

Title (EN): **Experimental research and fire simulation for increase of road tunnels safety**

Title (SK): **Experimentálny výskum a počítačová simulácia požiarov na zvýšenie bezpečnosti cestných tunelov**

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Scientific projects: APVV-15-0340

Project coordinator: II SAS, partner: Žilinská univerzita in Žilina

Main customer: National Motorway Company, Slovakia

External financial sources: in 2017: 85 991,- EUR (II SAS: 58 837,- €)  
whole project duration: 231723,- EUR (II SAS: 149999,- €)

Annotation: Two series of full-scale fire tests in two motorway tunnels Polana and Povazsky Chlmec were carried out in cooperation with NDS (National Motorway Company, Slovakia). The tests allowed obtaining a large set of unique data providing detailed information about safety systems operation and their response to fire. The measurements performed were used for tuning some parameters of the central control system of the tunnel. The tests verified the functionality and effectiveness of the automatic tunnel response to fire and provided authentic data from the tunnel control system, devices and detectors in the tunnel, emergency ventilation operation as well as the data about fire smoke propagation. Passenger car fires were tested using a non-destructive nontoxic technology of smoke generation.

The gathered data will be used for validation of computer simulations of the tested fire scenarios which will be prepared for NDS with the aim to increase tunnel safety in Slovakia.

Smoke stratification which is important for safe evacuation in the tunnel will be studied by computer simulation as well. The results of the ventilation effectiveness and efficiency analysis for the Polana tunnel were presented for NDS representatives.

Main scientometric outputs:

1. GLASA, Ján - WEISENPACHER, Peter - VALÁŠEK, Lukáš - DANIŠOVIČ, Peter - ŠRÁMEK, Juraj - HODOŇ, Michal. Modely vzniku a šírenia požiarov na zvýšenie bezpečnosti cestných tunelov. In PBT 2017: Zborník medzinárodnej konferencie Požárni bezpečnosť tunelů 2017. - Rožnov pod Radhoštěm, Česká republika, 2017, 11 s.
2. WEISENPACHER, Peter - GLASA, Ján - VALÁŠEK, Lukáš. Computer simulation of smoke stratification during fire in bi-directional road tunnel by FDS 6. In MCS-10: Tenth mediterranean combustion symposium. - Napoli, Italy, 2017, 10 p. ISBN 978-1-5090-4119-0.