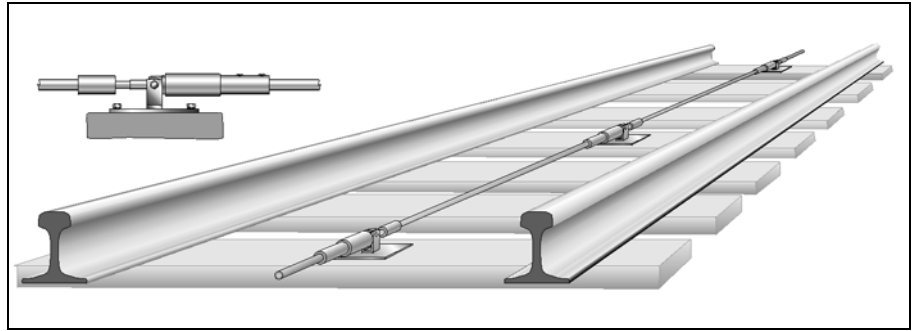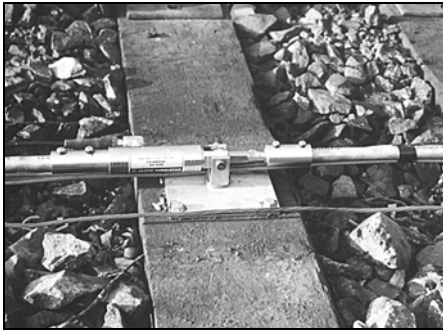# Track Monitoring System

Application

Track monitoring systems can help maintain the safety of railroad tracks by monitoring settlement and twist.

The systems are installed on tracks that may be affected by nearby tunneling or excavation. They can also be installed on tracks that cross potential washout and landslide areas.

System Components

Track Settlement Sensors: Track settlement is monitored by linked sensors that are installed parallel with the rail alignment.

Track Twist Sensors: Track twist is monitored by separate sensors that are installed perpendicular to the rail alignment.

Data Acquisition System: A data logger continuously monitors the sensors. The logger is linked to the control house or office by direct cable or radio telemetry.

Data Processing: Readings are forwarded to web-based monitoring software, such as Atlas, which checks for alarm conditions and can produce graphs and reports.

System Features

Single Cable Installation: Each sensor connects to the next in line, effectively reducing the number of signal cables to one.

Durable Components: Sensors, gauge tubes with telescoping sockets, and mounting brackets are designed to withstand vibration, temperature changes, and repositioning.

Continuous Monitoring: The track monitoring system is designed to provide readings 24/7. It can be configured to provide on-sites as well as remote alarms.

Compatible with Atlas: The Atlas web-based monitoring system provides profile plots, trend plots, three levels of alarms, watchdog alarms and much more.

SYSTEM CONFIGURATION

A track monitoring system consists of settlement sensors and twist sensors. Settlement sensors are mounted parallel to the rails and typically linked together. Twist sensors are mounted parallel to the ties.

Settlement Sensor: Sensors can be placed up to 3m apart. Each sensor includes signal cable to connect to the next sensor. Settlement sensors require a mounting bracket and gauge tubing.

Mounting Bracket: . Bracket includes swivel for settlement sensor and telescoping socket for gauge tube. Order one mounting bracket for each settlement sensor.

Gauge Tubing: Gauge tubing defines the gauge length of the settlement sensor. Order one gauge tube for each settlement sensor.

Twist Sensor: Twist sensors can be placed within 3m of any settlement sensor. Each sensor includes signal cable to connect to a settlement sensor. Twist sensors are supplied with a mounting bracket and do not need gauge tubing.

Jumper Cable: The jumper cable connects the sensor bus to a data logger. Order one jumper cable per installation.

End Plug: The end plug terminates one end of the sensor bus. Order one end plug per installation.

Other: Screws or anchor bolts are required to fasten mounting brackets to rail ties. These are best sourced by the user.

PART NUMBERS

Track Settlement Sensor 97806550
Gauge Tubing, 3m / 10 ft 97806558
Mounting Bracket 97806555
Track Twist Sensor 97806570
Bottom Plug 57804510
Jumper Cable, 25 m 57804525

Sensor Type: MEMS tilt sensor . Thermistor for temperature readings.

Requirements: Accepts power input between 8 to 15 Vdc. Outputs ±2.5 volt differential signal. Biaxial version contains two tilt sensors.

Calibrated Range: ±10 degrees.

Resolution: 9 arc seconds or 0.04 mm/m using the CR1000 data logger.

Sensor Repeatability: ±22 arc seconds or ±0.1 mm/m, subject to site conditions.

Calibration: 11-point calibration taken at three temperatures from -8 to 40 °C

Signal Cable: Cable for 3m gauge length supplied with each sensor. Connectors are fully waterproof.

Sensors per Chain: The table below shows nominal limits for chains of serial sensors.

Number of Sensors	Max Cable Length
50	40 m
43	75 m
37	115 m
32	150 m
27	190 m
23	225 m
19	265 m
16	300 m
13	340 m
10	375 m

DATA LOGGERS

M-Logger

The M-Logger is specifically designed to read MEMS sensors. It can operate a single chain of up to 16 sensors. The M-Logger can also be used to verify operation of the sensors at installation time.

Campbell Scientific CR1000

The Campbell Scientific CR1000 data logger can operate up to 6 chains of serial sensors. The CR800 logger can operate 3 chains of serial sensors.

ATLAS WEB-BASED MONITORING

Readings retrieved from the data logger can be processed manually by spreadsheet or automatically by the Atlas web-based monitoring system. See separate data sheet for details.