



EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY



**COST ACTION TU1103:**

# **OPERATION AND SAFETY OF TRAMWAYS IN INTERACTION WITH PUBLIC SPACE**

Final conference – Frankfurt, Germany – 29 September 2015

## COST Action TU1103

### Stops and stations



Klara Macsinka (Szent Istvan University, Budapest, Hungary)  
David Walmsley (UKTram, London, United Kingdom)  
Marine Millot (Cerema, Aix-en-Provence, France)

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### Stops and stations

#### Why this theme and what does it contain?

- Definition: a fixed location where passengers may board or alight from a tram. It may or may not include raised platforms. The terms "stop" and "station" have the same meaning and depend on operator's normal use
- The main interaction point: the first contact between the users and the system
- The need to study stops and stations separately from the rest of the infrastructure ("running sections"): area that mixes people and road traffic circulating around the stop and people who want to reach the stop



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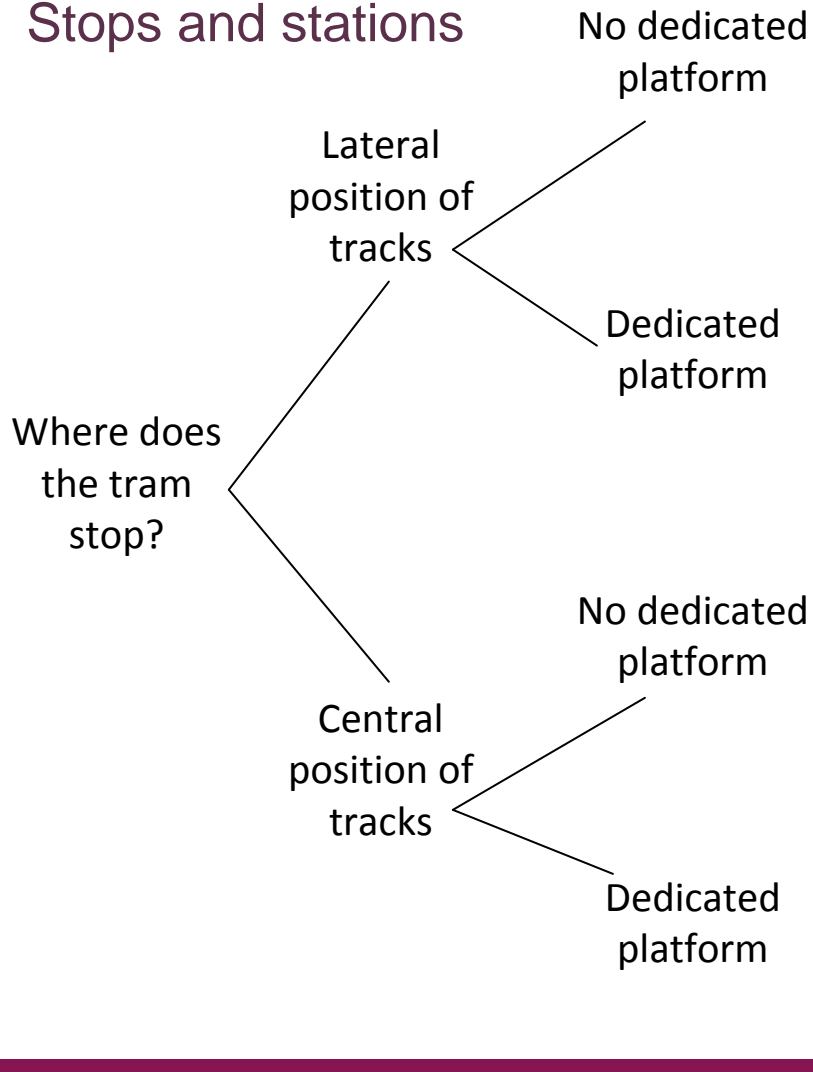
### Stops and stations: main hazards

- 1st category: People waiting at a stop or station
- 2nd category: Pedestrians crossing to reach the tram or getting out of the tram
- 3rd category: Vehicles circulating (mixed traffic)
- Additional distraction of pedestrians who use headphones, smartphones...



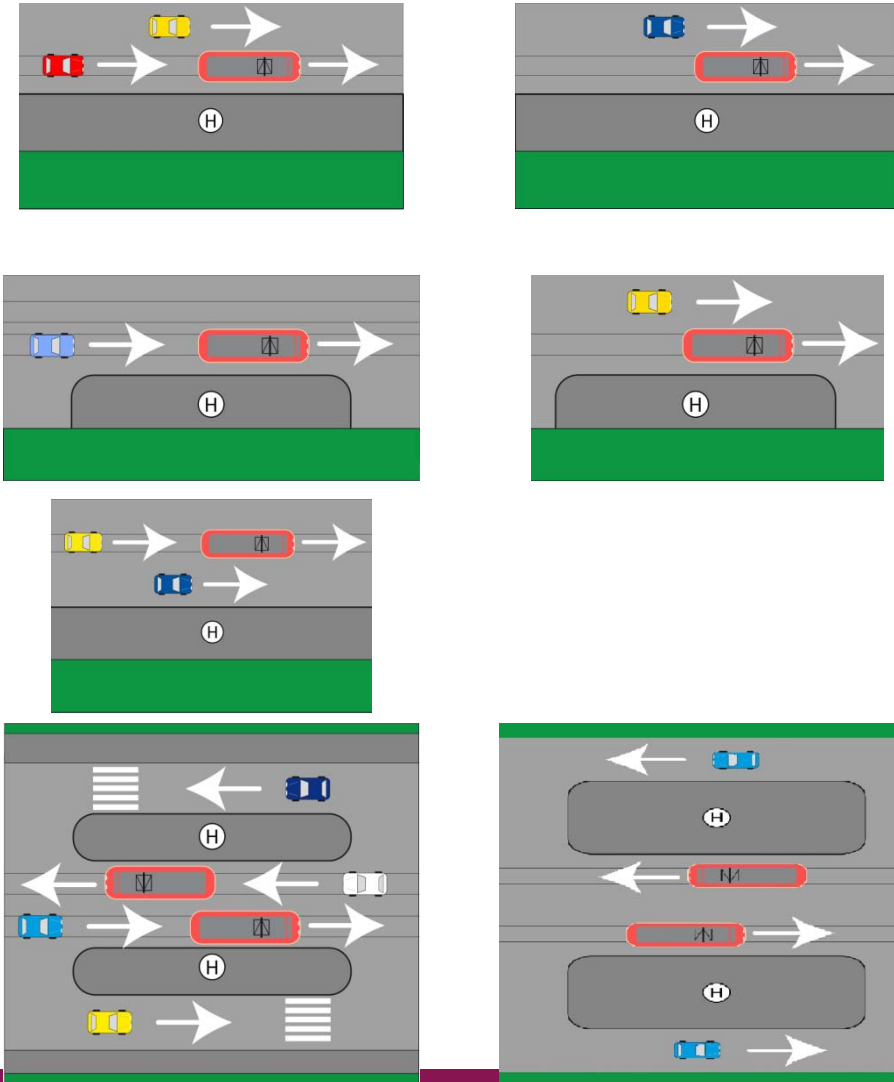
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**Stops and stations**



**Mixed traffic**

**Separated traffic**



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Stops and stations: hazard, objective and measure

### 1st category: People waiting at a stop or station

- Hazard: Pedestrians waiting on track when the platform is crowded or too narrow
- Objective: To make the track uncomfortable for pedestrians and the platform comfortable
- Measure: To use awkward materials between the rails and to widen the platform



*Porto: example of configuration with central track/ dedicated platform/ separated traffic*

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Stops and stations: hazard, objective and measure

**2nd category: Pedestrians crossing to reach the tram or getting out of the tram**

- Hazard: Crossing between platforms, sometimes behind a tram when another tram is approaching
- Objective: To prevent pedestrians crossing the track in the station
- Measure:
  - To implement barriers in the middle of the track
  - To signal danger for pedestrians between platforms



*Lyon: example of barriers for configuration with lateral track/ dedicated platform/ separated traffic*



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Stops and stations: hazard, objective and measure

### 2nd category: Pedestrians crossing to reach the tram or getting out of the tram

- Hazard: Crossing the station tracks on a pedestrian crossing without checking if a tram is approaching
- Objective: To make pedestrians aware of the different priorities
- Measure: warning signs, pedestrian traffic lights and avoid using zebra markings in order to differentiate roads and tracks



*Deutschland: example of configuration with central track/ dedicated platform/ mixed traffic*



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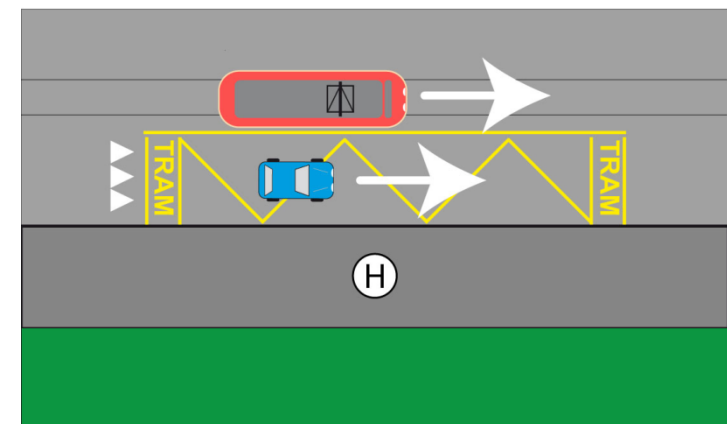
Stops and stations: hazard, objective and measure

### 2nd category: Pedestrians crossing to reach the tram or getting out of the tram

- Hazard: Crossing the traffic lane in front of the stop and getting hit by a road vehicle
- Objective: To avoid passengers being left in the driving lane and hit by car
- Measure:
  - To implement passenger refuge (markings) between driving lane and track alignment.
  - To raise the roadway, level with the sidewalk to improve access for the passengers and to make a speedhump for cars



*Wien: example of configuration with central track/ no dedicated platform/ mixed traffic*



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### Stops and stations: hazard, objective and measure

#### 3rd category: Vehicles circulating (mixed traffic)

- Hazard: Road vehicles overtaking a tram when it stops at a station and getting hit by another tram or a vehicle arriving from the other direction
- Objective: To prevent road vehicles overtaking the tram when the tram stops at a station
- Measure: To implement roadway marking and signage to prevent incorrect vehicle movements



*Wien: a platform cape for configuration with lateral track/ dedicated platform/ mixed traffic*



*Sheffield: example of configuration with lateral track/ no dedicated platform/ mixed traffic*

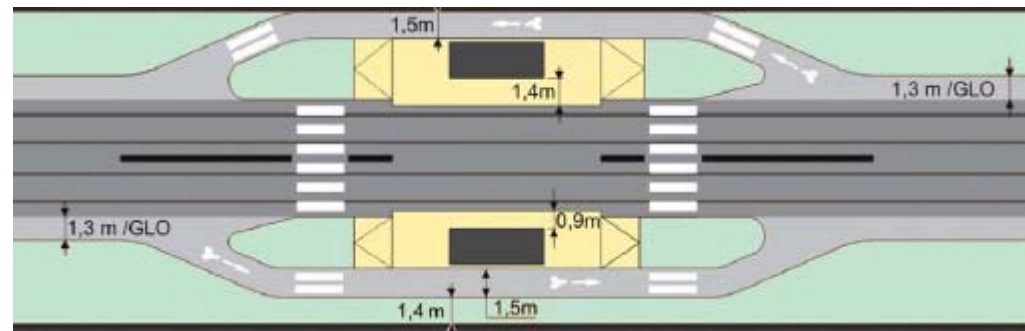
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Stops and stations: hazard, objective and measure

### 3rd category: Vehicles circulating (mixed traffic)

- Hazard: Cyclists changing lanes when a tram stops and being hit from behind by a car
- Objective: To make the path safe for cyclists
- Measure: To encourage cyclists to ride behind the station (when space is available)

*France: example of configuration with lateral track/ dedicated platform/ mixed traffic*



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### Stops and stations

#### Success story: Montpellier, France: Place Auguste Gibert - Stations Gare Saint Roch L1,2,3,4

- Problem: Pedestrian area used by non-authorized cars, trucks, and two wheel vehicles that forced tram drivers to apply emergency brakes
- Solution: Reduction of tram speed from 20 to 10km/h
- Lesson learnt: Speed reduction in crowded pedestrian areas can benefit in a decrease of incidents  
Before: 4 accidents/year 2000-2011  
After: 2 accidents in 2012  
0 accident 2012-2015





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Thank you for your attention !

Klara Macsinka (Szent Istvan University, Budapest, Hungary)

David Walmsley (UKTram, London, United Kingdom)

Marine Millot (Cerema, Aix-en-Provence, France)

[www.tram-urban-safety.eu](http://www.tram-urban-safety.eu)