

Service reliability and transfer convenience on the Brussels tramway network

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Do tram users prefer

delayed services without transfers or

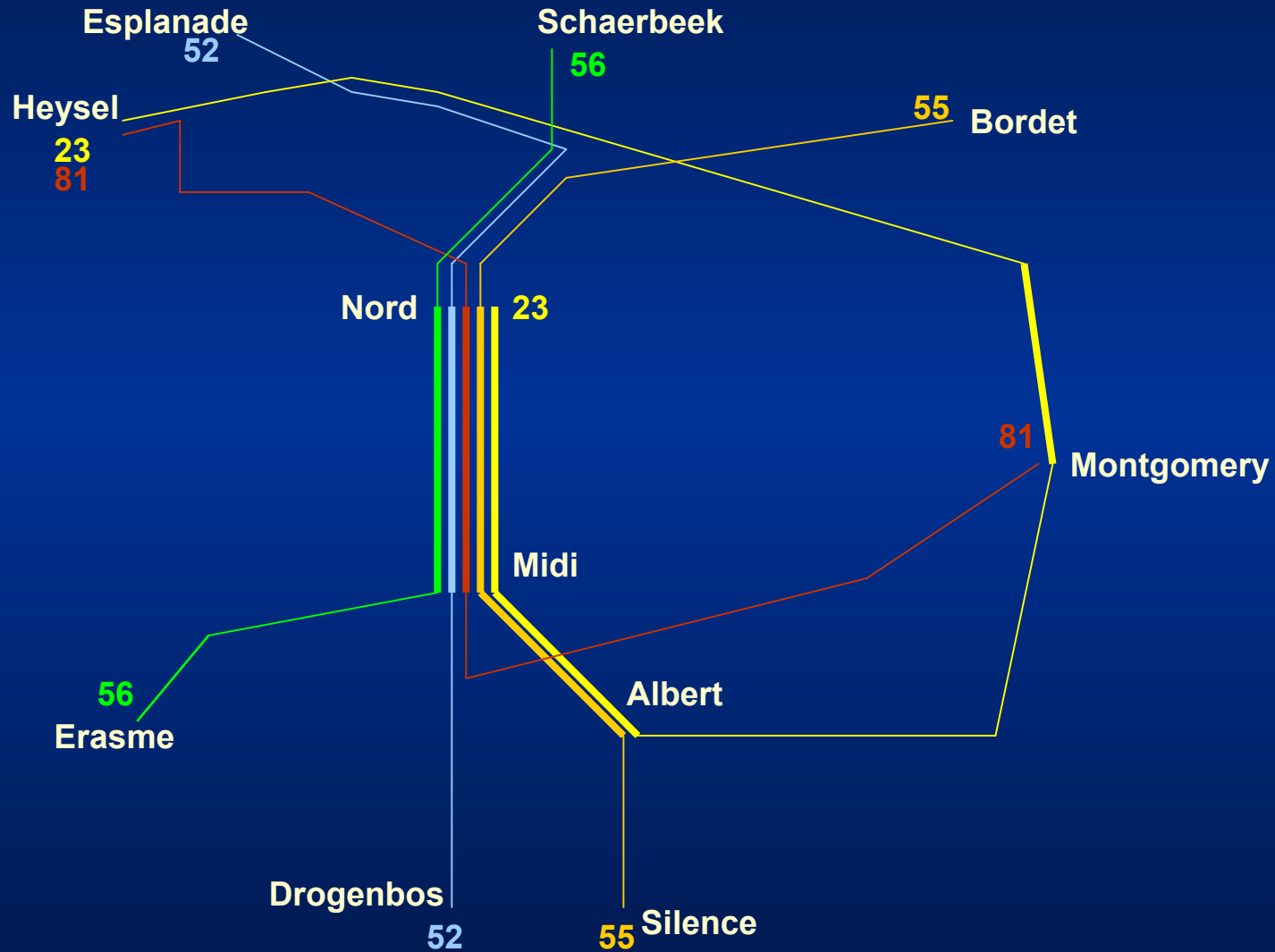
reliable services with imposed transfers ?

The context

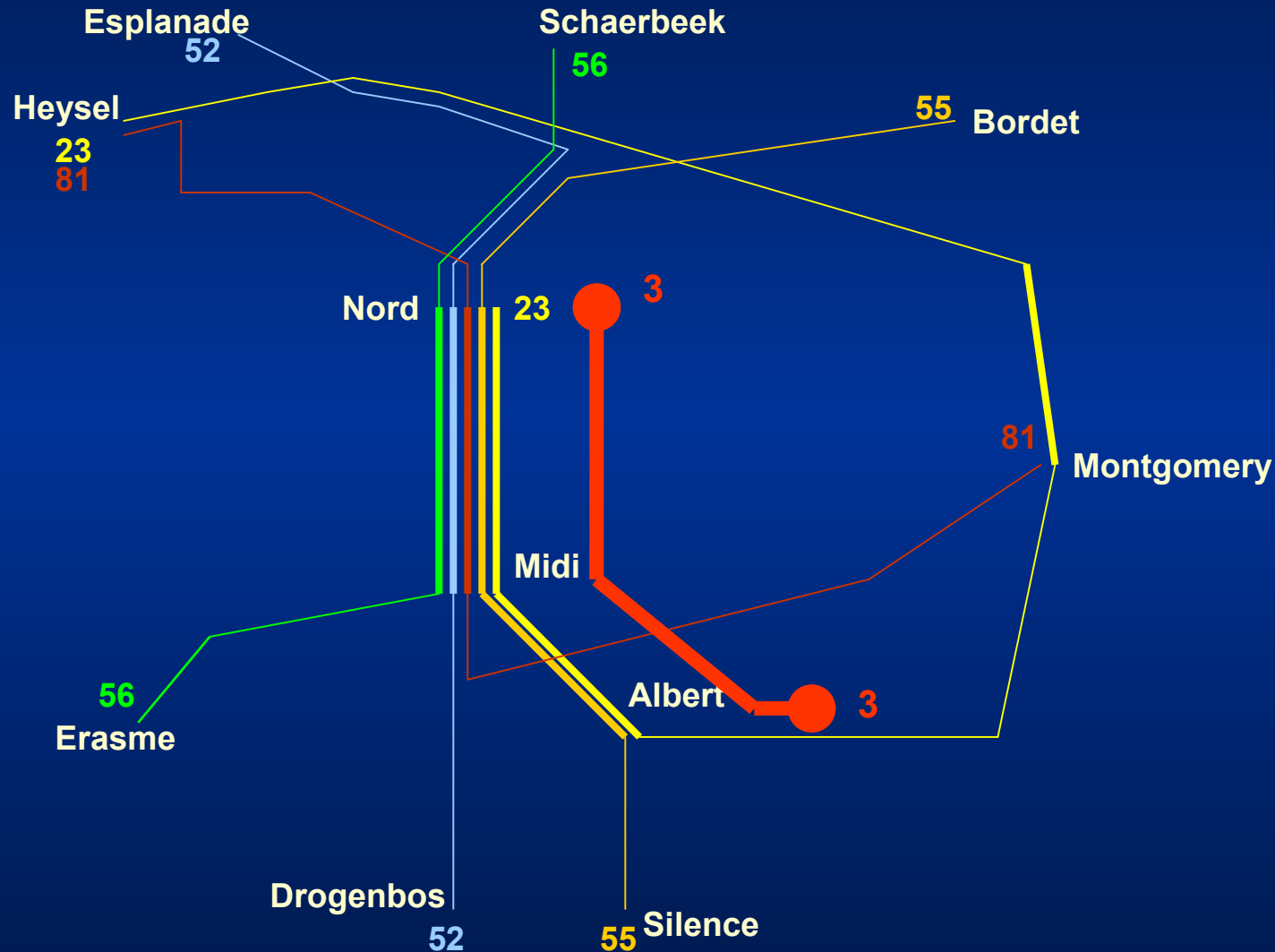
How to operate the Nord-Midi-Albert underground link of the Brussels tramway system ?

- Located in the centre of the city,
- Common trunk of several lines that crisscross the Brussels region in various directions.
- Run by the Société des Transports Intercommunaux de Bruxelles (STIB).

The context



The context



The STIB would like to remedy this situation by dividing up the N and S branches of the tram lines, organising a regular new “Line 3” on a shorter route in the centre;

The context

the STIB therefore asked :

“do users prefer a regular shuttle service circulating between the Albert and Nord stations but requiring transfers at the ends, or the current irregular services not requiring transfers?”

- ⇒ precise analysis of the behaviours of the users of the Nord-Midi-Albert infrastructure, especially in terms of regularity of services and transfer convenience.

The survey

- Stated Preferences method to precisely estimate the weight of each attribute of the services studied in the behaviour of the users, and to measure the judgments they make among these various attributes.
- The SP questions offered the user three options:
 1. an alternative without transfer with up to schedule services
 2. an alternative with transfer with up to schedule services
 3. an alternative without transfer but with delayed services
- 3,500 interviews were collected, corresponding to a sample of 8,900 valid SP observations.
- On Tuesday or Thursday continuously from 6:30 a.m. until 10:00 p.m., face-to-face to people stopped as they got off their tram.

Perception of service irregularity

1-minute delay	⇒	loss of € 0.10
1/2 likelihood of delay	⇒	loss of € 0.70
1/5 likelihood of delay	⇒	loss of € 0.41
Information panels	⇒	gain of € 0.17

Example :

A user who has to take transportation that is delayed 1/2 for 3 minutes perceives this irregularity as a loss of about € 1.00 (= € 0.70 + 3 * € 0.10)....

If information are given : € 1.00 - € 0.17 = € 0.83

Perception of transfers

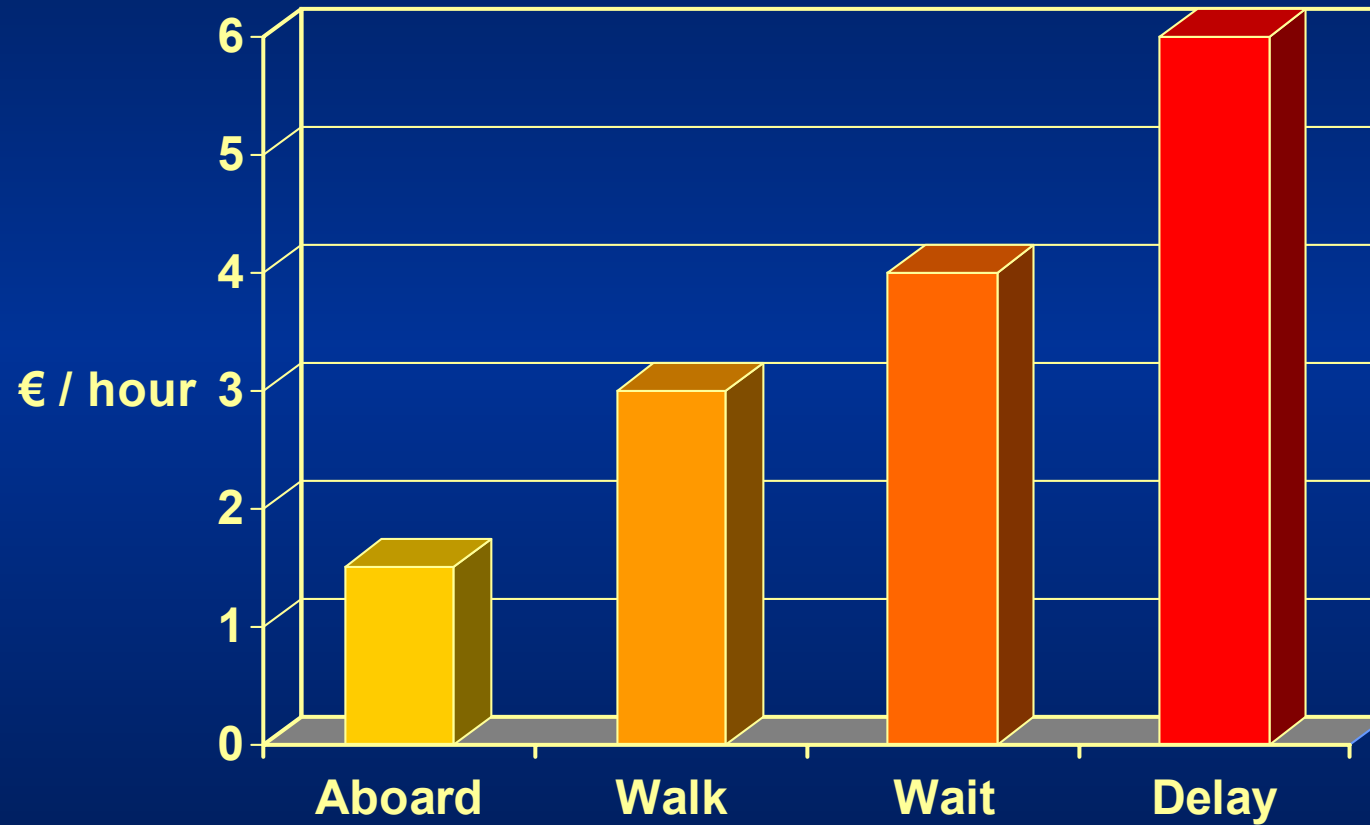
- ⇒ the more levels involved in making the transfer, the more onerous it is : loss of € 0.10 per level to pass through.
- ⇒ the longer the interval between vehicles, the more onerous the transfer : loss of € 0.06 per minute.
- ⇒ the most onerous waiting conditions are those that require waiting outdoors after crossing a road : loss of € 0.32.

Perception of transfers

- ⇒ Around € 0.40 per transfer, according to the reasons, station types and way in which the transfers are organised.
- ⇒ the transfer is perceived far worse by passengers who currently do not transfer than by those who already transfer one or more times : loss equivalent to € 0.51 and € 0.22, respectively.
- ⇒ transfers in certain stations are perceived more negatively than in others : an environmental factor explains the difference
- ⇒ the least onerous transfers are those done from platform to platform, waiting inside the station

example : Gare du Nord or Lemonnier, from platform to platform : € 0.22
 Arts-Loi to go from Metro 1 to the bus outside : € 0.76.

Value of time



Applications

- ⇒ Implementation of a fast and regular tramway Line 3 (every 3 min. at rush hour and 5 min. during non-rush hour) on the Nord-Midi-Albert axis.

Direct trip :

- mean gain equal to € 0.93 at rush hour (i.e., the user would be ready to pay € 0.93 per trip to get regular service at morning rush hour).
- man going to work : € 1.07
- woman going to work € 1.25.
- during non-rush hour, these values change to € 0.82, € 0.97 and € 1.14, respectively.
- Recreational purpose : € 0.60 for men and € 0.77 for women

Applications

Trip with transfer :

a user forced to make a transfer on Line 3 when he had previously made a direct trip by tram would, depending on the regularity of the line, perceive either a gain or a loss:

- for tram 52: a gain equivalent to € 0.07 at rush hour and a gain of € 0.02 at non-rush hour;
- for tram 55 N: a loss equivalent to € 0.38 at rush hour and € 0.58 at non-rush hour;
- for tram 55 S: a gain equivalent to € 0.30 at rush hour, and a gain of € 0.22 at non-rush hour.

Conclusions

While certain users gain in convenience when irregularity is greatly reduced in the services circulating in the Nord-Midi-Albert infrastructure, others lose as a result of additional transfers.

complete diagnosis :

- ⇒ relating to all users and weighted by the respective weight of users subjected to new transfers and users travelling without transfer,
- ⇒ to apply the results obtained to the entire demand.

This work will probably be done as part of the Brussels-Capital Region Master Plan.

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