High Speed Rail Monitoring, Korea

Güralp solution provides low-latency data for an earthquake early warning system in Korea.

Summary

The Korail project network was formed by the Korea Network Authority. The solution provides low latency data for an early warning system. Over 100 accelerometers and 65 digitisers make up 34 stations over 320 km of railway line. Each station contains two 5T tri-axial accelerometers, connected to the network using DM24 digitizers and data modules.

Figure 1: A map of the installations along the railway in Korea

Figure 2: Example of installation, Instruments are recess in a supporting column, and a second within the hollow concrete superstructure. Each instrument is secured to the structure with a single fixing bolt.

Güralp Solution

The Korail project network consists of over 100 accelerometers and 65 digitisers. These are spread at regular intervals over 320 km of railway line.

Güralp strong-motion accelerometers gather real-time data from structures along a newly-built high-speed railway line, and transmit it to operators using a combination of Scream! and GSMS protocols. GSMS can provide every second and on triggered data, MMA (minimum, maximum and average ground acceleration), PGA (Peak Ground Acceleration), RMS (Root Mean Square), Cross correlation and SI (Spectral Intensity).

A minimum of two accelerometers are used; one at the bottom of the column, one at the top. The instruments are connected to a single 6-channel DM24 mk3 digitizer in a nearby building, which is linked to the local TCP/IP network with a DCM. The DCM runs a Scream! server so that real-time data can be viewed from anywhere on the network. Only one of the two digitizer input ports on each DCM is used, giving the array scope for future expansion as necessary.

Cont.

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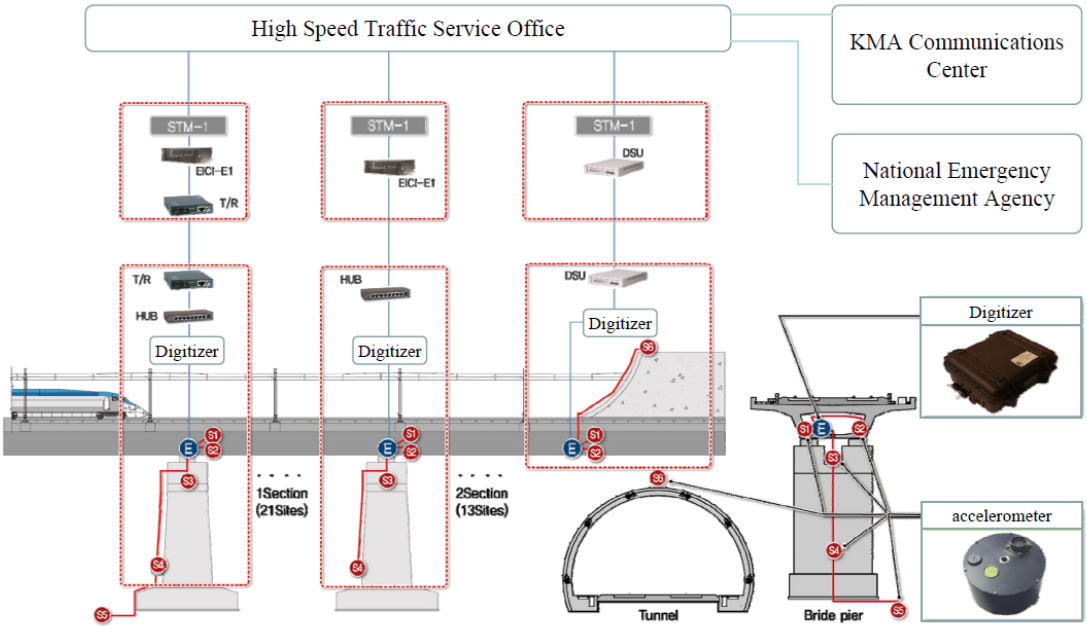
Korail Project Network Diagram



Key features

- Strong motion accelerometer
- Low latency digitiser
- Various output protocols including Scream! and Seedlink.

Benefits of monitoring

- Monitor the safety of structures along the line;
- Assess how the structure responds to seismic events and to vibration arising from normal activity on the line; and
- Contribute to the knowledge of seismicity in the region.

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