

P78 Multifunctional Device for Threat Detection

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Abstract:

The consequences of an explosion are particularly severe in confined spaces, such as tunnels and other underground structures, where air-blast waves are amplified and therefore, are more destructive compared to an open air explosions. Furthermore, there is a great concern about increased terrorist activity in recent years targeting civilian population including mass transit system. Therefore, explosion mitigation techniques need to be applied in civilian facilities such as motorway and rail tunnels and stations. There are more than 500 tunnels in operation in Europe and many more are under construction, or at the design stage. Georgia also has many tunnels designed for transportation as well as industrial activities.

This paper presents progress results of the studies to design and build multifunctional threat identification and mitigation wireless device intended for protection of underground facilities. Threats which can be identified include: explosions, fires and explosive gas clouds (such as methane) in underground facilities, subway tunnels and stations. The designed system consists of two modules: transmitter and receiver. The transmitter module contains sensors and a microprocessor equipped with the threat identification software; the receiver module produces an activation signal to trigger the

The reliability of the system depends on rapid and constant signal transmission between the transmitter and receiver modules. Therefore, the reliability of the proposed system depends on the selection of working frequency. This paper presents the results of experimental investigations to identify and process different signals from various sources in tunnels. A series of explosion tests were conducted at the underground experimental station of the Mining Institute in Tbilisi, Georgia. The aim of the experiments is to validate and fine tune operational parameters of the hardware and software of the explosion identification module of the air-blast load absorbing wireless system.

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