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**Branimir Milosavljević<sup>1</sup>**  
**Radivoje Pešić<sup>2</sup>**  
**Jovanka Lukić<sup>3</sup>**  
**Saša Babić<sup>4</sup>**

## **ESTIMATION OF EXHAUST EMISSIONS FROM TRANSPORT BY TIER METHODS ON KRALJEVO CITY**

**ABSTRACT:** In this paper is proven suitability of Tier 1 method calculation and correlation between Tier 1 and Tier 2 methods. Along with this, emissions of polluted gases and matter (originated from road traffic on territory of Serbia, township Kraljevo and two streets with conditions for monitoring) are calculated. Further directions of research refer to completion of necessary data in order for successful use of Tier 3 method (software COPERT IV) as well as for comparison of gained results. So far, in our country, attempts like this are still pioneering character, although mentioned computer program is almost a decade recognized in science world as quality tool for calculation of emission from road traffic.

**KEY WORDS:** Tier method, exhaust emission, road vehicles, Kraljevo, COPERT

### **INTRODUCTION**

Given the diversity in propulsion concepts, the calculation of emissions from road vehicles is a complicated and demanding procedure which requires good quality activity data and emission factors. The emissions from road vehicles are illustrated schematically in Figure 1, with the red [3].

The most important pollutants emitted by road vehicles include: ozone precursors (CO, NO<sub>x</sub>, NMVOCs (non-methane volatile organic compounds); greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O); acidifying substances (NH<sub>3</sub>, NO<sub>x</sub>, SO<sub>2</sub>); particulate matter mass (PM); carcinogenic species (PAHs (polycyclic aromatic hydrocarbons) and POPs (persistent organic pollutants); toxic substances (dioxins and furans) and heavy metals.

Pollutant emissions are influenced by a number of parameters: vehicle type and age, driving patterns, vehicle load, fuel volatility, thermal conditions and usage characteristics. Driving patterns are themselves linked to road characteristics, geographical location (urban, motorway, etc.), time period, etc. For emissions estimations, some of these variables are envisaged as categories (vehicle categories, geographical location), other as correction factors (gradient, load transported, etc.) and emissions functions can be speed and temperature dependent [5].

Emissions from road vehicles have been controlled by European legislation since the 1970s. In order to meet the increasingly stringent requirements of the legislation, vehicle manufacturers have continually improved engine technologies and have introduced various emission-control systems. As a result, modern vehicles have emission levels for regulated pollutants (CO, NO<sub>x</sub>, THC) which are more than an order of magnitude lower than the those of vehicles entering service two decades ago.

<sup>1</sup> Branimir Milosavljević, College of Applied Mechanical Engineering Trstenik, e-mail: lenka1809@gmail.com

<sup>2</sup> Radivoje Pešić, Ph. D., Prof., Faculty of Engineering, University of Kragujevac, Serbia, e-mail: pesicr@kg.ac.rs

<sup>3</sup> Jovanka Lukić, Ph. D., Prof., Faculty of Engineering, University of Kragujevac, Serbia, e-mail: lukicj@kg.ac.rs

<sup>4</sup> Saša Babić, College of Applied Mechanical Engineering Trstenik, e-mail: babicsf@nadlanu.com

















