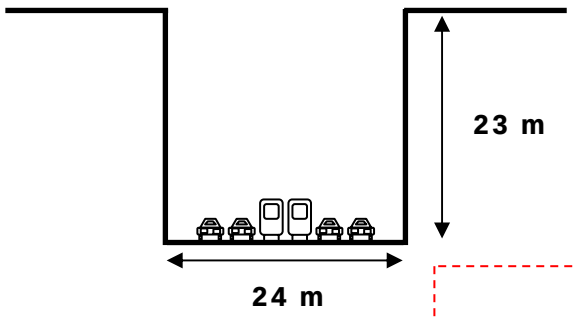
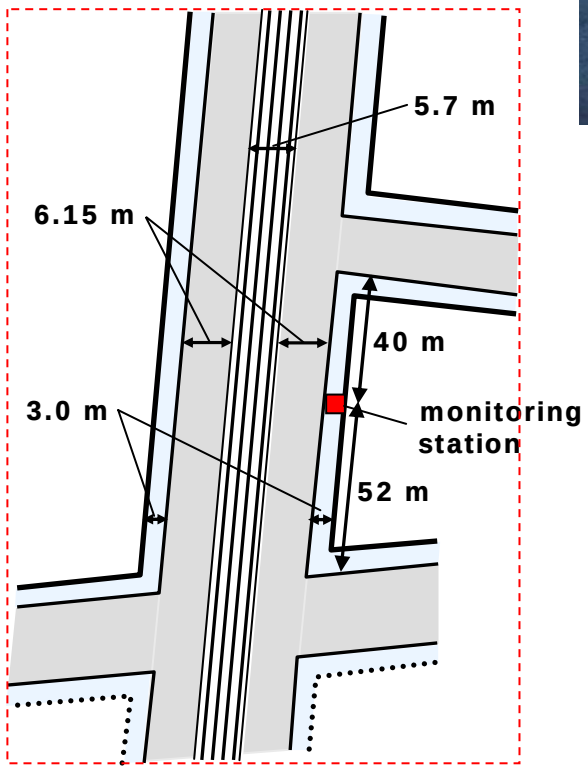
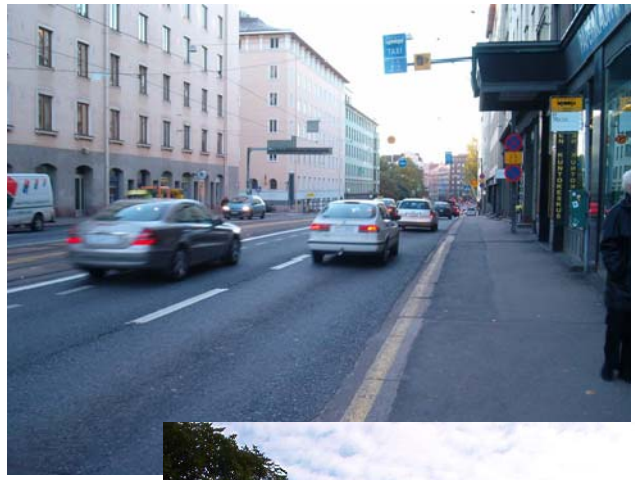
Measurement Campaign in Runeberg Street in Helsinki and Influence of Speed and Driving Pattern on Exhaust Emissions

- Part of the EU/OSCAR project (2002-2005)
- Actions in Runeberg Street:
  - air quality, traffic, and meteorological monitoring campaigns
  - driving cycle measurements: emissions – influence of speed and driving pattern
  - evaluation of the dispersion models with new emission data
  - analyse the influence of buildings on air quality in the street canyon
- Similar work in four cities: Athens, Helsinki, London, and Madrid

Runeberg Street – Monitoring Station







Runeberg Street – Monitoring Campaigns

Location	Time period	Parameters
Street canyon	19.2.2003 – 31.12.2004	$PM_{2.5}$*, PM_{10}*, NO_2, NO
Street canyon	20.3.2003 – 31.12.2004	Time, speed, length and type** of each vehicle passing the station – the two directions separately
Roof top	3.9.2003 – 2.5.2004	WS, WD

* Method of PM monitoring: β-attenuation
** i) passenger cars and vans, ii) buses, iii) lorries, iv) lorries with a semi-trailer, v) juggernauts, vi) passenger cars and vans with a trailer, and vii) passenger cars and vans with a caravan

This data, together with data from several other air quality and meteorological stations is available in the NORDIC database.

OSCAR – Influence of Speed and Driving Pattern on Emissions

Coordination and development of the new practices to estimate EFs:

- **TRL (UK) and TNO (the Netherlands)**

Background:

- **for newer vehicles speed is less important descriptor of the exhaust emissions, especially in urban traffic**

Aim:

- **To develop the best practices for estimation of EFs for congested flow:**
  - **a traffic situation model: correlate average emission rates with a number of test cycle parameters (not just speed), which are referenced to specific 'traffic situations' (e.g. motorway with 120 km/h limit)**

Driving cycle measurements in Helsinki

- carried out by FMI
- with one passenger car, in real-world traffic
- 1 week

EOBD Interface

GPS Antenna

Data logger (time, vehicle speed, rpm, % load, % throttle position)

Diary

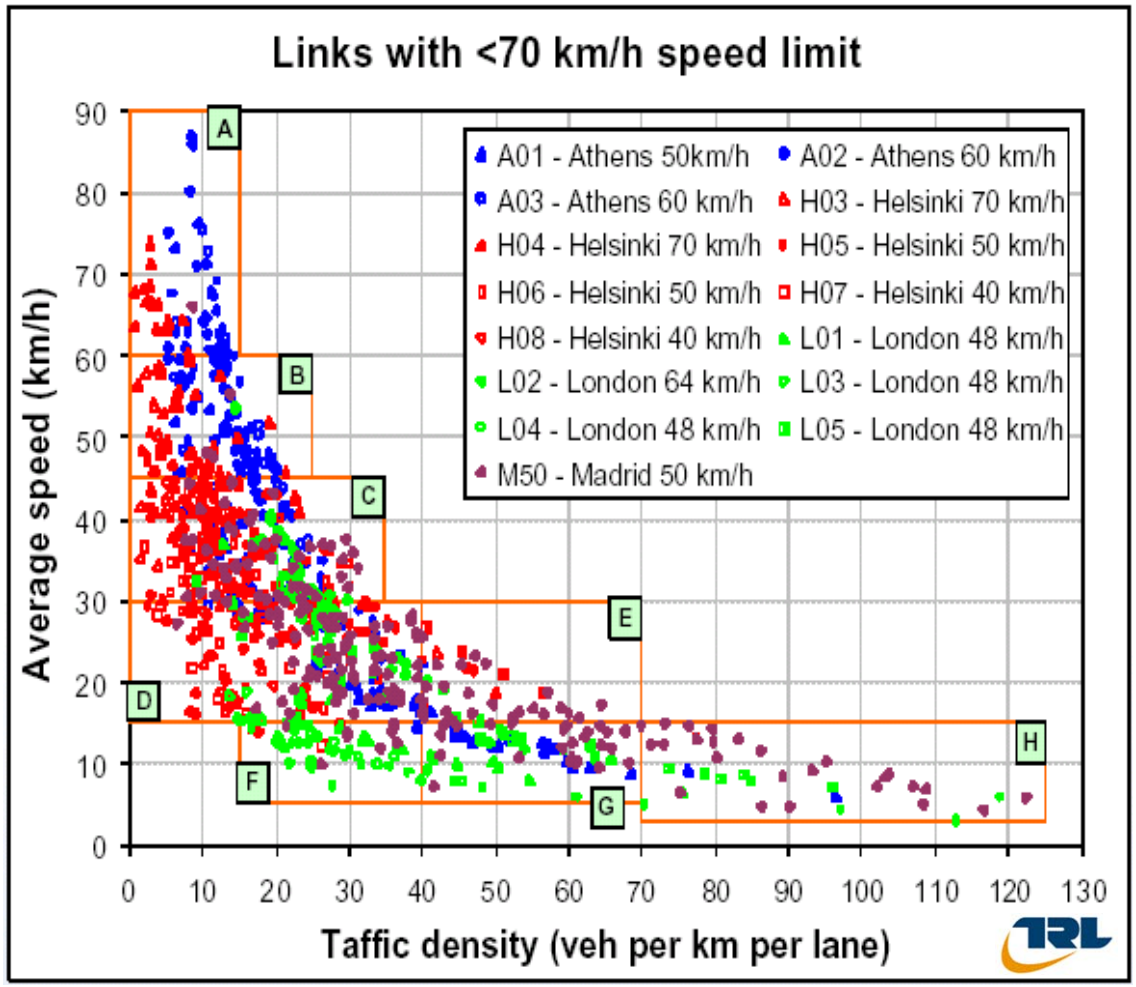
Driving cycle measurements – analysis of data

- Characterisation of the driving pattern database for each city, e.g.
  - mean speed
  - engine speed and load
  - % of time by gear
  - speed range

- Characterisation of each link using a number of parameters, e.g.
  - traffic flow per lane per unit time (traffic counts)
  - vehicle composition (traffic counts)
  - speed limit
  - traffic management

- Identification of links between driving pattern descriptors and link descriptors

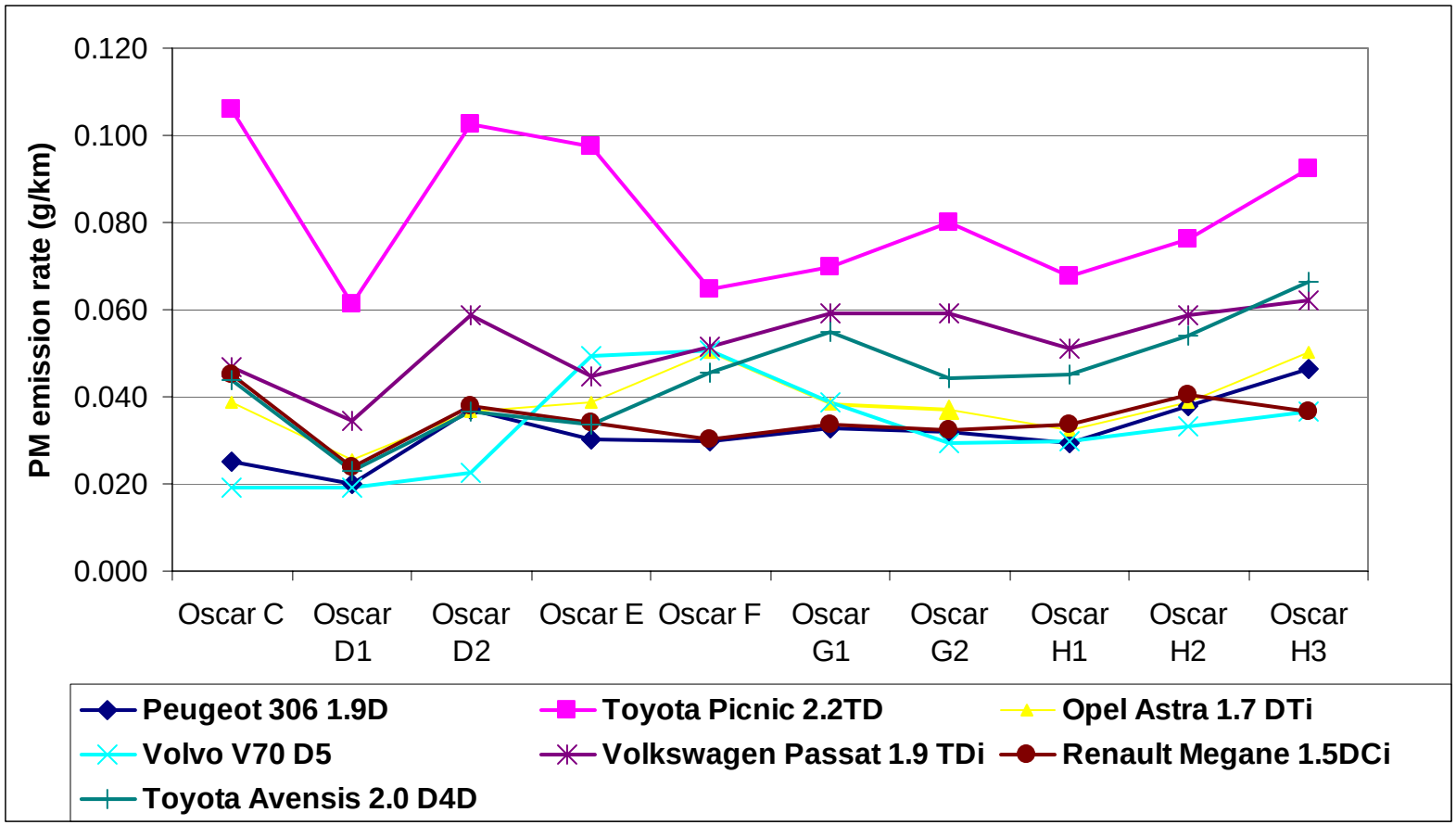
Links between driving pattern and link descriptors



Dynamometer Emission Tests

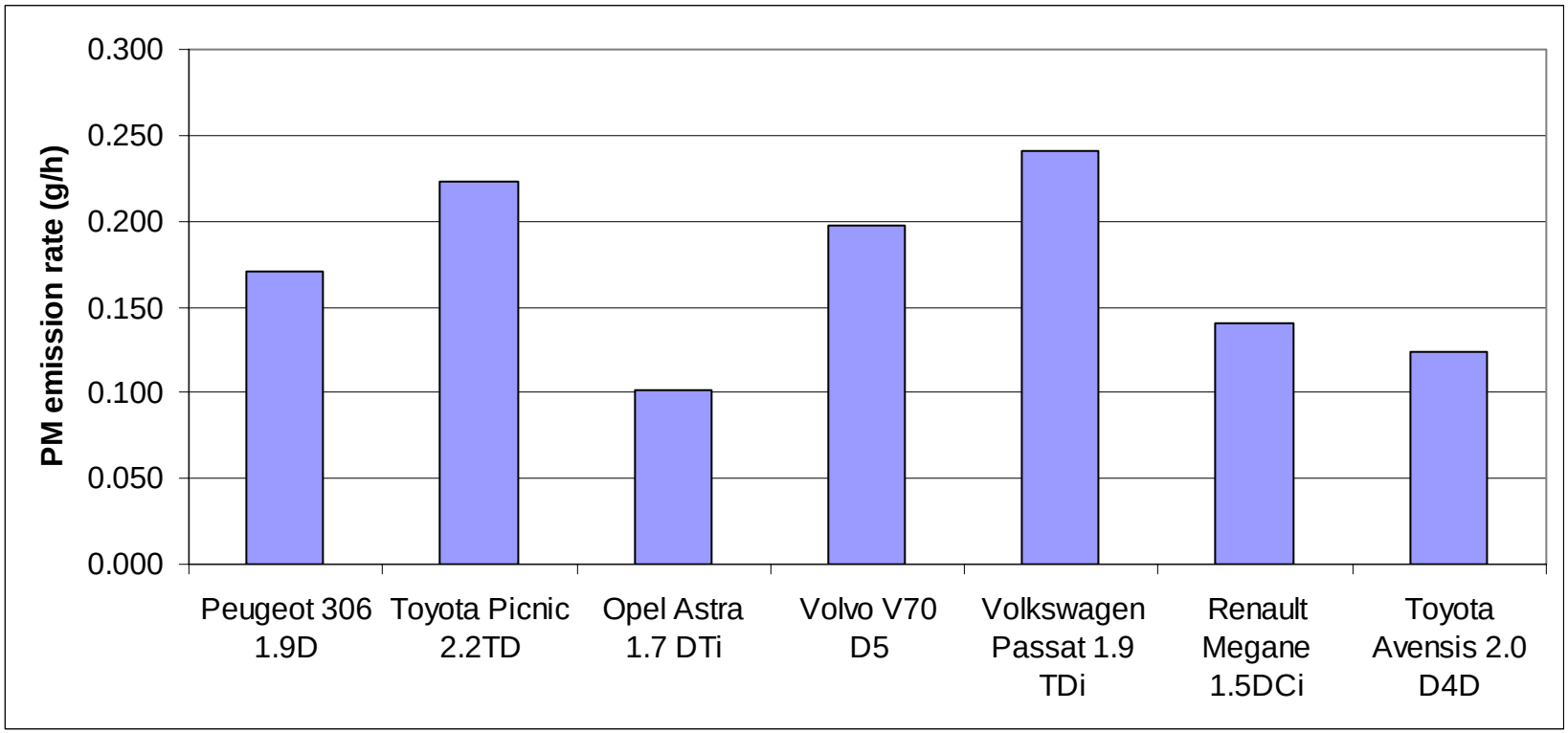
- conducted by TNO
- 20 light duty vehicles including e.g. EURO III, EURO IV
- 10 OSCAR driving cycles per vehicle, plus legislative cycle, ARTEMIS cycles, and other TNO cycles
- regulated pollutants: CO, NOx, VOC, CO2, SO2, PM10

Some results: PM_{10} Emission Rates for Diesel Vehicles



Some results: Measured PM_{10} Emission Rates for Diesel Vehicles

- **the driving mode: idle**



The Best Practices for Estimation of EFs for Congested Flow

- integration of OSCAR emission data with existing databases (COPERT/ARTEMIS)
- adoption of traffic situation modelling approach
- reporting the final results:

www.eu-oscar.org