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BUDAPEST TRAM-SAFETY UPDATE

All data provided by BKV – Public Transport Operator of Budapest

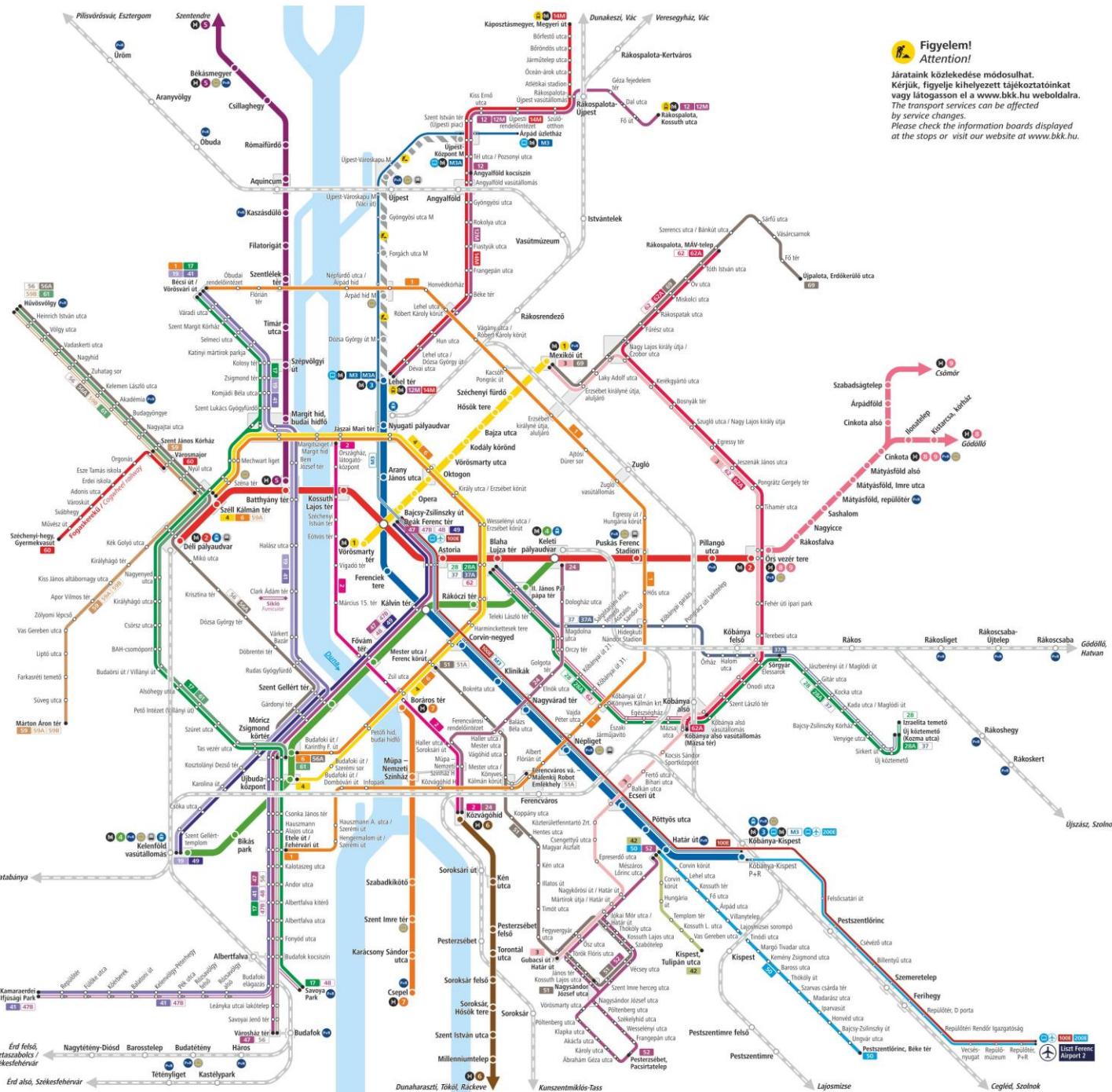
28th of November, 2018.

Basic data

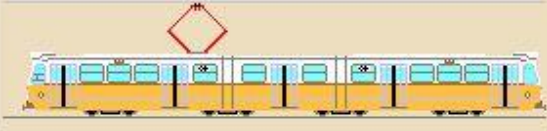








Population: ~1.736.000 inhabitants
Daily number of passengers on PT:
4.700.000 passengers / day

Tram-system:

- In operation since 1887
- One of the most enwreathed/looped networks of Europe
- most frequent service
- 32 tramlines + 4 nightlines (length: 2,2 km – 18,2 km)
- Length of tracks: 344 km + 733 switches/sidings + 54 structures
- Number of stops: 5167
- Number of vehicles: 430 (in service)





Típus		
Ganz csuklós		38
KCSV 7 (korszerűsített Ganz csuklós)		30
TW 6000-6100 (Hannoveri)		113
Combino		40
CAF 9		12
CAF 5		35
UV motorkocsi		4
Tátra T5C5 motorkocsi		125
T5C5K (Korszerűsített Tátra)		195

Major development in last years

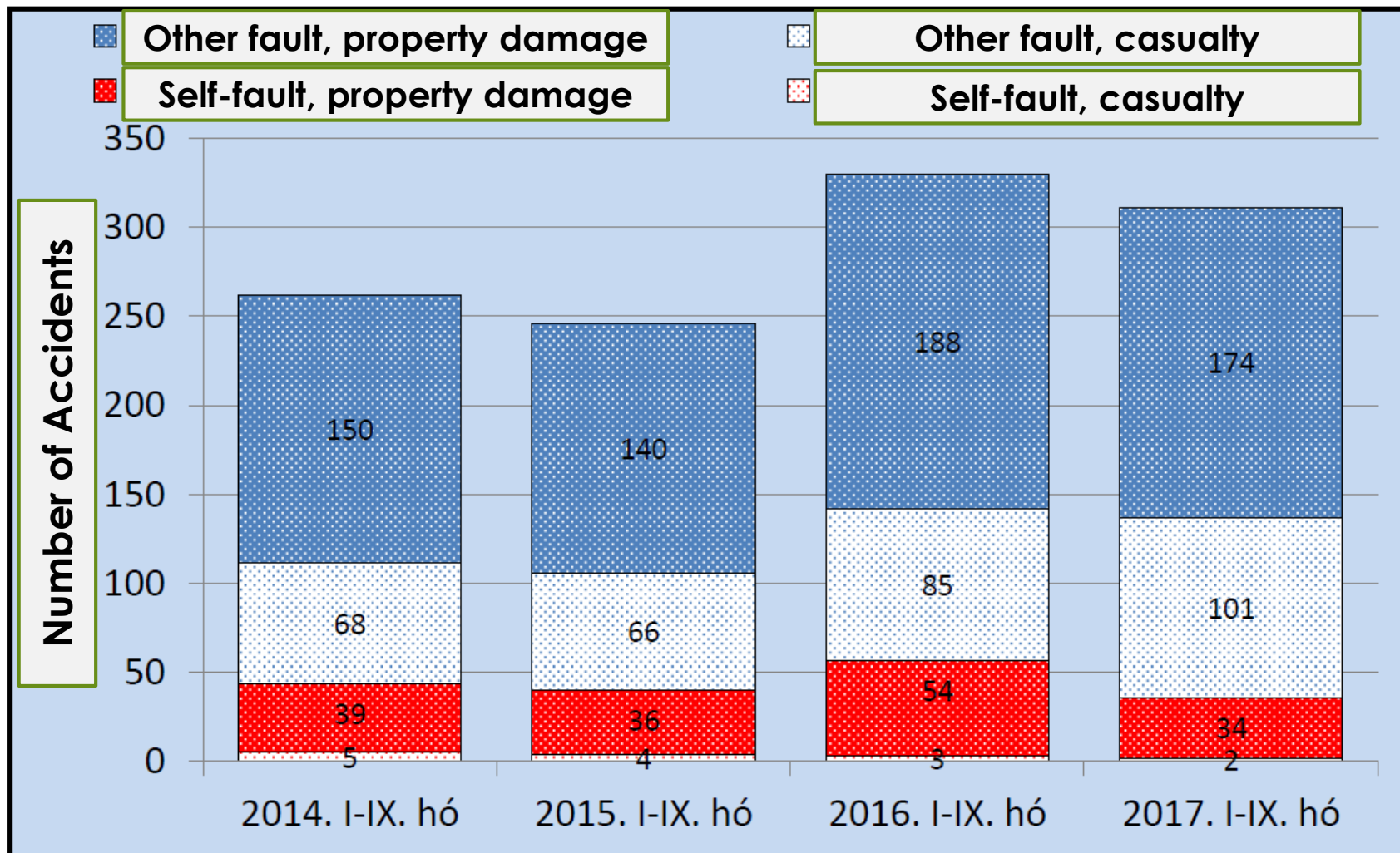


Merging tram-system of Buda

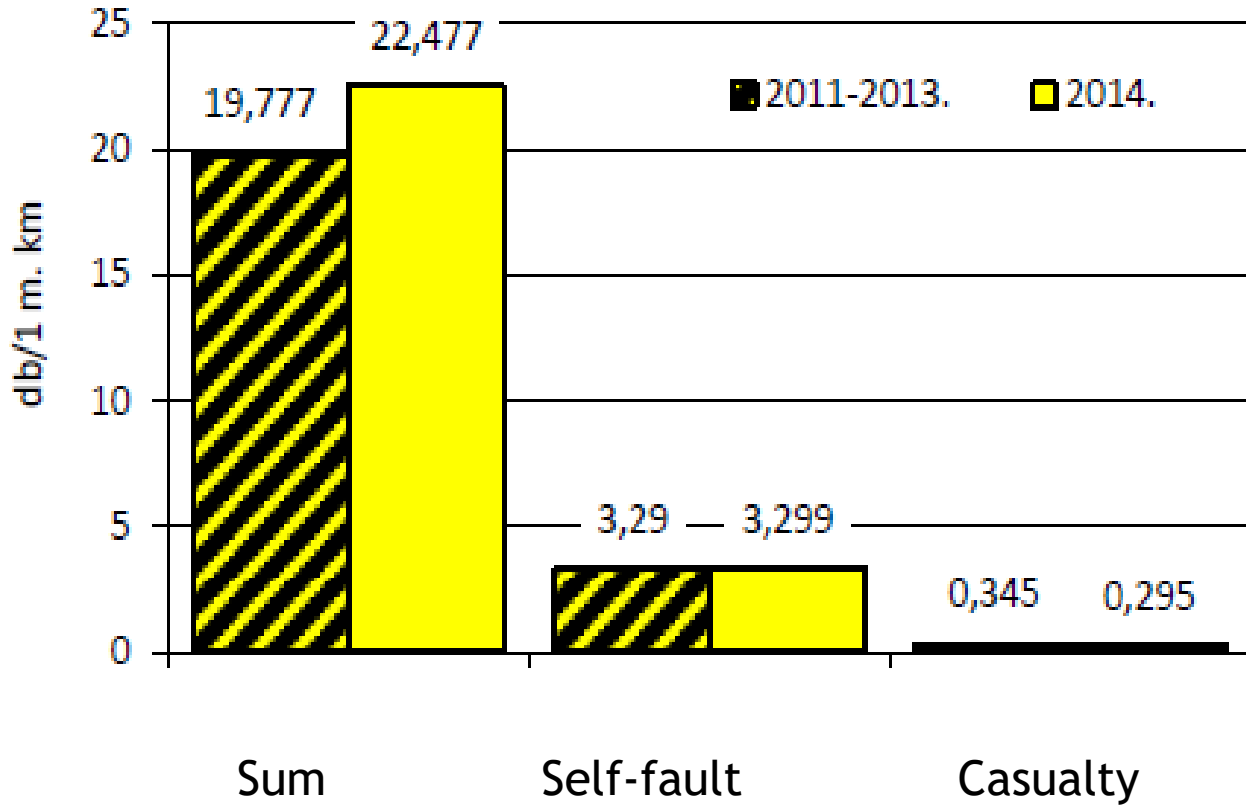


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Number of Accidents involving trams



Tram-Accidents / 1 Million km



ety trend



In fault	Outcome			Rate
	Other	Casualties	Sum	
Third party/Other	154	90	244	90%
Self-fault	25	2	27	10%
Sum	179	92	271	



Accidents of self-fault (01-08. 2017.)

Cause of accident	Rate	
Crash into an object within gauge	13	48,15%
Not keeping distance	5	18,52%
Breaking regulations	2	7,41%
Ignoring red light	1	3,70%
Not giving way at sign	1	3,70%
Careless driving	1	3,70%
Diseasedness while driving	1	3,70%
Inappropriate action	1	3,70%
Careless depart (casualty)	1	3,70%
Technical problem with door (casualty)	1	3,70%
Altogether	27	



Number of Accident on different types of infrastructure



Middle of the road without separation

48

19,67%



Middle of the road, segregated with marking

77

31,56%



Side-tracks without separation

14

5,74%



Middle of the road segregated tracks

37

15,16%



Side-tracks, segregated

63

25,82%



Other segregated tracks

5

2,05%

Accident-types



Car-crash

176 72,13%



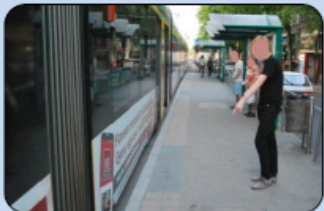
Accidents involving Passangers

43 17,62%



Pedestrian hit

23 9,43%









Other

2 0,82%

244

Parties involved in accidents

Direction/location of Parties	Centre, no separation	Centre, separated by marking	Side track	Centre, segregated	By road, segregated	Other segregated	Altogether	
								
Vehicles in same direction	31	52	3	14	25		125	51,23%
Vehicles crossing	12	7	8	6	20	3	56	22,95%
Tram and pedestrian	1	10	2	8	9	2	32	13,11%
Passanger on tram	1	8	1	3	6		19	7,79%
Vehicles in opposite direction	2			2	2		6	2,46%
Stopped and moving vehicles	1			4	1		6	2,46%
Altogether	48	77	14	37	63	5	244	

Preventing accidents – from the operator point of view

Focusing on training

- Yearly plan of training
- Forums on-site
- Actions by the company (operator)
- Contest among drivers
- Control
- Traffic-behavior-forming correction training



Drivers involvement in accidents (yearly average)

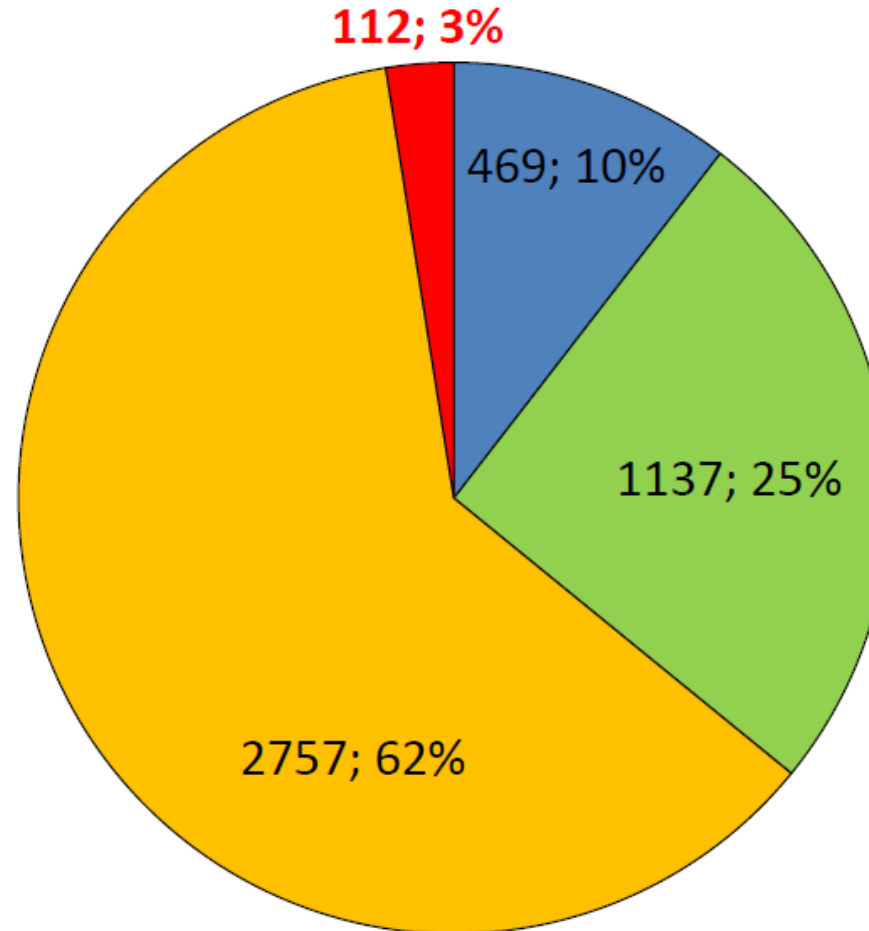
Drivers cause 15 % of accidents.

■ Average – 1-2 accidents

■ Did not cause accident

■ No accident

■ **Special attention is needed_ more than 2 accidents**



4475 drivers (not only on trams)



Main elements of preventing accidents



Materials on accident-prevention



Forgalomtechnikai felmérés az 50-es villamosjárat útvonalán

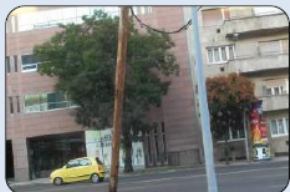
Study and analysis of tramlines



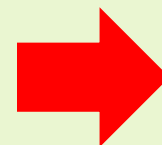
Traffic control and organisation



Sharing accident-data



Complex investigation of accidents



**TRAM-TRAFFIC SAFETY
ACTION PLAN**

TRAM-TRAFFIC SAFETY ACTION PLAN (19+)



Traffic engineering measures



Reason of accident



Conditions of employment



Homogenization of vehicle-types



Training and selection

Motivation



Control and monitoring



Actions by employer



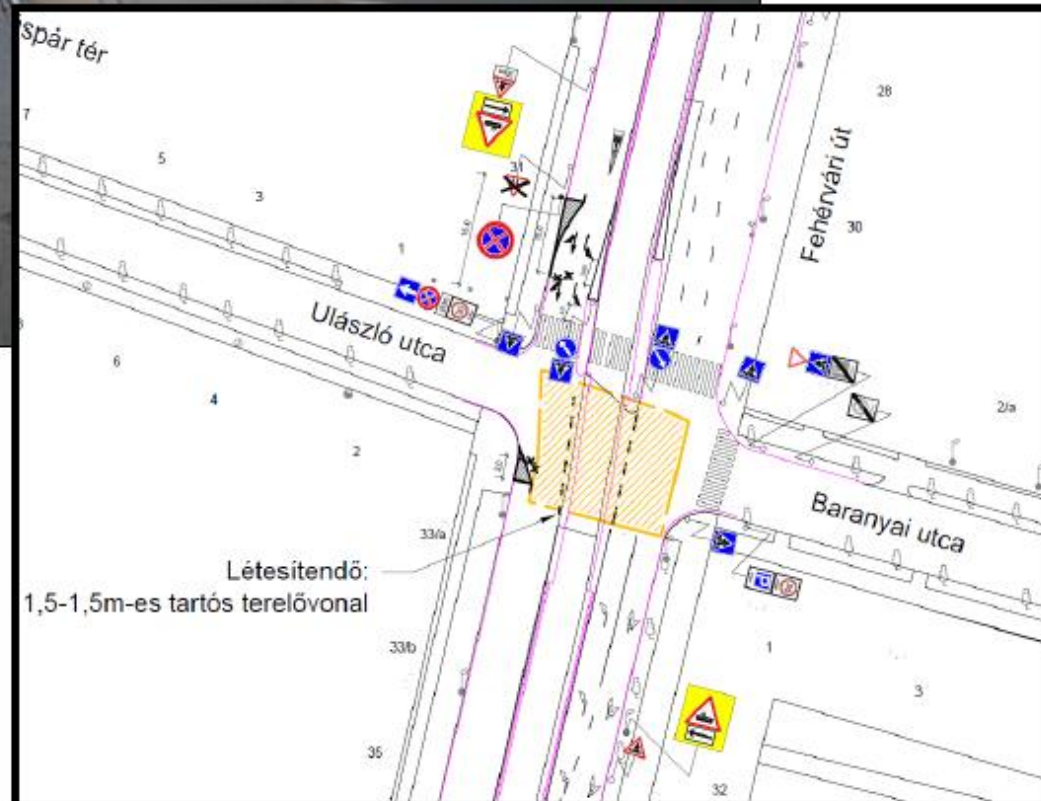
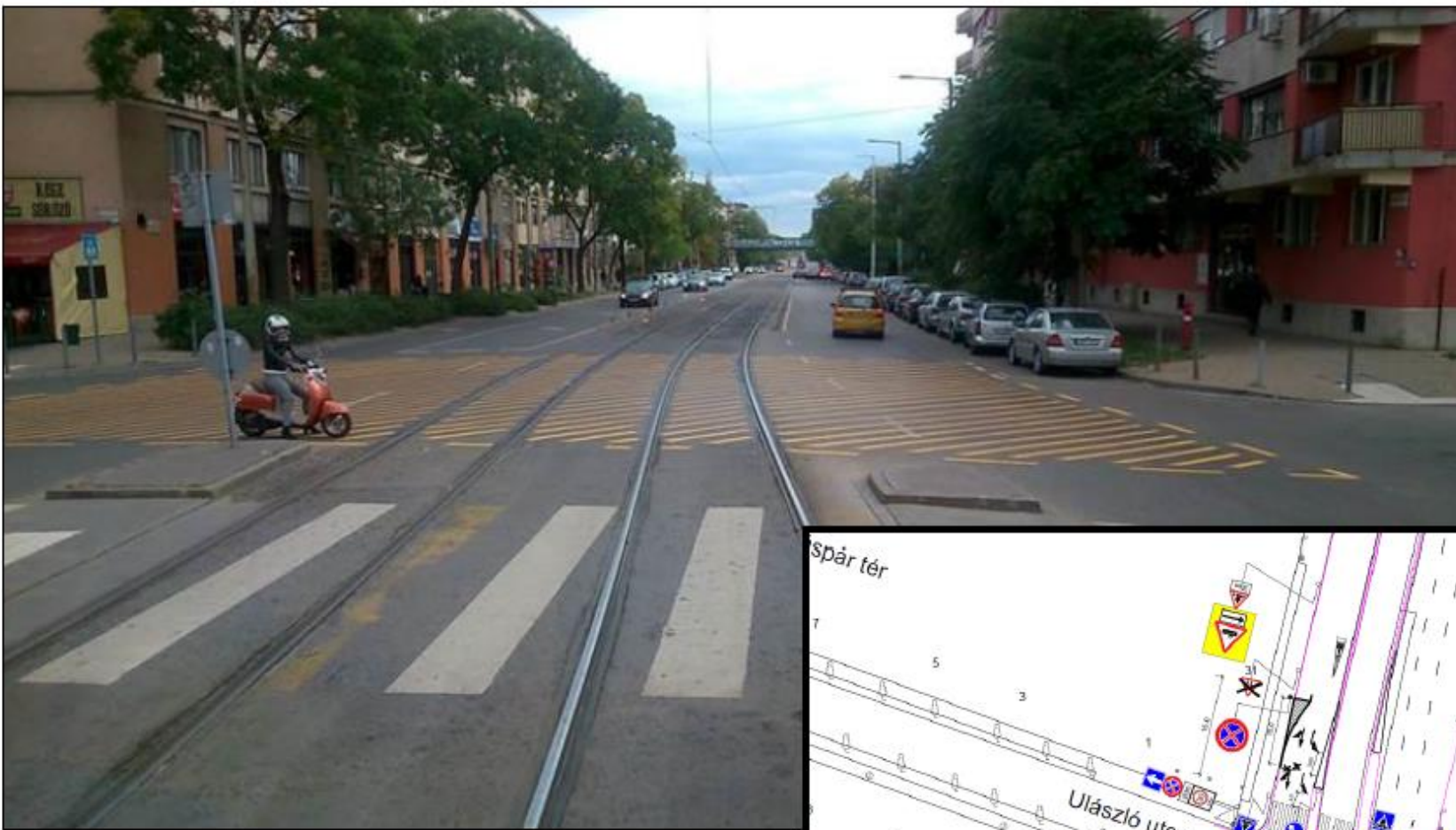
Complex investigation of accidents



Communication with drivers



Suggestions about infrastructure





No safeguard



Optical safeguard



Visibility



ONGOING DEVELOPMENTS

- ▶ Extension of Tramline No1.
- ▶ Tram-project – Phase II.
(new, modern CAF-vehicles 2019-2020.)



THANK YOU FOR YOUR ATTENTION!

