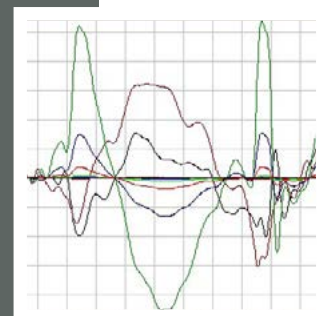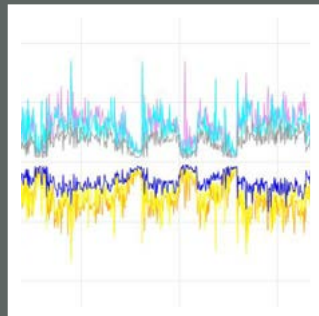*MONITORING*
TEST
MEASUREMENTS
DATA MANAGEMENTS
ASSISTANCE
SUPPLY

ACCELEROMETER MONITORING SYSTEM

SERVICES FOR GEOTECHNICAL ENGINEERING

Powered with WMS WebMonitoringSystem

FiELD

SYSTEM DESCRIPTION

Why Civil and Industrial Structures need Dynamic Instrumentation for Monitoring?

The strength and serviceability of a structure can be considerably reduced by natural or human-made events, earthquakes, extreme levels of operation, uncontrolled structural changes and various other external influences.

The Dynamic Instrumentation in addition to a Geotechnical Monitoring System can be a useful tool for the control of any potential problems or hazards, with the result of a better management of the safety issues concerning the structures.

For this purpose, Field has developed an accelerometer system capable of measuring an event of seismic accelerations to which are subjected the monitored structures allowing the interpretation process of any effects on the structures themselves.

Analyzing the acquired data by the FIELD system, fundamental features (seismic wave propagation) of a dam may be identified such as the damping within the large dam structure, amplification of the ground motion along the path from the foundation up to the crest, differential motions between structures, natural frequencies, mode shapes, etc.

The monitoring system consists of a network of accelerometric sensors strategically placed on the structure to be monitored and a central system which processes the information and makes it available.

The main benefits are increased security, but in addition to security, there is also a benefit, because the monitoring is used to identify the presence of damage not directly visible, making timely repair operations.

Be constantly updated on the status of a structure to minimize the risks and reduce the need for inspections. This allows you to invest in an optimal way the public and private resources, intervening only where necessary.
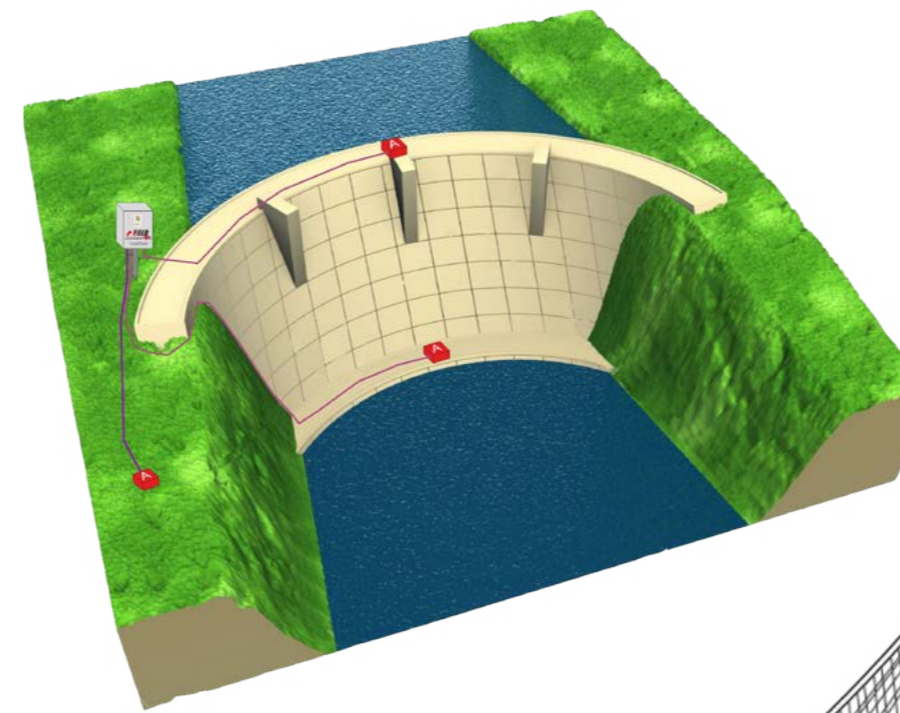

ARCHITECTURE

Each station is constituted, mostly by one triaxial (X, Y and Z) bound to a concrete base, the sensors are connected by cable to a central data acquisition, the data collected are stored in a memory, together they can then be downloaded locally or sent via 3G router to a remote control station. The data acquisition units are power supply through electrical connection, or if not possible by means of photovoltaic panels.

SOFTWARE and DATA ANALYSIS

The management and analysis software allows:
- channels configuration;
- to activate and deactivate the registration;
- the configuration of the acquisition times pre and post trigger;
- to visualize in real time the values;
- to do manual registrations.

In addition, it is possible to set up programmable filters to limit the analysis in frequency only to significant spectrums. The user could configure the interesting frequency band and delete all the other components in frequency. These could return values that are altered with respect to the frequencies of the viaduct. It could also be defined how to delete the "unwanted" components in frequency, defining the filter to apply.
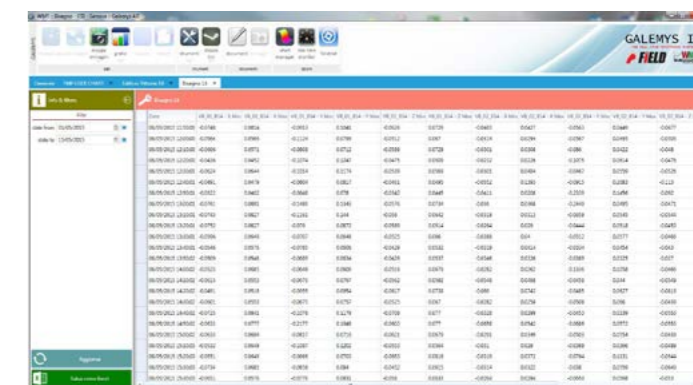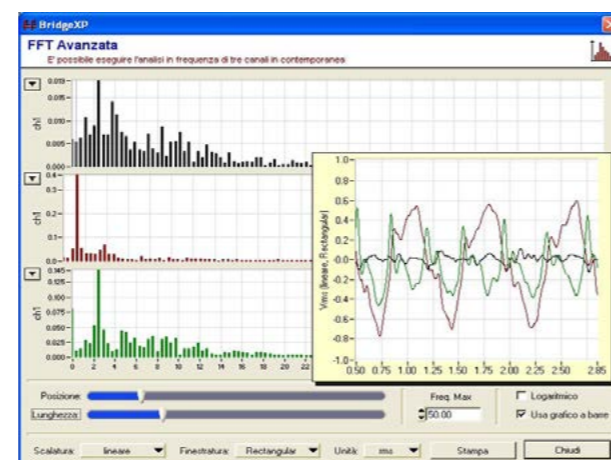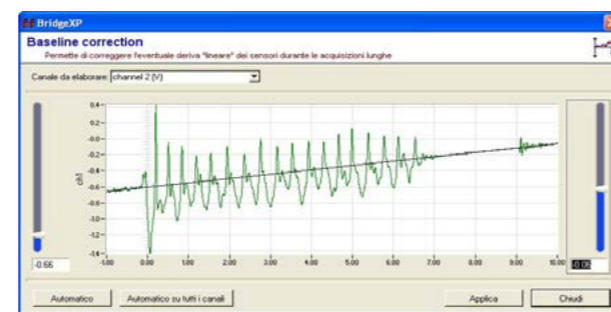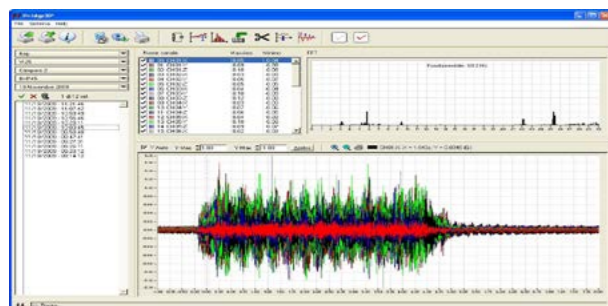
The Accelerometer monitoring system completely integrates within WMS Software Platform for the validation, processing, conversion, management and automatic visualization of data.

The signals of the acquired instruments, through F/O – LAN – GPRS – Radio – Satellite connection are sent to a server, integrating them within a SQL type database.

Data are subjected to a first automatic validation to delete potential reading peaks and/or abnormal readings. Then, these are converted in the opportune engineering units. Through an application and a web connection, data are made available for the client, both in graphic and in tabular format (.xlsx). This way, the system could be completely automatic and updated in real time 24h/365 days a year.

Services For Geotechnical Engineering
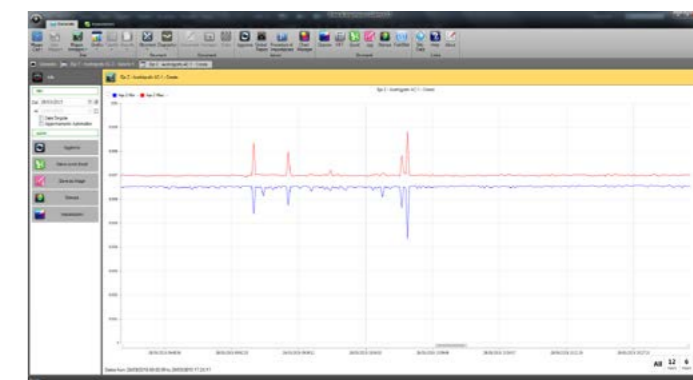
SENSOR

TECHNICAL CHARACTERISTICS			
Model	ASF 15 ±2g	ASF 15 ±1.7g	ASF 15 ±2gM
Number of axis	"3 orthogonal axis X,Y,Z (2D or 1D Optional)"		
Technology	Servo accelerometric	Piezo resistive	Mems
Measuring range	±2g	±1.7g	±2g
Sensitivity	5.0 V/g	5.0 V/g	5.0 V/g
Linearity	<±1% FS	±25mg	±2% FS
Power Supply	13-20 VDC		
Resolution	±100ug	±0.5mg	±1.5mg
Output	13.5 - 20 Vdc		
Box	Aluminium		
Protection	IP66		
Dimensions	105 x 150 x 95 mm		
Connection	cable		

Note : the maximun range could be able to set until ±4g

DATALOGGER

TECHNICAL CHARACTERISTICS	
Computer Dual Core 1.8 GHz	• Dual Core Intel 1.8GHz processor • Memory DDR3 800MHz 2GB SDRAM • 8 USB input, • 3 RS232 input, • 1 input RS232/422/485,2 input LAN Ethernet • 3 input SATA 3Gb/s • 8 I/O digital (4 input/4 output) • Power supply 12VDC +/-5% 1.7A
Acquisition card IO-TECH daqboard 3005usb/3035usb	• 16 acquisition channels single ended (3035USB: 64 singles ended channnles) • 24 ports digital input/output • Control and acquisition of computer through serial interfaceUSB 2 • Alimentation 6/16 VDC - 2 W • Operating field -30/70°C • Acquisition speed 1Ms/channel • 10 Mohm of input impedence and analogical inputs • 16 bit resolution • Non linearity error +/-2 LSB max • Precision +/-0.031% and reading +/-0.008% f.s.
Router wireless netbox NB1600	• UMTS/GSM/2G/3G • 2 Ethernet ports • 1 USB input • 1 serial input RS232 • 4 I/O (2 inputs and 2 outputs) • Antenna connector SMA female • Power supply 12/48V DC 5W • Temperature -25°C/70°C