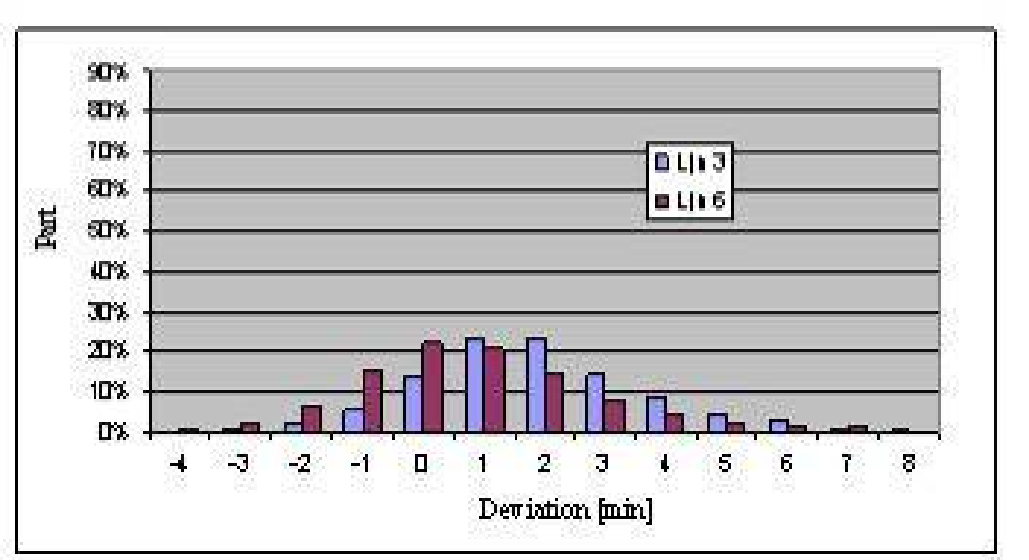
Why controlling?

- High level of quality and reliability
- In urban area
  - Poor punctuality
  - Poor regularity
- High number of vehicle
- Signalling applied: limit
- Shared tracks with tram
- Operational targets of transit authority



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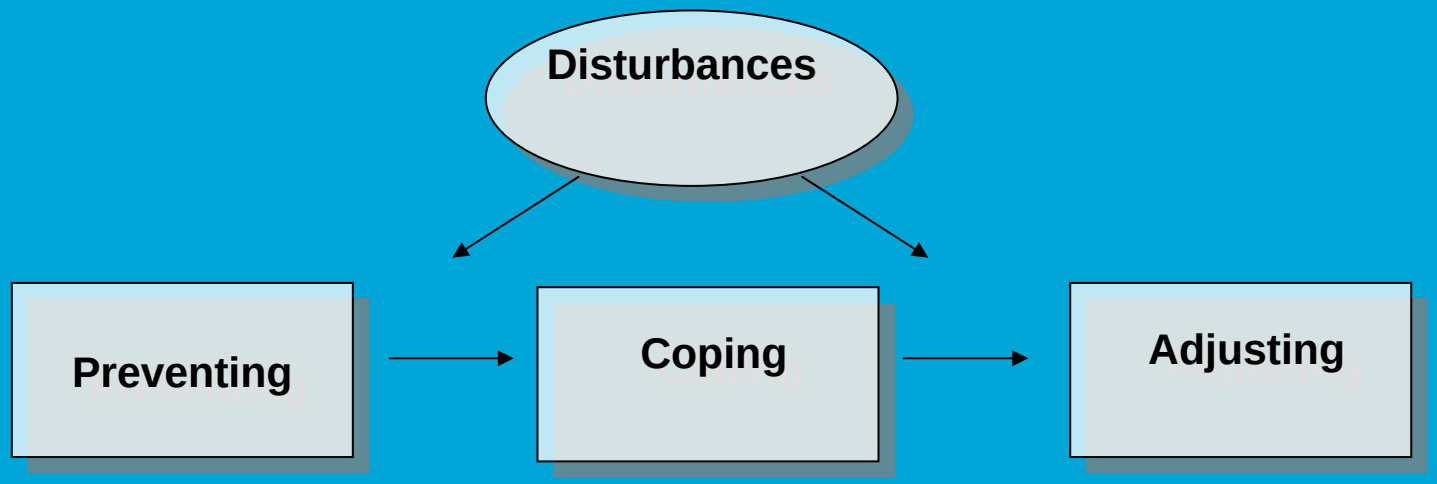
Without controlling?

- Bunching -> Increase in average waiting time
- Overcrowding -> Probability of having a seat decreases
- Uncertainty -> Less satisfied travellers

How to deal with deviations?



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Main elements

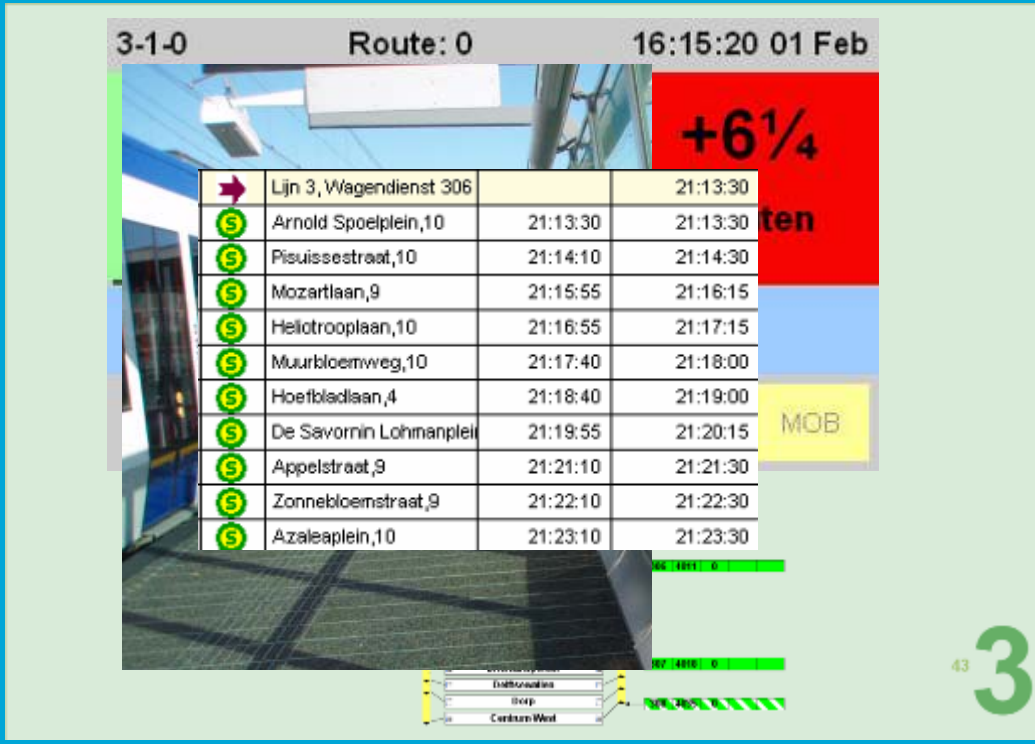
Preventing unplanned stopping

Punctuality

Dwelling

Timetable

Dispatching room



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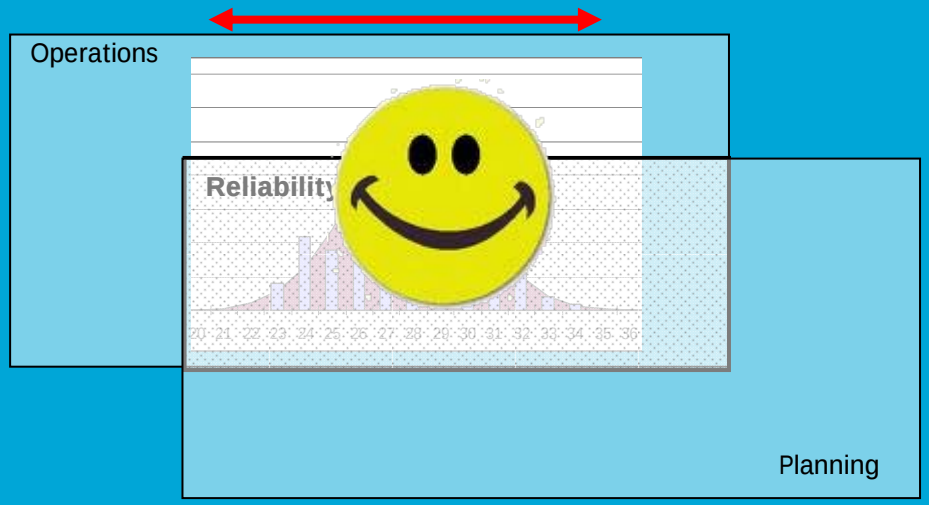
Actual effects

- Continuous monitoring operational quality
  - To optimize timetable
  - To find and remove bottlenecks

Improvements

- Variation of driving time
- Punctuality
- Customers satisfaction



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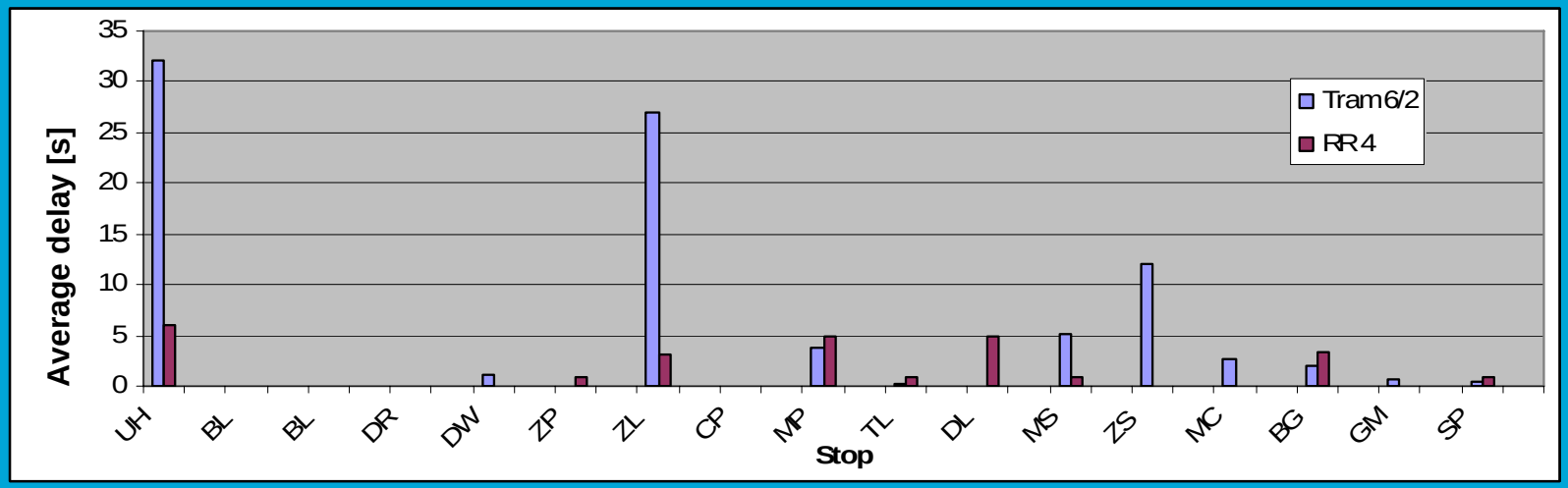
Variation of driving times

Unplanned stopping

Average delay	90 s → 20 s
Standard deviation	- 50%



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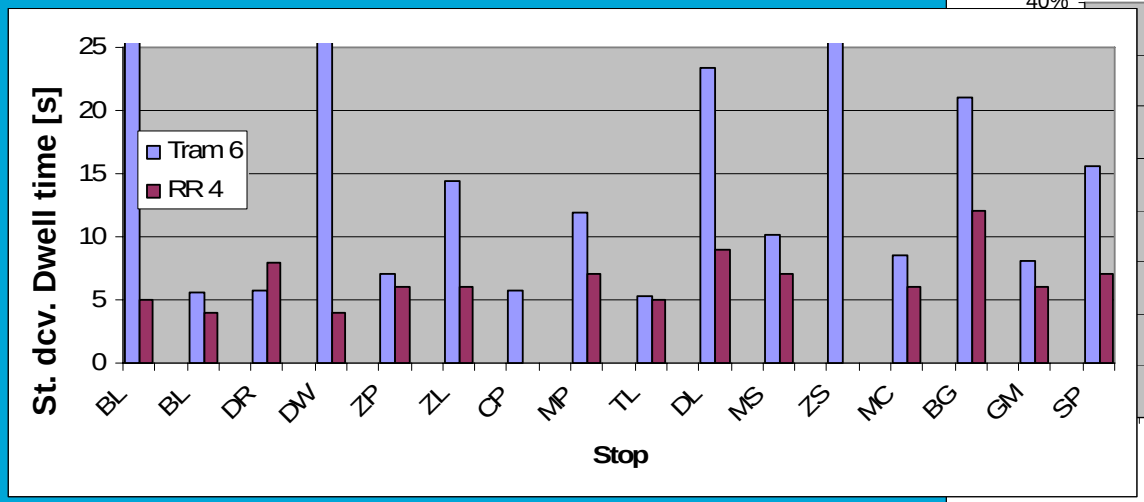
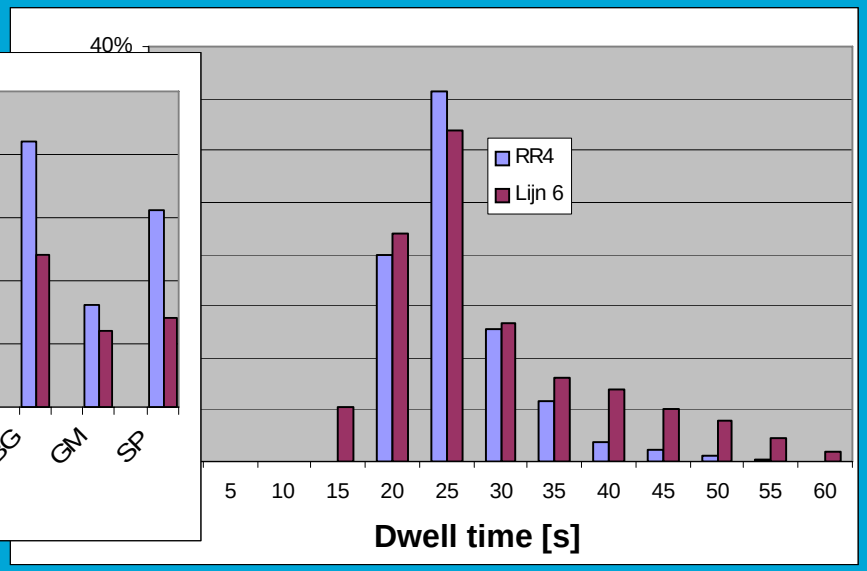
Variation of driving times (2)

Dwelling

Average dwell time	28 s → 24 s
Standard deviation	- 70%





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Punctuality

Departure punctuality:	70%→ 93%	<-1,+1>
Driving ahead of schedule:	50%→7%	<←,0>

15% less waiting time for passengers

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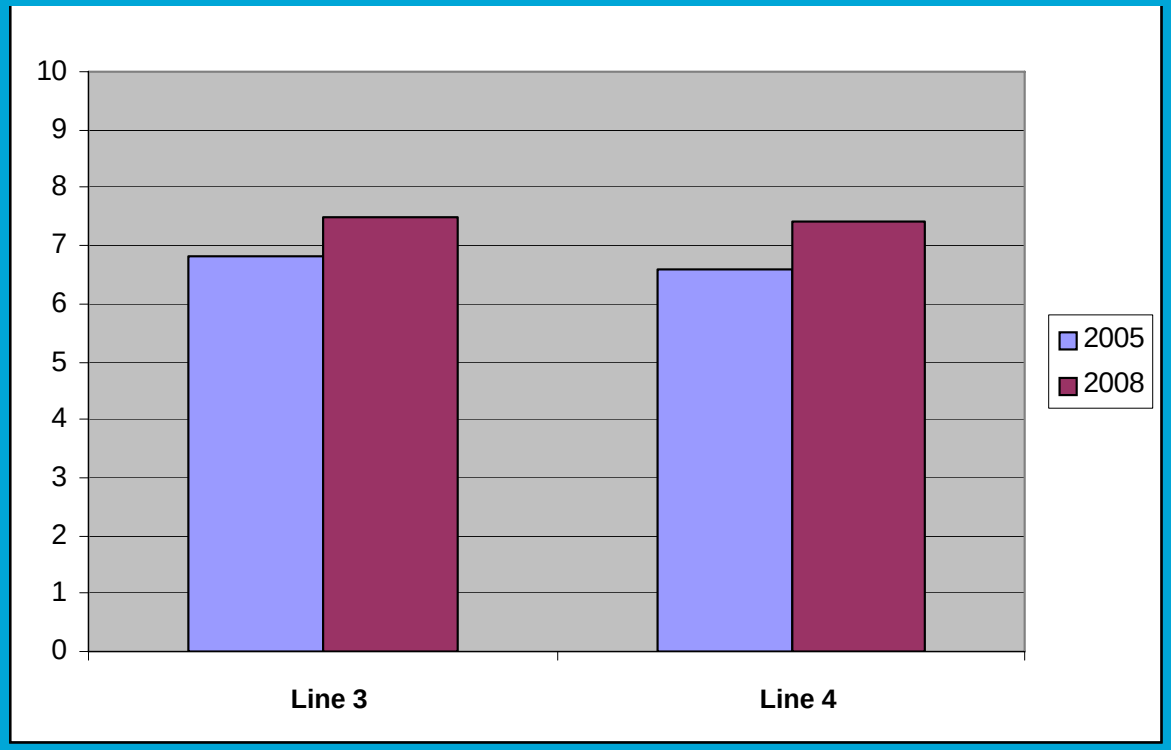
Customers satisfaction



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Conclusions

- RandstadRail: High frequent light rail in urban area
- High reliability because of controlling operations
- Still more attention needed to reliability during network and timetable stage

Further (PhD)research

- Optimizing slack allocation
- Infrastructure network design and robustness
- International benchmark of strategic and tactical design parameters of urban public transport

Questions / Contact

Niels van Oort

N.van.Oort@HTM.net

Site PhD Research:

http://www.htm.net/Pages/DEF/533.html

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