Transport Operation

Introduction of On-field Measurement 3
Traffic Survey at a Road Intersection

Tamás SOLTÉSZ
soltesz.tamas@mail.bme.hu
Room St 426.

Faculty of Transportation Engineering and Vehicle Engineering
Department of Transport Technology and Economics

MŰEGYETEM 1782

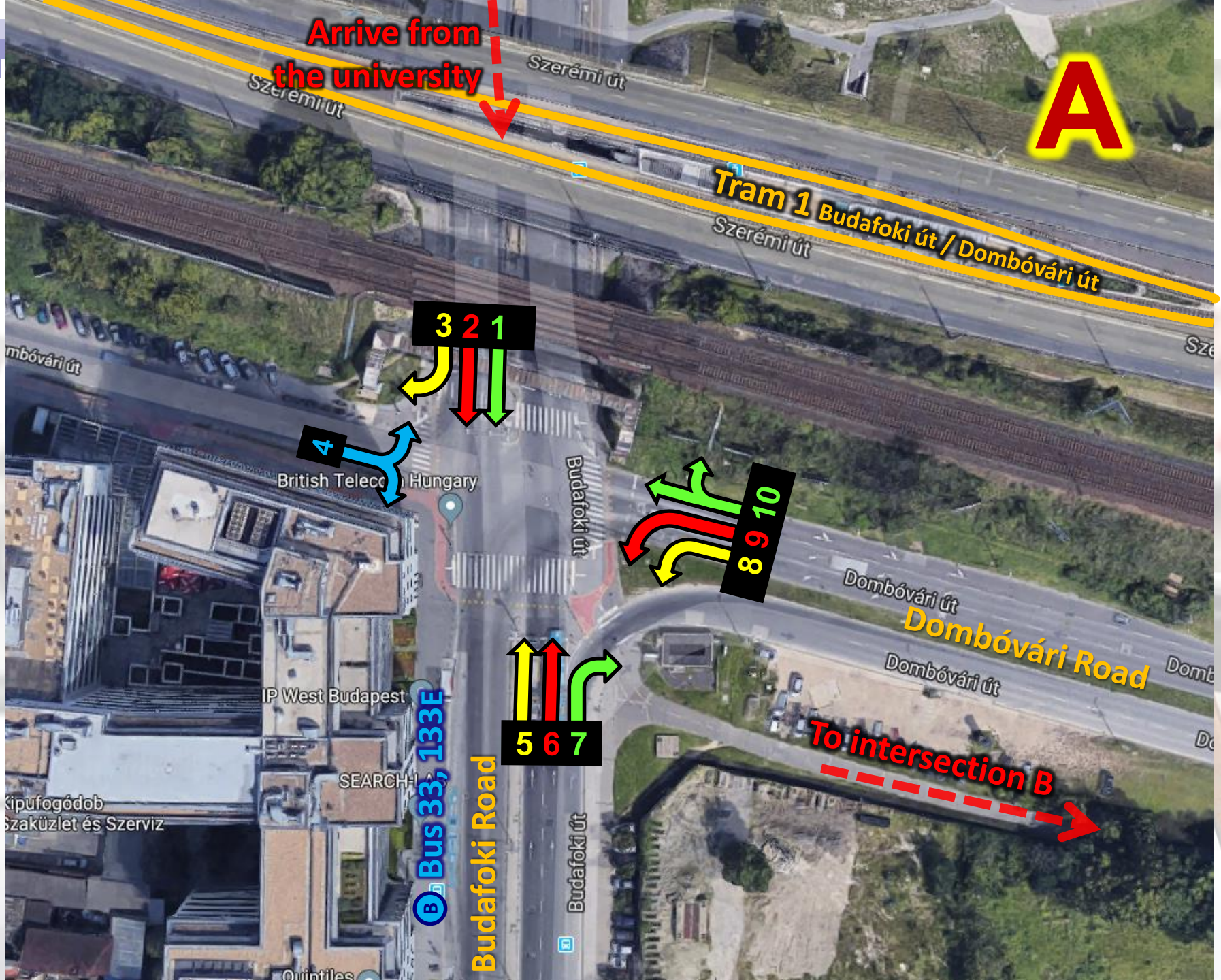
Schedule

Week	Date	Subject	Place
1	11 Sept	NO CLASS	
2	18 Sept	Introduction, editing requirements of reports	St 320
3	25 Sept	Presentation of on-field measurement 1 (Safety level)	St 320
4	2 Oct	(1) Safety level examination of road traffic	Road intersection
5	9 Oct	Presentation of on-field measurement 2 (Occupancy)	St 320
6	16 Oct	(2) Examination of public transport vehicle occupancy and time parameters	Public trsp. stops
7	23 Oct	National holiday – NO CLASS	
8	**30 Oct**	Presentation of on-field measurement 3 (Intersection)	St 320
9	**6 Nov**	(3) Traffic survey at a road intersection	Road intersection
10	**13 Nov**	Presentation of on-field measurement 4 (GPS)	St 320
11	**20 Nov**	(4) Examination of public transport circulation with GPS device	Public trsp. route
12	**27 Nov**	In-class exercise 1: Tram tachograph data analysis	St 320
13	**4 Dec**	In-class exercise 2: Rail line capacity analysis	St 320
14	**11 Dec**	Site visit / Consultation	

Traffic survey at a road intersection

- Measurement shifts: 1st: 8:15 – 9:00
  two groups 2nd: 9:00 – 9:45
- Place of measurement:
  - Intersection of Budafoki Road and Dombóvári Road **(A)**
- Accessible by:
  - Stop *Budafoki út / Dombóvári út*:
    tram **1**, buses **33, 133E**
  - 15 minutes walk (~1 km along Budafoki Road)


Buildings:
St
J
BME Campus
Budafoki Road
Stops of buses towards Intersection A
33
133E
33
Intersections
A
B
Dombóvári Road
B32 Galéria és Kultúrtér
Stoczek Melodin Menza
BME Sportközpont
Lotek Kft.
Lidl
Bajor Söröző
Móricz Zsigmond körtér
Kármán Tódor Kollégium
Goldmann György tér
A38 Hajó
Egyetemisták parkja
ELTE Museum of Mathematics
Budapest Főváros Kormányhivatala XI...
Újbuda-központ
Október huszonharmadika u.
Schönherz Kollégium
BME Building Q
BEAC
Lágymányosi Bárdos Lajos Általános Iskola
Infopark parkoló
Magyar tudósok körútja
Szerémi út
Dombóvári út
Gábor Dénes u.
Rákóczi
MMKM Műszaki Tanulmánytár
Google


Arrive from the university
A
Szerémi út
Tram 1 Budafoki út / Dombóvári út
3 2 1
4
British Telecom Hungary
Budafoki út
8 9 10
Dombóvári út
Dombóvári Road
5 6 7
To intersection B
Bus 33, 133E
Budafoki Road
SEARCH!

Lane schedule

1st time shift, **8:15 – 9:00**		Lane	2nd time shift, **9:00 – 9:45**	
Group	**Student**		**Group**	**Student**
1	Farias Chaves Quirino Yasmin	**1**	**7**	Manoel Victor Araújo Oliveira
	Fatma Dilek Gamlı	**2**		Rodrigo Netto de Souza
2	Malek Alkhatatne	**3**	**8**	Lucas Gabriel Soares Padre Santos
	Sagidullayeva Slushash	**4**		André Pessoa Pacheco
3	Issa Matalqah	**5**	**9**	Fabian Feiland
	Anas Alatawneh	**6**		Timo Lederer
4	Pathan Zaid Khan	**7**	**10**	Thérèse de Nantes
	Kevin Armel Sonkeng			Sébastien Vieugué
5	Esra'a Husein	**8**	**11**	Nils Mielicki
	Muslum Dibirov	**9**		Erik Drawe
6	Julio Cesar Lopez Lizarraga	**10**	**6**	Yahya Aladdin

Traffic survey at a road intersection

- What have to be measured:
  - Number of vehicles in a specific lane,
    - Split by quarters (3 x 15 minutes)
    - Split by vehicle categories:
      1) Passenger cars+ motorcycles + minibuses (van) + light trucks (1)
      2) Medium trucks (1,4)
      3) Heavy trucks + buses (2)
  - Green time (t_{gr}) and cycle time (C) of traffic light
- Measurement time (start, end and also the quarters) should be kept accurately

Truck Classification Manual

Light truck (weight <= 3,5 tons)

Medium truck (3,5 tons < weight <= 7,5 tons)

Daewoo Avia D75

Renault Midliner

Heavy truck (7,5 tons < weight)

Trailer truck

Special truck

Traffic survey sheet

Dept. of Transport Technology and Transport Economics

Name of counter:			Date:	
Place of measurement:			Lanes:	
Cycle time of intersection (sec):			Green time of lanes (sec):	
Lane	Time interval	Passenger car, motorcycle, minibus, light truck	Medium truck	Heavy truck, bus

Analysis of measured data

- Traffic volume in Passenger Car Equivalent (PCE)
  - For each quarter (PCE/15 min)
  - For the whole survey (PCE/hour)
  - Example:

Category	PCE
1	1
2	1.4
3	2

Vehicles

Lane	Time	Cat. 1	Cat. 2	Cat. 3
A	8:15 – 8:30	12	5	2
A	8:30 – 8:45	10	6	3
A	8:45 – 9:00	11	7	4

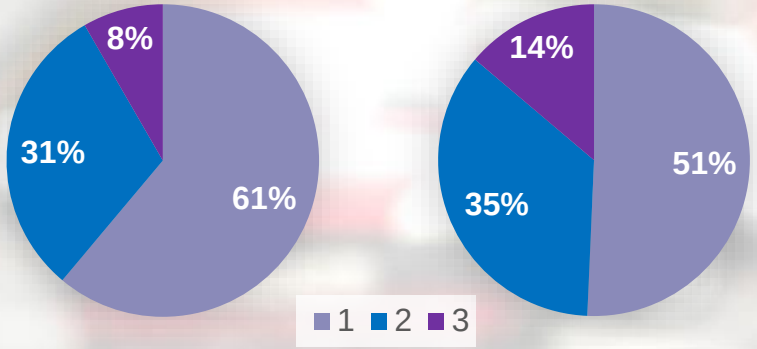
PCE

Lane	Time	Cat. 1	Cat. 2	Cat. 3	Σ
A	8:15 – 8:30	12	7	4	**23**
A	8:30 – 8:45	10	8.4	6	**24.4**
A	8:45 – 9:00	11	9.8	8	**28.8**

$$N_{60} = N_{45} \cdot \frac{4}{3} = (23 + 24.4 + 28.9)\frac{4}{3} = 101.6 \left[\frac{\text{PCE}}{\text{hour}}\right]$$

Analysis of measured data

- Distribution (share) of vehicle categories
  (for the whole survey time)
  - By the number of vehicles
  - By PCE volumes



- Simplified capacity analysis of the intersection
  - Lane capacity: needed: min. headway (t_{hw} = 2 s), t_{gr}, C
    Method: $t_{gr}, C \rightarrow n_C \rightarrow T_{gr/1h} \rightarrow N_{max,1lane} \rightarrow N_{max}$

$$N_{max,1lane} = T_{gr/1h} / t_{hw} = t_{gr} \cdot n_C / t_{hw} = t_{gr} \cdot 3600 / (C \cdot t_{hw})$$

  - Comparison to measured PCE traffic, saturation (traffic/capacity ratio, i.e. N_{60} / N_{max})

Thank you for your attention!