

Correlation between CO, NO_x, NMCH and formaldehyde tailpipe emissions

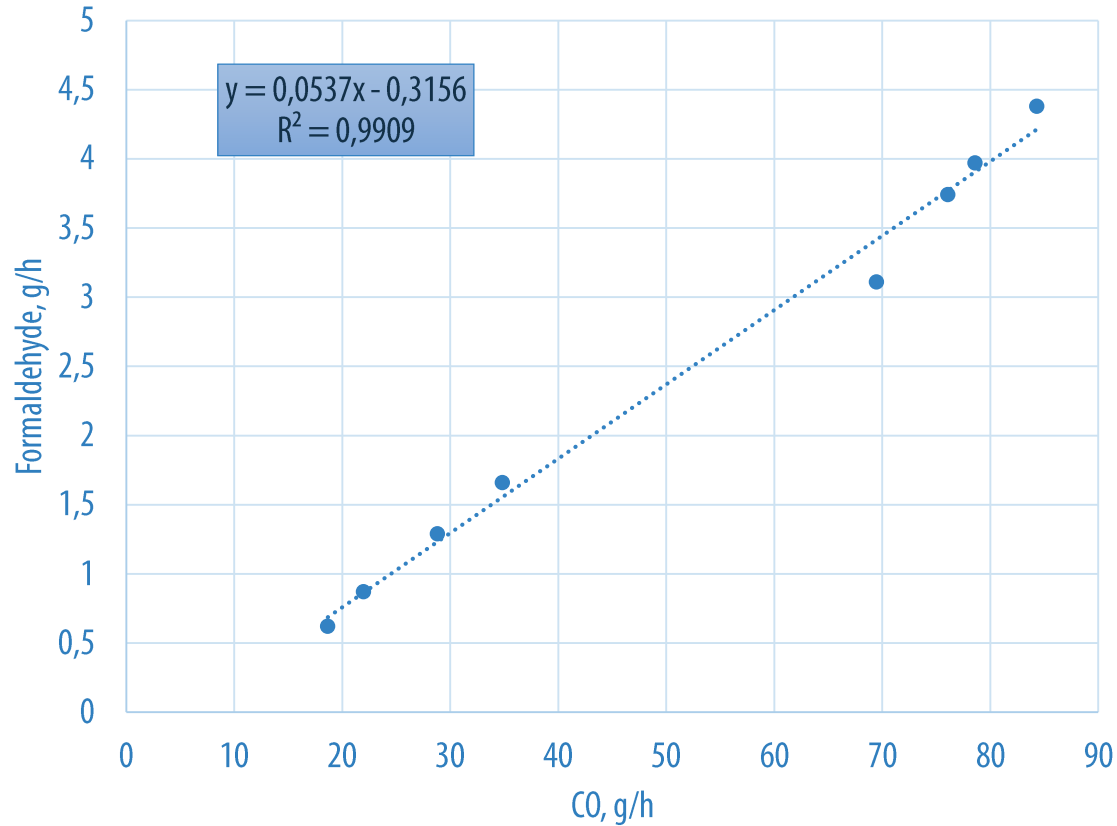
Andrey KOZLOV



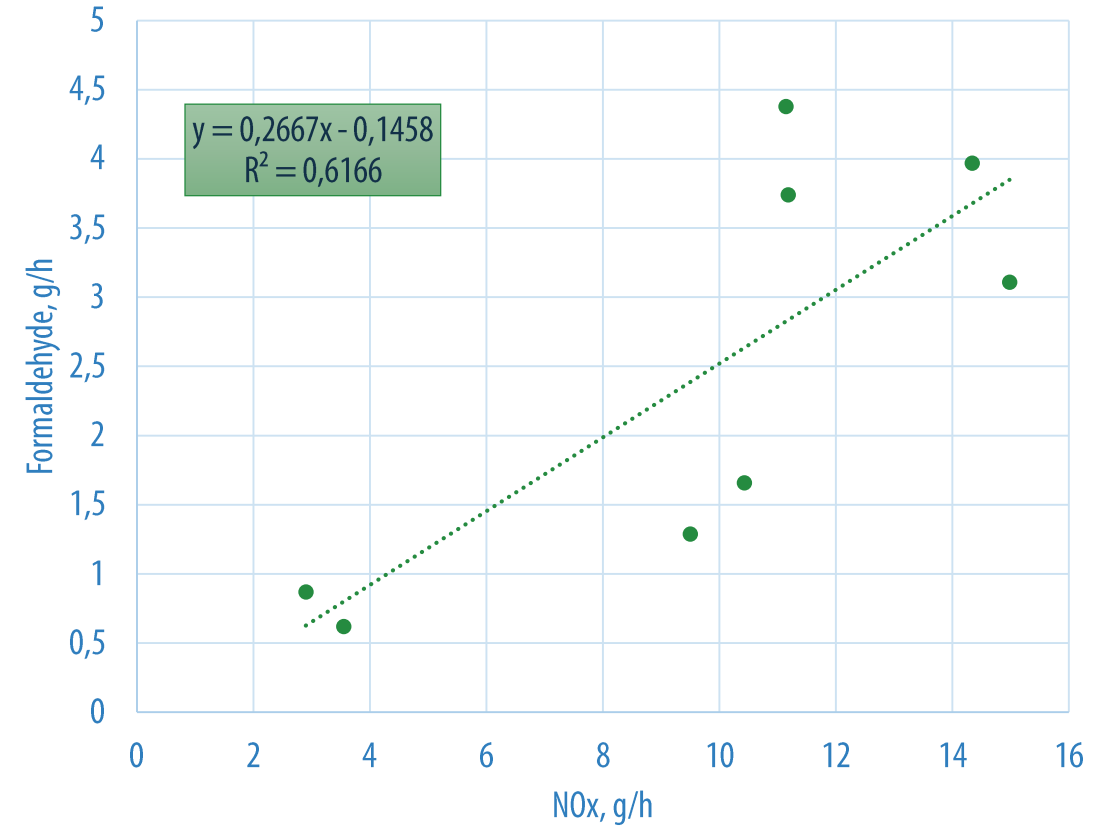
Idle test emission correlation

This study* investigates regulated and unregulated emissions from both light-duty passenger car (1.7 L) and medium-duty (6.4 L) diesel engines at idle and load.

Formaldehyde vs. CO



Formaldehyde vs. NOx



No observed correlation between Formaldehyde and NMHC emissions ($R^2=0.367$)

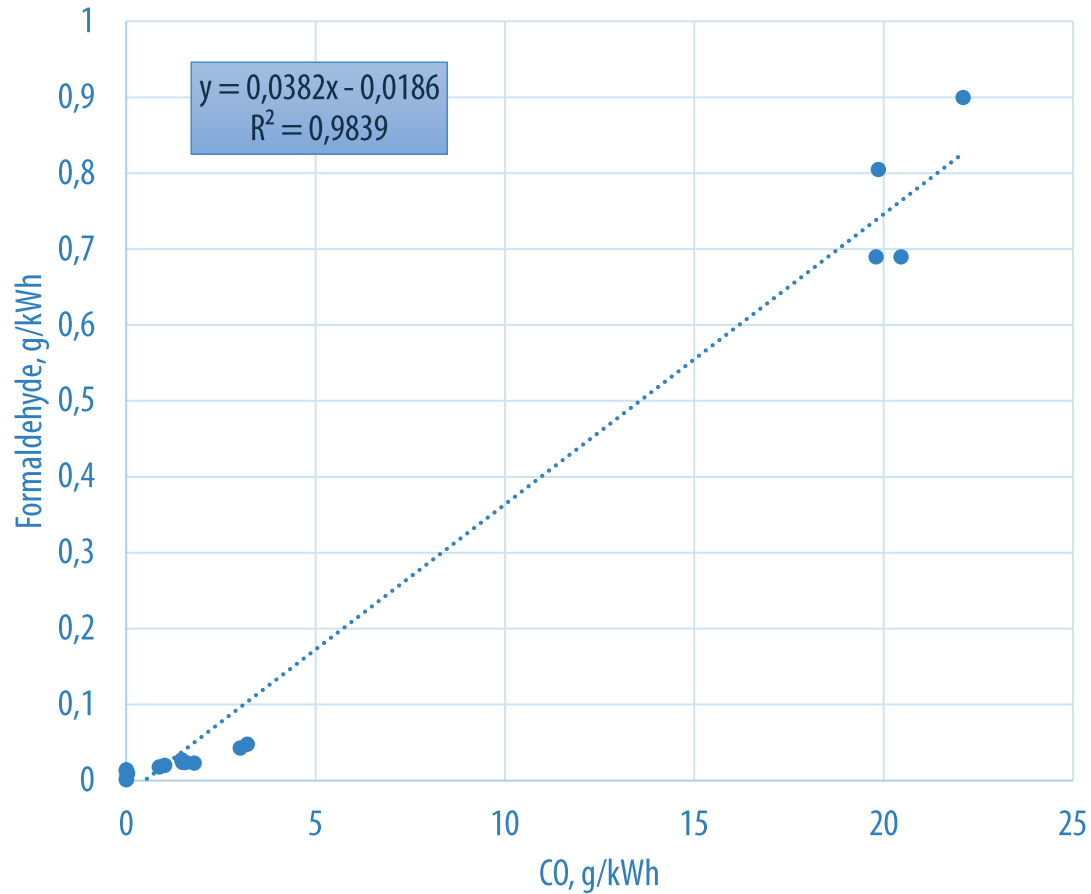
*Chin, J. Y., Batterman, S. A., Northrop, W. F., Bohac, S. V., & Assanis, D. N. (2012). Gaseous and Particulate Emissions from Diesel Engines at Idle and under Load: Comparison of Biodiesel Blend and Ultralow Sulfur Diesel Fuels. *Energy & fuels : an American Chemical Society journal*, 26(11), 6737–6748. doi:10.1021/ef300421h



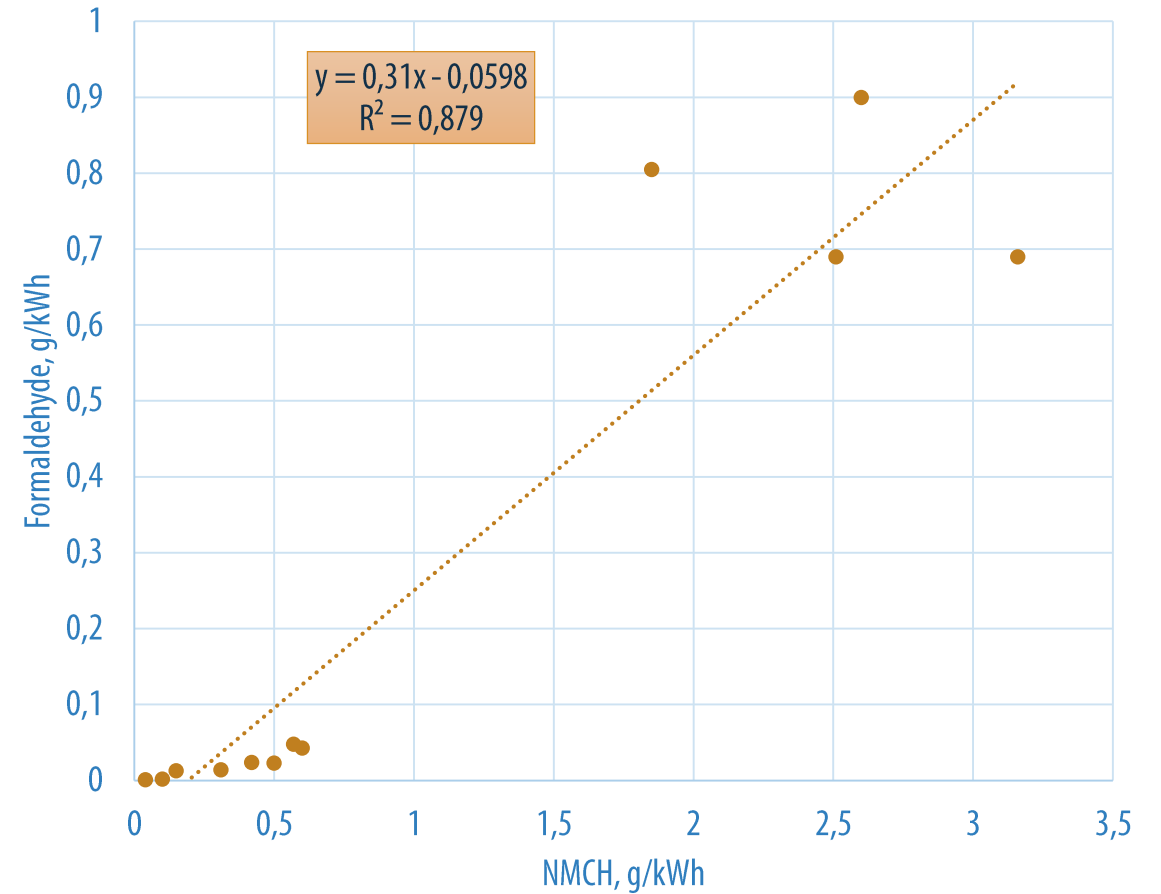
Load test emission correlation

*BMEP=2...9 bar

Formaldehyde vs. CO



Formaldehyde vs. NMCH



No observed correlation between Formaldehyde and NOx emissions ($R^2=0.06$)

Conclusions

1. It is expected that concentration of pollutants in vehicle interior air depends on tailpipe emission level.
2. Formaldehyde concentration measurement for commonly used technologies takes up to 15 minutes per 1 measurement. On-line equipment for formaldehyde concentration measurement is very expensive.
3. Correlation analysis of diesel tailpipe emissions was carried out and strong correlation between Formaldehyde and CO and NO_x for idle mode and between Formaldehyde and CO and NMCH for load modes was observed.
4. Results of this analysis allows to use only CO and NO_x concentrations in vehicle interior air as indicators of interior air quality to reduce cost of tests and test equipment and testing time.

Thank you for your attention!

