

Tampering detection in-field surveys

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LONS L-vehicles Emissions and Noise mitigation Solutions



Execution of tampering in-field surveys

- **Primary objective:** Identify LVs with nonconform noise and/or exhaust emissions ("high-emitters") through roadside measurements combined with roadside inspections
- **Goals:**
 - 1) Measure noise and pollutant emissions from $\geq 3,000$ of LVs from the roadside in three cities
 - 2) Define criteria to identify tampered LVs, supported by onboard (WP3) and test-bench (WP4) data
 - 3) Notify cooperating authorized staff pull over and on-site inspections of ≥ 300 suspected tampered LVs
 - 4) Direct dissemination to LENS city and stakeholder group at dedicated events during each pilot (WP2)
 - 5) Develop approach for real-time identification of noise and pollutant "high-emitters"
 - 6) Post-process measured data after establishing link to vehicle data through license plate numbers, calculate emission factors and make available for LENS database (WP6)

Execution of tampering in-field surveys

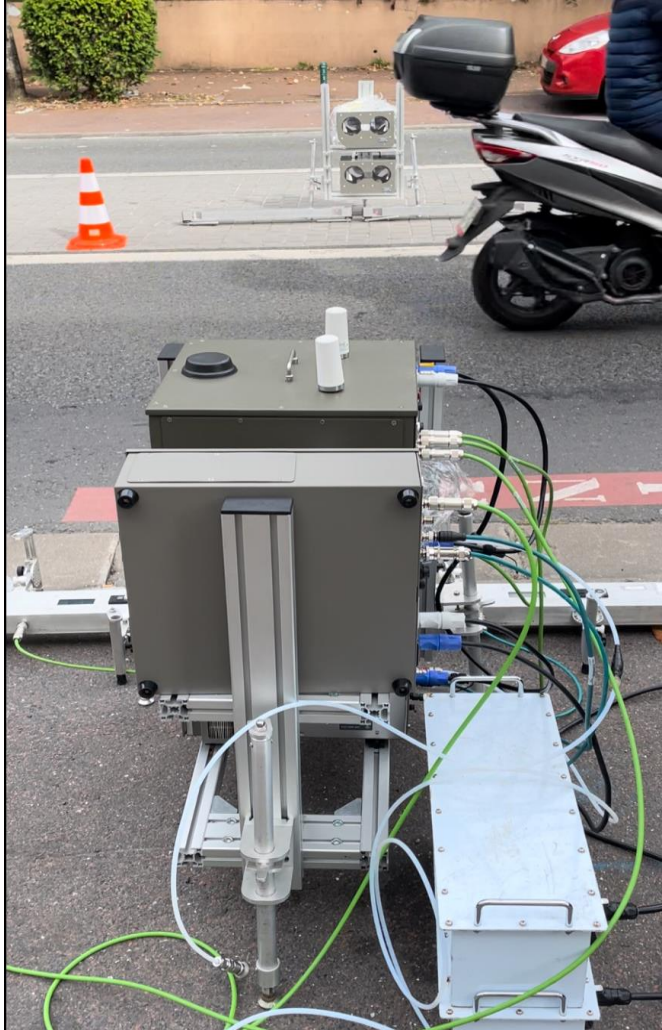
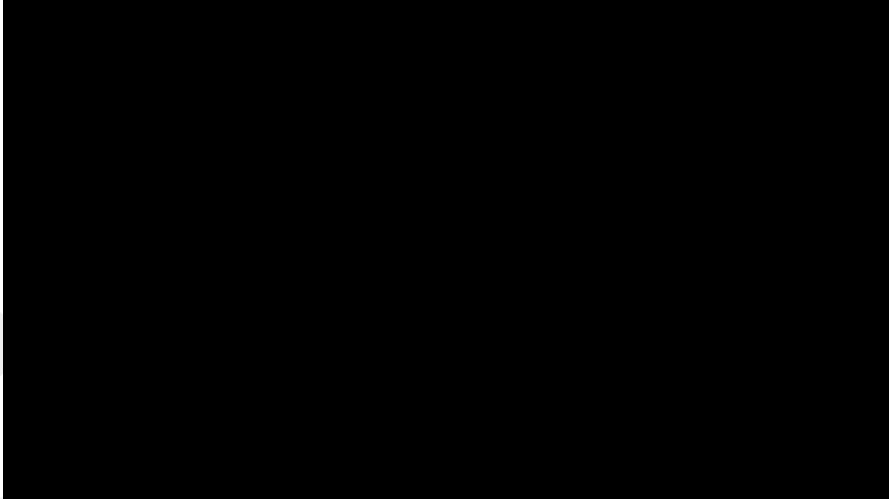
- Field survey locations:
 1. Flanders → Leuven, 14-16 May
 2. Paris region → Rueil Malmaison and Dampierre-en-Yvelines, 16-22 September
 3. Barcelona → 14-18 October

Roadside instrument setup Rueil Malmaison

Noise measurements
- KU Leuven

Particle emission measurements
- TU Graz

Gaseous emission measurements – Opus RSE



Roadside instrument setup Rueil Malmaison



Status of measurements in the Paris region

- More than 300 LVs measured in the first 1.5 days
- Not clear yet whether there will be any roadside inspections, hopefully some toward the end of the week
- Measurements planned for 21 and/or 22 September in [Dampierre-en-Yvelines](#), but unfortunately weather forecasts don't look that good



Some results from the Leuven campaign



Leuven measurement sites

Donkerstraat 13, 14, 16 May



Tiensestraat 15 May



Donkerstraat



Roadside instrument setup





Roadside inspections



- Check of driver documents (certificates)



- Driver interviews
- Visual inspection

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WT 5.3 Roadside inspection form

General and vehicle info 154

Date	
License plate no.	SBQC 608
Make	Derbi
Model	Senza XTREME
Engine type (2-stroke or 4-stroke)	2
Engine displacement	50
Model year	2003
Euro class	
Mileage	19 984
Other	muffler afterburner

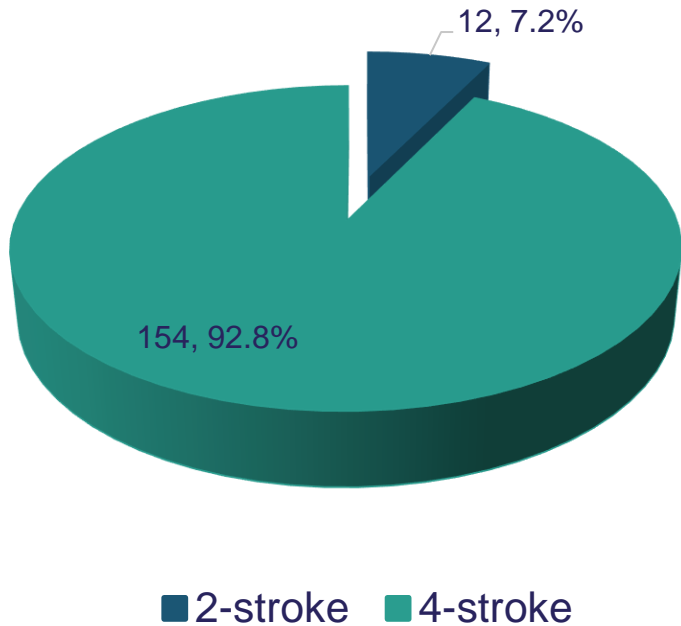
Measurement checks

% CO idle	4,1
ppm HC idle	14000

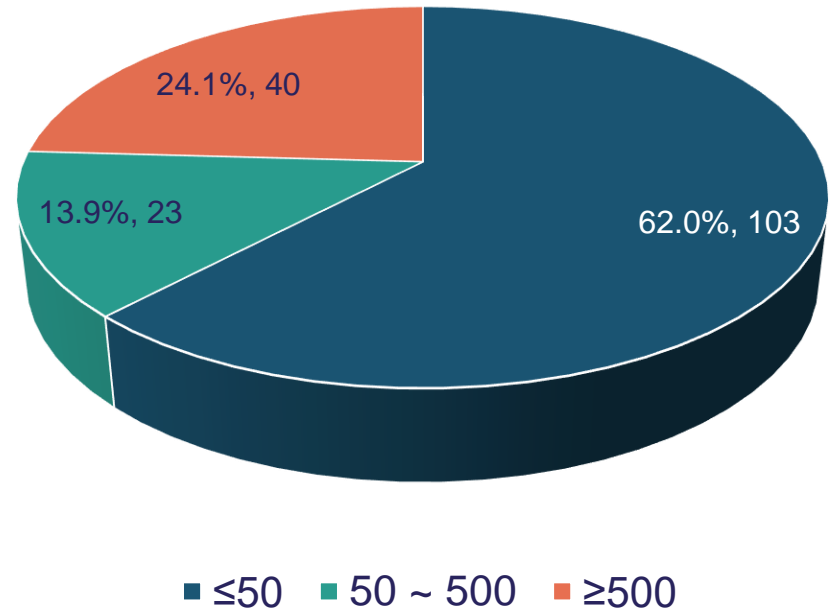
5500 : 91,9

Engine type and size distribution

Engine type

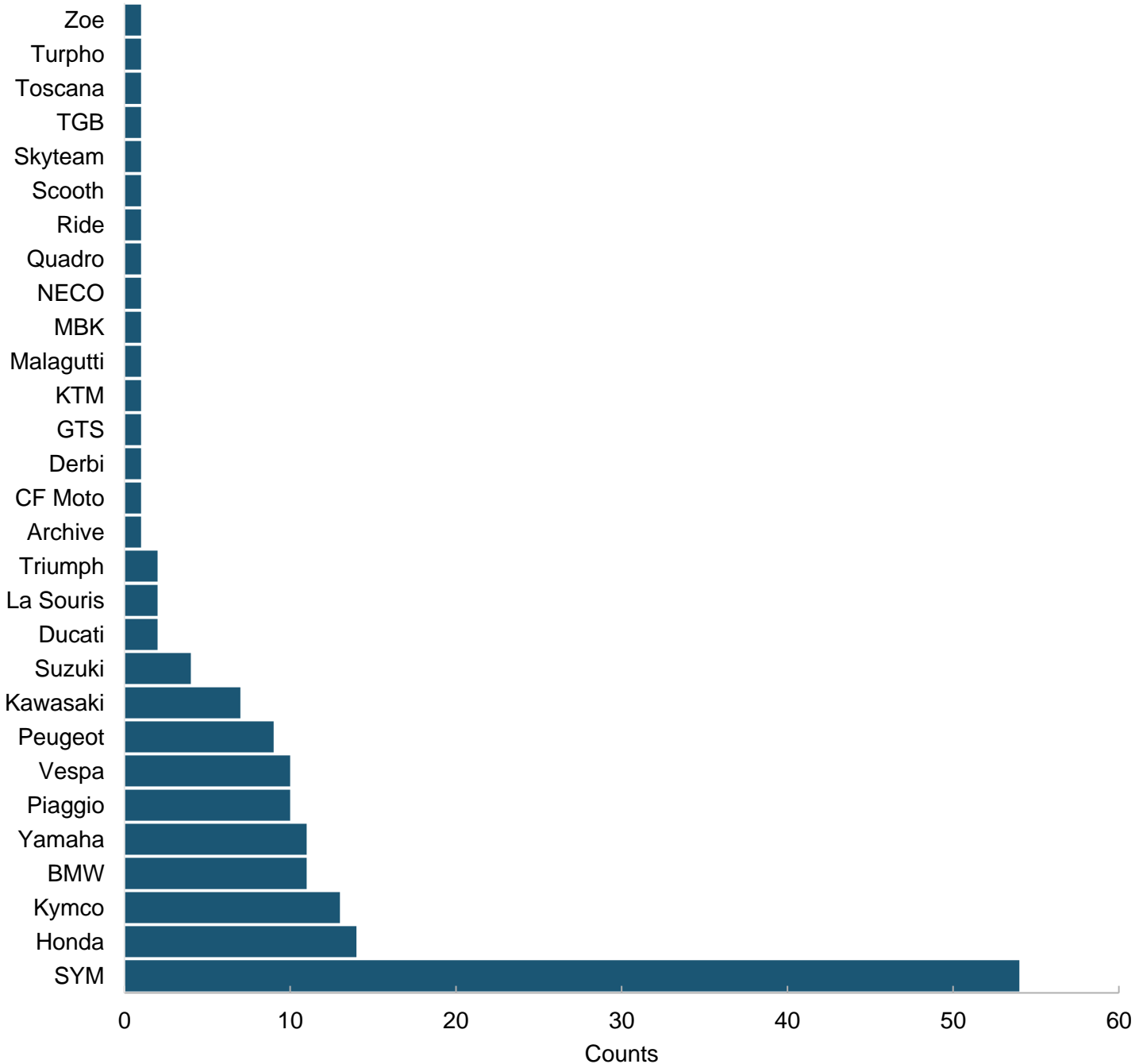


Engine displacement

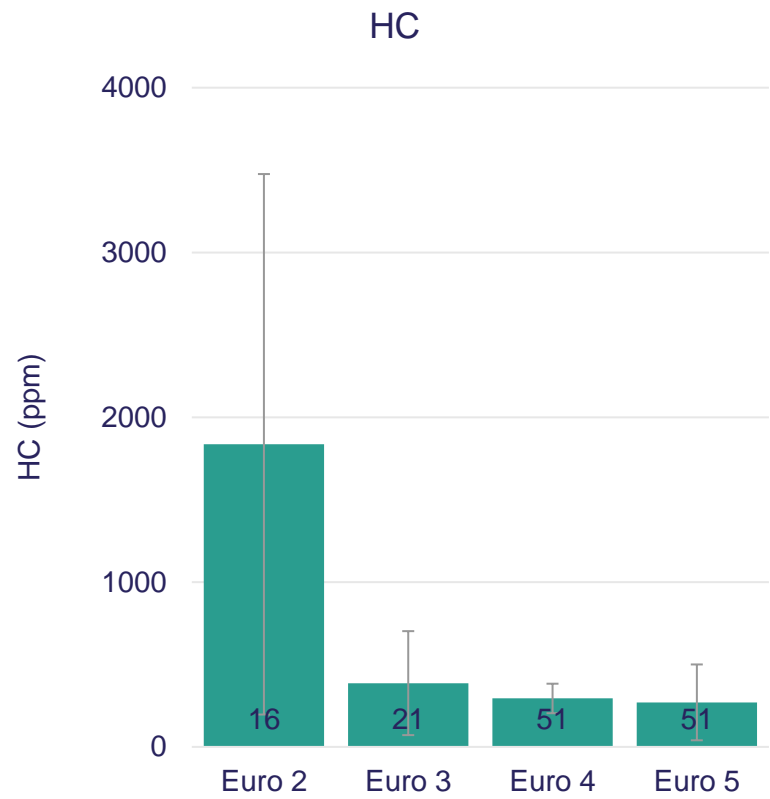
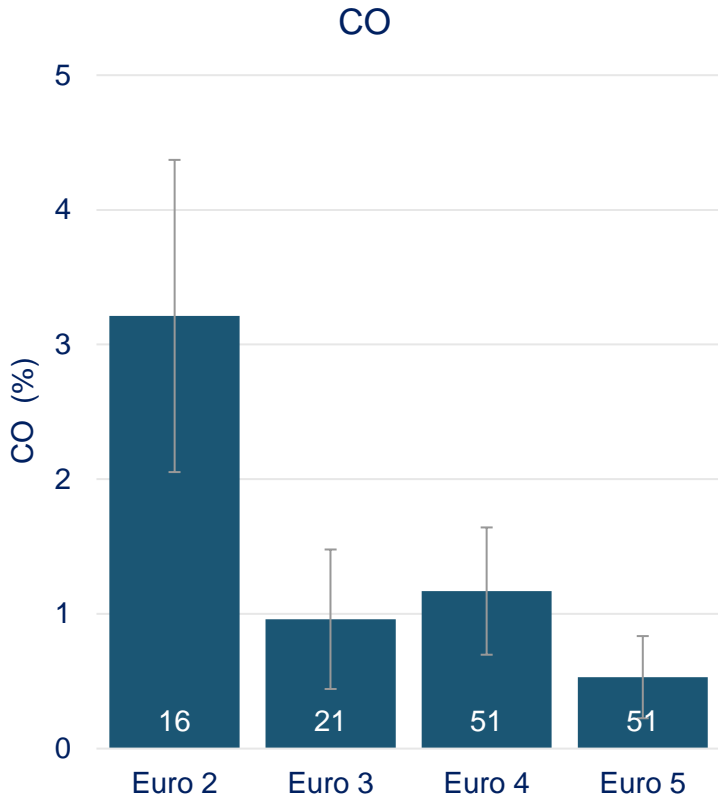


Vehicle make distribution

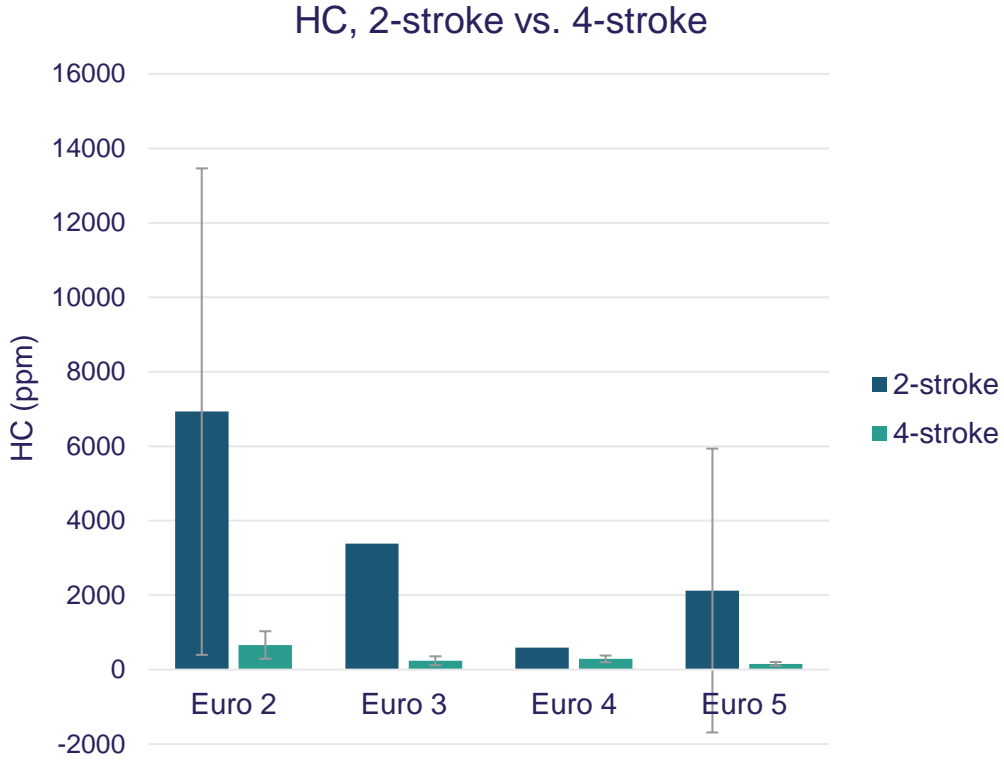
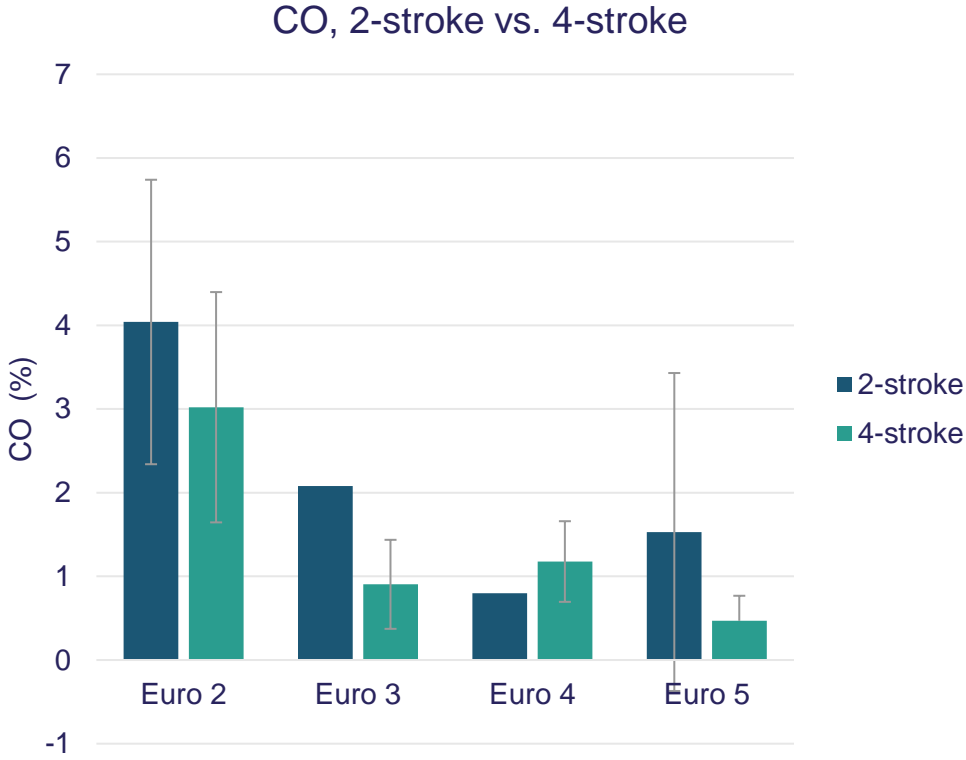
166 LVs roadside inspected



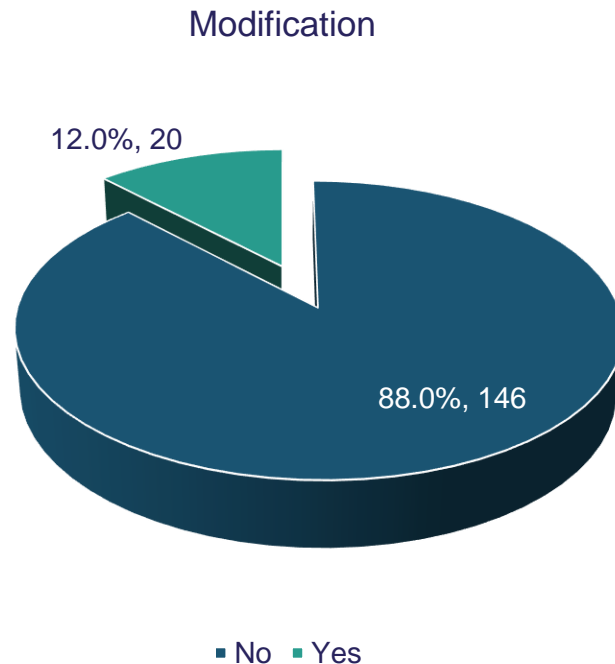
Idle test emissions - by Euro standard



Idle emissions – 2-stroke vs. 4-stroke



Modifications



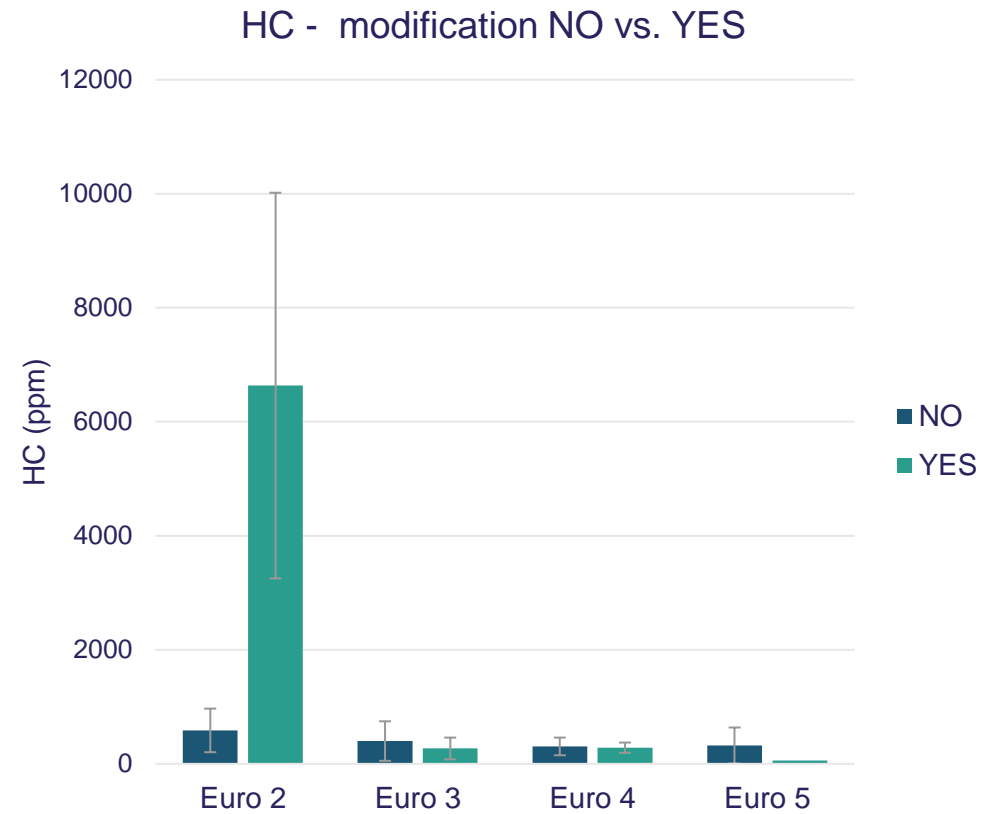
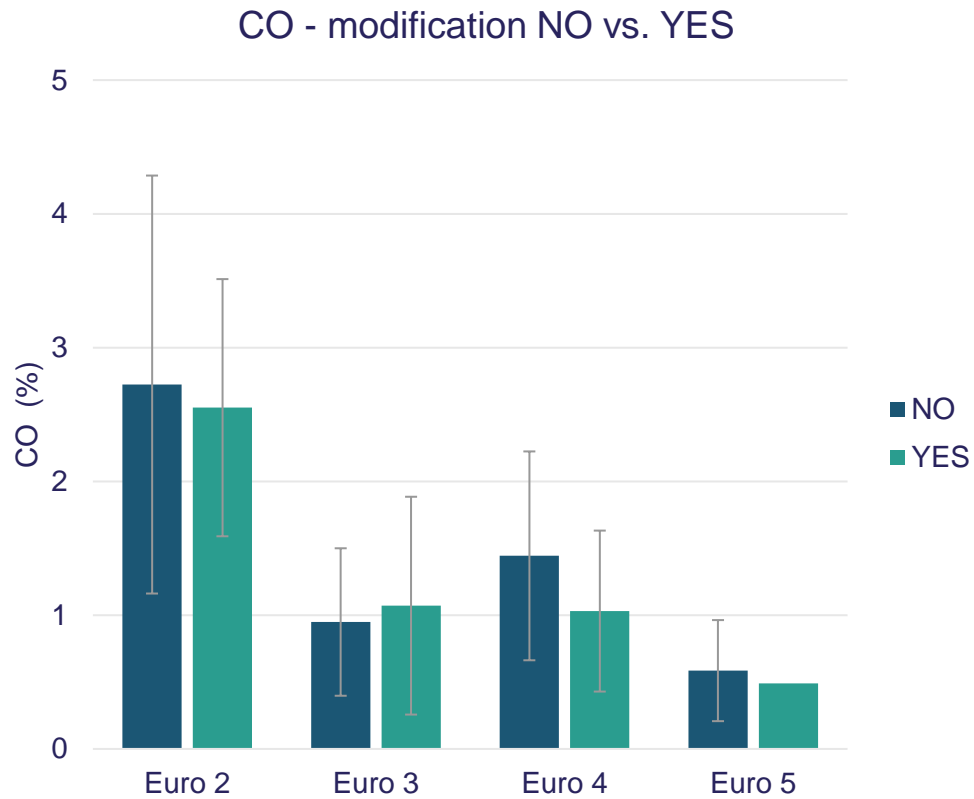
Modification list:

1. Aftermarket muffler
2. (Akrapovic muffler)
3. Covers missing, exhaust aftermarket, racing muffler
4. Old scrambler modified
5. GPR muffler bend
6. Aftermarket ZARD muffler
7. Aftermarket exhaust
8. Cover broken, race exhaust pipe, other engine
9. Aftermarket muffler, clutch modified Ducati
10. Exhaust pipe modified, not original
11. CVT crank bearing bent, cover broken
12. Exhaust not original, muffler aftermarket
13. Exhaust + muffler
14. Exhaust not original, carburetor
15. Exhaust SAI missing
16. Exhaust pipe modified (race)

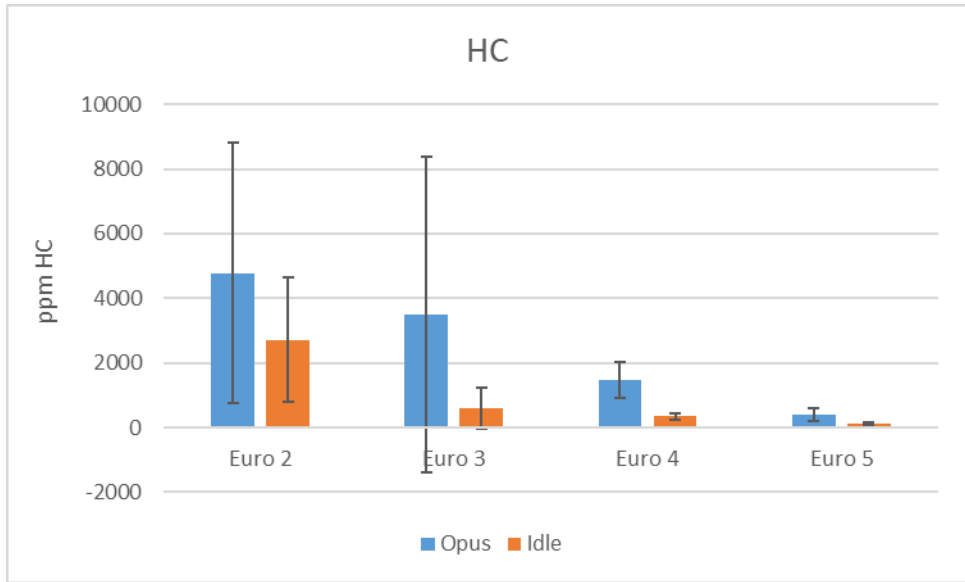
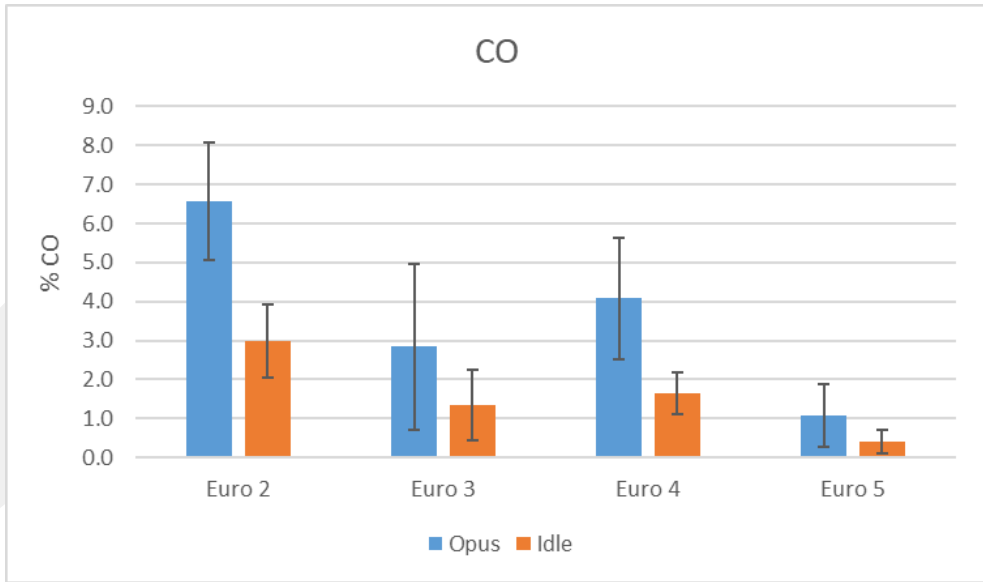
No modification but notes:

1. Engine cold
2. Hole in exhaust, rusty exhaust pipe
3. Fairings broken
4. Old exhaust pipe, rusty
5. Old and rusty exhaust pipe
6. New mc with Akrapovic muffler
7. Rusty exhaust pipe
8. Akrapovic muffler
9. Aftermarket
10. Rusty exhaust pipe
11. High idle
12. Old exhaust pipe
13. Rusty exhaust pipe, high idle

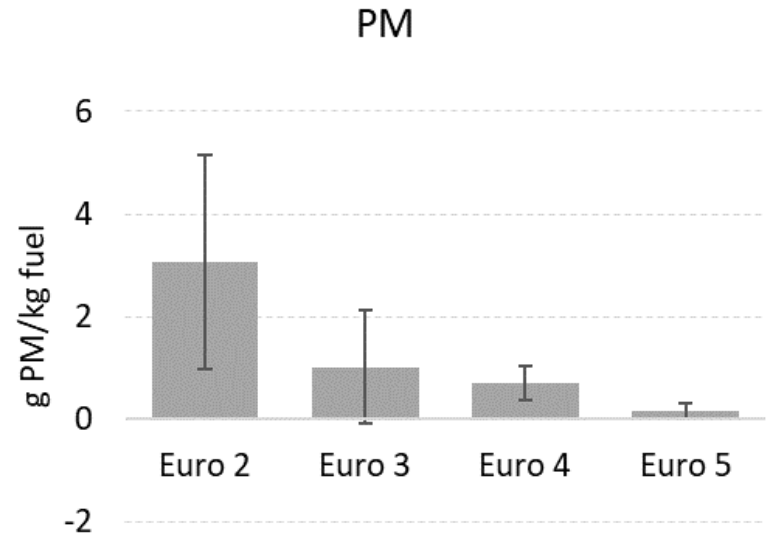
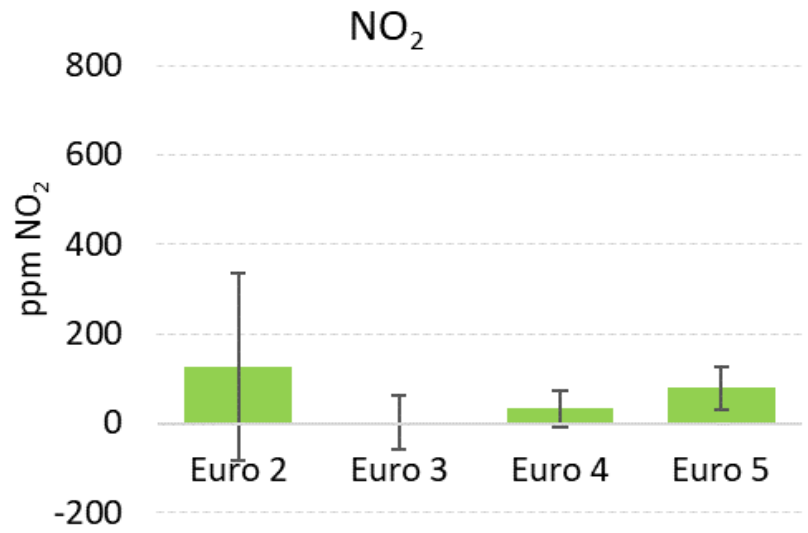
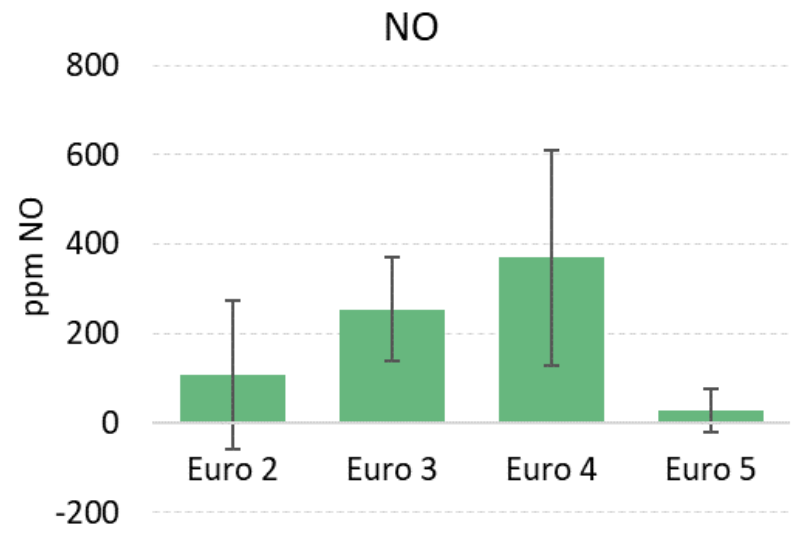
Idle emissions – w/wo modifications



Leuven on-road remote sensing vs idle test results



Leuven other on-road remote sensing results



3rd and final survey – Barcelona

- Timing: 14-18 October
- The city with most LVs in Spain
- Police support offered for 2-3 days
- Support from Applus+ in the roadside inspections
- Three sites have been explored and used in earlier RES studies – Via Augusta prio 1



Thank you for your attention!

Questions?

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