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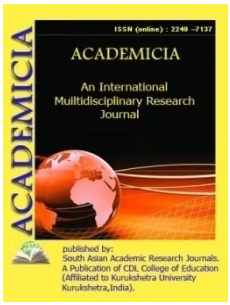

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APPLICATION OF RADIOMONITOR SYSTEM IN MOUNTAINOUS AND MOUNTAINOUS TERRITORIES OF RAILWAY TRANSPORT

H.A. Rustamov*; A.J. Kurbanov; Sh.A. Tillaev**; F.I Kushnazarov****

*Teachers of the Life Safety Training Center,
Khorezm Regional Department of Emergency Situations,
UZBEKISTAN

**Teacher,
Tashkent Institute of Irrigation and Agricultural Mechanization Engineers,
UZBEKISTAN

ABSTRACT

This article is devoted to the development of a method for monitoring and monitoring the condition of mountain layers in mountainous and foothill areas on the basis of integrated sensors of optical fiber communication.

KEYWORDS: *Railway, Optical Fiber, Technological Process, Optical Fiber Sensor.*

INTRODUCTION

Ensuring the implementation of plans for the transport of goods and passengers by rail, management of trains, organization of loading and commercial operations, operation and maintenance of technical means of railway transport, organization of safety of cargo and passengers and their timely arrival at their destinations, The development of the railway industry through the introduction of new technical innovations, increasing the profitability and productivity of railway work are among the key issues and tasks. [1].

1) Ensuring safety in the transportation of goods and passengers is of particular importance in railway transport. Because the process of movement in mountainous and foothill areas is complex and requires extreme caution. Mountainous areas are the most vulnerable areas to natural influences as we know them. Earthquakes, floods and other natural disasters, in particular, have a significant impact on train traffic. The following are real examples of these situations:

As a result of the earthquake that occurred on
January 23, 2017 in Kamchik Pass

1-picture.

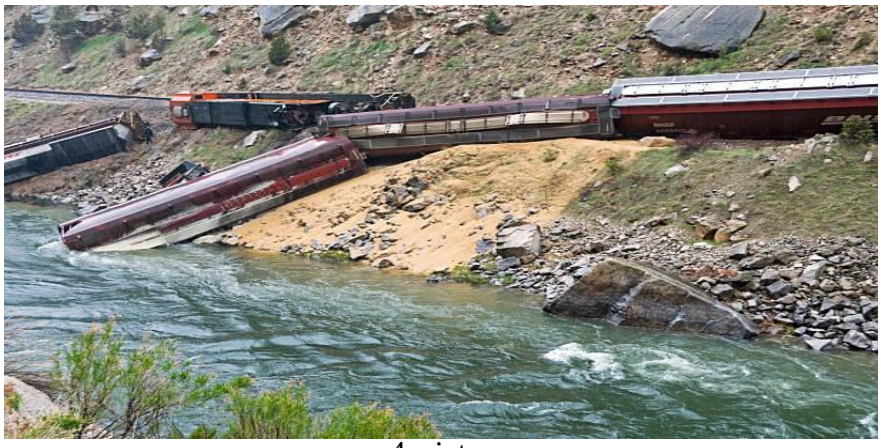
2-picture.

According to media reports, the landslide damaged the freight train and suspended the Andijan-Tashkent-Andijan train indefinitely (Figure 1.2). [2]

On the night of June 30, 2008, a 6-car passenger train No. 1322 traveling from Guangzhou to Chongqing in China overturned as a result of a strong mountain landslide, injuring several people (Figure 3).

3- picture

A 2013 mountainous landslide in Wyoming, United States, caused a moving freight train to crash (Figure 4).



4-picture

The main cause of the above cases is a dangerous geological phenomenon - a mountain landslide caused by an earthquake. In order to prevent the recurrence of the above adverse events, it is important to monitor and control the condition of the soil layer in mountainous and foothill areas, which causes landslides. As an innovative solution, it is advisable to use a radiomonitoring system based on optical fiber sensors.

The small weight and volume of the optical fiber, the absence of fire hazard, high resistance to abrasion, low cost and the risk of explosion make it possible to use optical fibers as sensitive elements for the measurement system.

Optical fiber cables designed for data transmission can also be used as sensitive elements in determining temperature, pressure, vibration, and magnitudes that have a physical effect. The main advantages of such systems are the ability of power grids to serve you, the absence of the effects of electromagnetic interference, high sensitivity and small size. In addition, the use of standard optical fiber cables and elements used in telecommunications shows that the cost of such sensors is not expensive.

An optical fiber sensor (OTD) is a measuring instrument consisting of a measuring transducer (OO) that is transmitted from an optical fiber, connected to an optical signal processing and conversion device via an optical fiber communication line, and measures the physical size of any optical fiber signal. designed to present the measured data signals in the form of applications by varying the size.

The advantages of using optical fiber measuring sensors in the monitoring system of various objects and processes are:

-no impact on the measuring device;

-no problems with the heater;

-no problems such as arcing and sparks;

-high resistance to adverse environmental conditions

-possibility to carry out measurements in potentially explosive atmospheres;

-the impossibility of the fiber to chemically react with the measuring medium;

-high mechanical strength and simplicity of the system structure;

-resistance to temperature rise.

Another major advantage is the ability to perform remote measurements when electronic sensors cannot be used or are not recommended for use.

Based on the advantages and capabilities of the optical fiber sensors listed above, it allows for continuous monitoring of mountain layers and mountain migration processes in mountainous and foothill areas.

The continuous monitoring process (Figure 4) is performed by the data processing center.

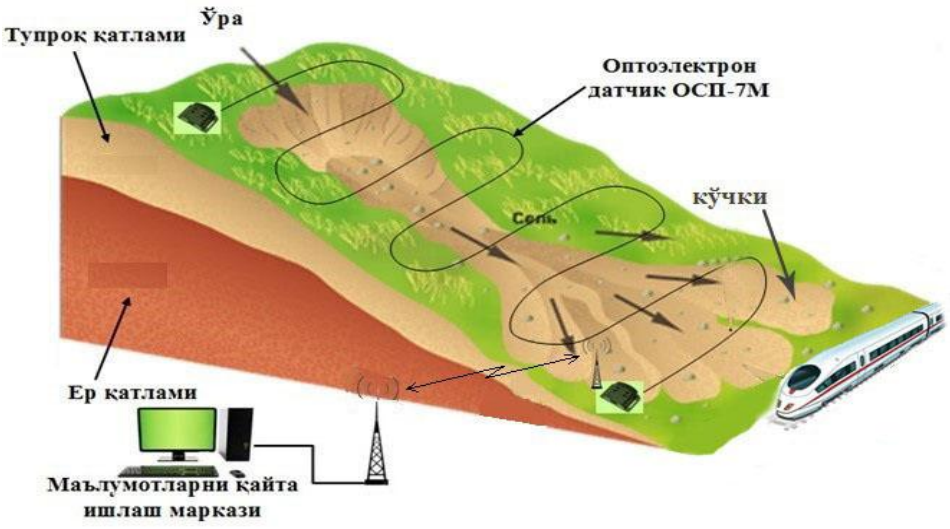


Figure 4. The principle of organizing a radio monitoring system.

The center will be located at the nearest station on the mountain and in the foothills where the train is moving, the data will be processed, and if the area is concluded to be dangerous, the train driver will be notified by train radio. The train driver will take all necessary measures to ensure safety.

Similar innovative methods of railway transport aimed at ensuring the safety of trains running in mountainous and foothill areas, first of all, increase confidence in railway transport and bring great benefits to the economy of the republic.

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