



Cabinet
Rector

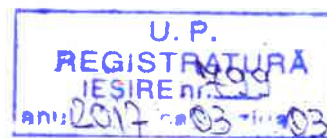
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Distinguished and honored colleagues,

In order to build-up an International Consortium aimed at developing a grant proposal for accessing funding to finance a research project within the HORIZON 2020 program, we submit to your attention and expertise the research topic which we would like to represent the proposal:

DEVELOPMENT OF FLEXIBLE VENTILATION SYSTEM FOR ROAD TUNNELS BASED ON THE INTELLIGENT CONTROL OF PHYSICAL INDICATORS OF FIRE

Based on our longstanding and fruitful cooperation with the renowned scientist Professor, Ph.D. Eng Omar Lanchava from the Georgian Technical University and within Gr.Tsulukidze Mining Institute in Tbilisi, Georgia, international expert in the field of fire and ventilation in underground structures and considering the longlasting tradition and competencies detained by the University of Petroșani concerning underground structures development and system's safety, we kindly address you the invitation to join us in a partnership aimed to research grant proposal formulation, which is intended to enter the competition in H-2020, Work Programme 14. *Secure societies – Protecting freedom and security of Europe and its citizens, Call – SECURITY, Integrated tools for response planning and scenario building.*

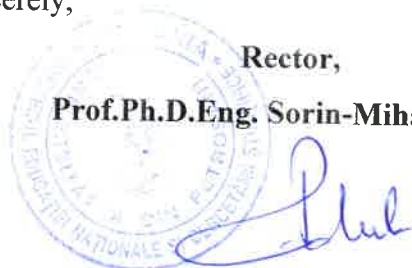
Expressing our confidence that our proposal will arouse your attention and that the contribution of your expertise and skills that you own can materialize the idea of this project, please confirm your opinion and - possibly - your agreement in principle.

Please find in the annexed document, details regarding the research topic of our proposal.

Yours sincerely,

Rector,

Prof.Ph.D.Eng. Sorin-Mihai RADU



DEVELOPMENT OF FLEXIBLE VENTILATION SYSTEM FOR ROAD TUNNELS BASED ON THE INTELLIGENT CONTROL OF PHYSICAL INDICATORS OF FIRE

RESEARCH TOPIC

1. In situ monitoring of ventilation parameters of any road tunnel for the purpose of comparison with the results of computer simulation to refine the simulation parameters such as geometric scale, time scale, the development of the optimal ratio of these scales, consideration of compliance with the boundary conditions for different ventilation systems.
2. Implementation of control tasks on computer simulations using CFD, PyroSim and FDS models for clarifying the research methodology.
3. Study of 30, 100 and 200 MW power fires by computer simulations for different gradients of road tunnels in conditions of longitudinal ventilation system.
4. - the same for cross-ventilation system.
5. - the same for the combined ventilation system.
6. Investigation of the conditions of occurrence of back layering in according of longitudinal gradient of tunnel depending on the power of fire, its effect on the operation of the fans and efficiency of ventilation as a whole. (Back layering = aspiration of hot air to move upward).
7. Analysis of the results of simulated different fires and determination possibility of collapse of ventilation in time from beginning of fire in according type of ventilating systems and with character of longitudinal gradient of tunnel.
8. Determination of the critical value of the distance between the emergency exits in accordance with the simulation results.
9. Delivering of general conception for calculation of optimum limits between evacuation exits.
10. Evaluation of the results of theoretical and experimental studies, the development of practical recommendations.
11. Elaboration of the basic requirements based on international standards that are imposed to the advanced wireless control systems.
12. Selection and development of a flexible network topology for modern wireless control system.
13. Study of the compatibility of standard wireless protocols with the requirements of modern wireless control systems.
14. Selection of the target group of the international market among advanced wireless control systems.
15. Comparative analysis of the proposed by international market advanced wireless control systems.
16. Special requirements imposed on the modern wireless systems designed for road tunnel control.