Mission Statement

For more than 40 years our intent has been to provide our clients with information which characterizes the wellbeing of their assets. We do this via both numerical modeling and collecting operational data, or, ideally, a combination of the two.

Sometimes these projects are long term, such as the monitoring oil and gas pipelines, offshore production platforms or transmission towers. At other times the monitoring phase may last only a few milliseconds, as with a pipeline burst test.

In all cases, our mission is to provide the client with results which enable them to operate and react with greater safety, efficiency and understanding. We earn repeat business by protecting personnel, environment and assets.

Iain Weir-Jones, Chairman, Ph D., P.Eng., FGs.

Company Overview

The Company was founded in 1971 to provide specialized structural and geomechanical monitoring and testing services to the resource and transportation sectors. The Company’s capabilities subsequently expanded into the areas of data processing and testing system design, and the application of this expertise has been extended considerably in the fields of structural integrity monitoring for heavy structural, energy, and offshore systems.

The Company has its headquarters in Vancouver and has been active in projects in 55 countries. We also maintain an office in Fort McMurray, Alberta, the heart of the oil and gas industry in Canada.

The Company offers comprehensive end-to-end solution planning, implementation, and analysis capabilities. 90% of our clients typically retain the Company on a project basis in order to characterize a problem, develop a solution, and evaluate its effectiveness.

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ShakeAlarm is part of The Weir-Jones Group’s Reduced Carbon Footprint suite of solutions for the reduction of environmental impact due to the potential catastrophic effects of a seismic event, and the inability for emergency services to otherwise react and respond quickly.

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Seconds Matter

Earthquake Early Warning System

The Weir-Jones Group of Companies

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Introduction

ShakeAlarm® is a cost-effective, highly reliable Earthquake Early Warning System (EWS) which provides critical minutes or seconds of warning in order to minimize loss of life and assets. This is done by recognizing and quantifying the faster, but lower energy, P (compressive) wave which is the precursor of the more damaging S (shear) wave.

When used in conjunction with industrial or civil infrastructure control systems, these critical seconds of warning can be leveraged to save lives, minimize runway failure modes in critical structures, and shut down gas and electricity feeds to infrastructure—minimizing fire risk to assets after the seismic event.

Application

Early warning of an approaching earthquake allows for the following actions to occur when appropriate systems receive ShakeAlarm® data:

- "Duck and Cover or Evacuate" message is broadcast in populated areas such as transit stations, schools, hospitals, and shopping centers
- Trains are brought to a full stop, avoiding catastrophic derailments and associated casualties
- Gas and electricity are shut down
- Elevators are returned to ground level and an open door condition
- Metered exit doors default to open and unrestricted states
- Bay doors are opened at fire halls and ambulance stations
- Backup power systems are activated

Wiring:

- Power from 410/240V
- Internal wiring to 12V
- Transformer provided
- 3 position switch

Benefits

ShakeAlarm® provides additional seconds of warning which can, as part of an earthquake preparedness plan, translate directly into the reduction of casualties and property damage.

When ShakeAlarm® is deployed in schools, hospitals and on large infrastructure projects such as tunnels and bridges, it provides crucial seconds of warning to evacuate or to seek cover.

Quality Built In

ShakeAlarm® was designed and engineered with the following considerations:

Reliability
To minimize false alarms.

Serviceability
The system has an operational lifespan of 25 + years. System maintenance and repair is easily carried out by replacing and servicing individual components when required, without decommissioning the system as a whole.

Survivability
Enclosures are constructed for indoor or outdoor use in order to provide protection for both the equipment and personnel.

Deliverables

ShakeAlarm® Weir-Jones’ simple turn-key earthquake early warning solution, is composed of:

- Seismic Sensors
  Passive triaxial seismic sensors installed on the foundation of an asset being protected
- Data Acquisition Unit
  A processing unit converts the analogue sensor signals and transmits digitized information to the processing centre in real-time
- Data Processing Center
  The controller for the structure being monitored is equipped with an industrial computer that runs P-Wave detection software. It directly interfaces with the available Safe-Shut-Down system. Threshold values are preprogrammed and ShakeAlarm® generates a Shake/No-Shake command in the event of excessive ground motion
- Cable and connectors, user manual
- Programmable Features
  - To generate audio/visual alarm
  - To send text message or email to any designated recipients
  - To activate a relay
  - To communicate with additional ShakeAlarm® networked units

Example

ShakeAlarm® installed at the George Massey Tunnel in Richmond, British Columbia, records magnitude 6.3 and 5.6 quakes near Queen Charlotte Island on November 17, 2009. The signature of the P-Wave was automatically analyzed in less than a second, and the risk analysis algorithm determined that the yet to arrive S-wave would not create hazardous conditions at the tunnel.


Parameters of the first earthquake:
- 15:30:46 UTC, Mw=6.6, Latitude52.15N, Longitude131.49 W.
- Depth: 10 km, Hypocentral Distance: D=700km, Distance in Degrees: Δ=6.3
- IASP-91 travel time curves are used to compute P- and S-waves arrivals.
- They are: t(p-wave) = 1 min 30 sec  t(s-wave) = 2 min 41 sec.
- S-wave/P-wave time difference = 1 min 11 sec.

Based upon the November 17 2009 event, the effective amount of warning time to vacate structures, shut down infrastructure or seek cover would have been: 1min 11 sec.