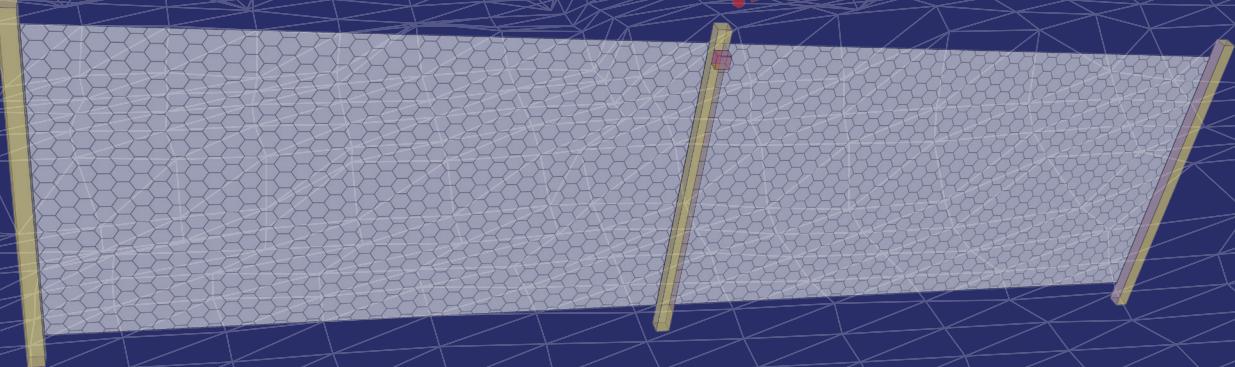




# D-FENCE

Monitoring system for remote control of flexible rockfall barriers.



We monitor the present with the instruments of the future



We monitor the present with the instruments of the future



GEOREFERENCING  
SENSORS ON GIS  
CARTOGRAPHY



DYNAMIC GRAPHS



REMOTE MONITORING  
AND DEVICES  
CONFIGURATION



AUTOMATIC FTP



AUTOMATIC REPORT



POSSIBILITY OF UPLOADING  
TECHNICAL DOCUMENTS

## TECHNOLOGY

D-Fence is a system specifically designed for the real-time remote control of flexible rockfall and debris flow barriers. It consists of devices called DFC modules that are installed on the posts of the monitored structures. They communicate data via a local network (Wi-Fi or LoRa), generated through a Gateway, powered by a photovoltaic panel or by electricity where possible. Inside the modules there are two different sensors that allow **near real-time** monitoring of the posts rotation, as a result of the elongation of the braking devices, and **real-time** monitoring of an impact on the barrier.

By installing a DFC device every two posts, it is possible to fully monitor the barriers, immediately identify and geolocate a possible impact on them and assess the work rate of the different portions of the structure.

## INSTALLATION

Installation of the D-Fence monitoring modules is quick and easy.

The measuring devices are fixed to the posts by friction through a special connector, while the Gateway (LoRa or Wi-Fi) is installed inside IP66 boxes with brackets for pole or wall mounting.

## COMMUNICATION

The D-Fence system is produced in two versions, Wi-Fi or LoRa, which differ in the mode of data transmission between the measurement modules and the Gateway.

The Wi-Fi system is designed to be installed in smaller sites. The LoRa version is recommended if there is more than one structure to be monitored on a slope. This technology is also suitable for monitoring barriers in areas where the telephone signal is poor.



INSTANT DETECTION  
OF AN IMPACT  
ON THE BARRIER

DAILY MONITORING  
OF THE STRUCTURES  
WORK RATE

DATA TRANSMISSION  
VIA Wi-Fi OR LoRa  
NETWORK





## DATA REPRESENTATION OF THE D-FENCE SYSTEM

### MONITORING RESULTS

The monitoring results are sent via GPRS network to the Geo-Atlas\* management system. The data is stored on Cloud with backup in the physical servers, processed by software based on Self-learning and Machine Learning algorithms. Results are represented through a dynamic web platform with controlled access. The system is fully automatic and can send e-mail/SMS alerts or activate remote warning devices in the event of:

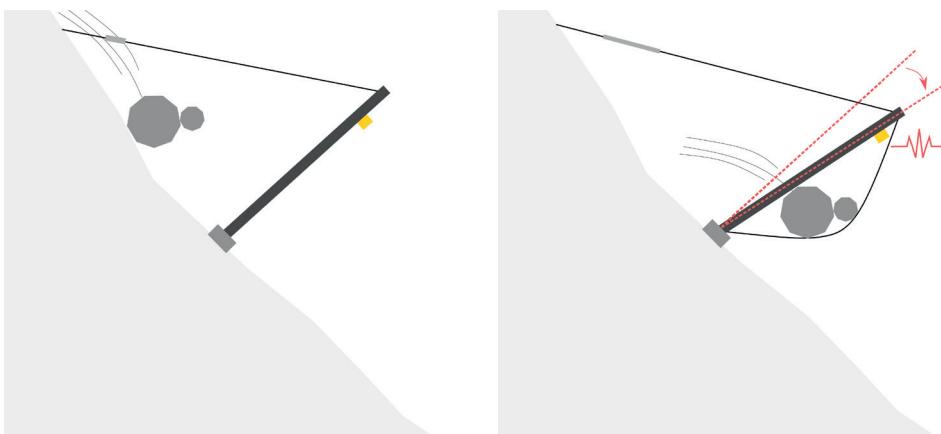
- Detection of an impact with energy value higher than SEL or MEL
- Detection of gradual filling of the net
- Failure to receive data or detection of a low battery value.

The parameters recorded by the individual sensors (**post rotation, temperature, shock sensor activation, battery level**) are represented by means of dynamic graphs. Furthermore, the representation of the sensors on dynamic GIS cartography makes it possible to immediately identify and georeference any devices in an "**ALERT**" state.

\*The D-Fence system data can also be managed by third-party platforms

### ADVANTAGES

- Remote control of rockfall barriers
- Instantaneous detection of impacts with energy level estimation
- Near real-time detection of network filling
- Automatic alerting based on multiple levels
- Automatic monitoring reports
- Possible integration of one or more ASECAM type cameras



### SPECIFICHE TECNICHE

Sensors	Accelerometer 3D, Thermometer, Shock Sensor
Acceleration measurement range	± 1.2 g
Inclination measurement range	± 90°
Inclination sensitivity	105 LSB/° (0.009°)
Acceleration sensitivity	6000 LSB/g
Sensitivity dependence on temperature	Min. -0.3 % - Max. +0.3 %
Linearity error of the accelerometer	Min. -4 mg – Max. +4 mg
Temperature operating range of the accelerometer	-40 °C ÷ +125 °C
Amplitude response of accelerometer	40 Hz
Thermometer measurement range	-50°C ÷ +150°C
Thermometer sensitivity	18.9 LSB/°C (0.05 °C)
D-Fence module dimensions	7.5 X 7.9 X 5.9 cm





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