

TUNNEL DISPLACEMENT

CHALLENGE:

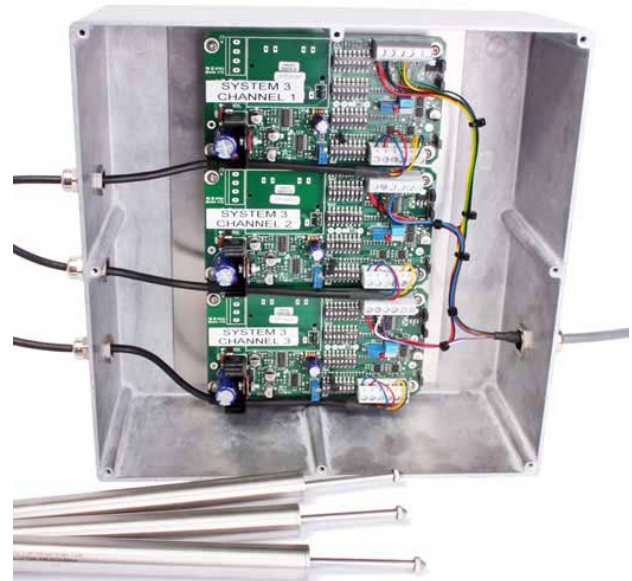
To design a bespoke bridge monitoring system to monitor the displacement of the joints for a 76.3km long immersed high capacity rail tunnel.

Date:

May 23, 2014

Industries:

- Civil Engineering
- Infrastructure
- Material and Endurance Testing



The Marmaray Project

- This 76.3km long tunnel is the deepest immersed tunnel in the World and is regarded as the foremost challenging infrastructure project in Turkey.
- The tunnel provides a direct link between Halkali on the European side of Istanbul, with Gebze on the Asian side.
- This modernised high capacity rail tunnel will carry up to an estimated 65'000 passengers per hour in 2015, increasing to a predicted 75'000 in 2025, saving commuters a 1 hour 15 minutes of travelling time.

Products Used:



[Strain Gauge Displacement Sensor AML/SGD](#)



SGA Strain Gauge Amplifier

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AML/SGD Displacement Transducers

We created a bespoke bridge monitoring system using 3 off 50mm AML/SGD strain gauge displacement sensors, forming a triaxial measurement of each joint. The displacement sensors converted the linear movement of the joints within the tunnel into an analogue electrical signal.

High Accuracy

The AML/SGD strain gauge displacement sensors were chosen thanks to their 0.1% excellent accuracy, high resolution and long-term stability, which was essential in this application.



Custom Die-Cast Enclosure with SGA Amplifiers

The 50mm higher accuracy AML/SGD strain gauge displacement sensors were wired into a custom-made IP68 die cast enclosure. This IP68 enclosure provided:

- Housing for 3 off SGA Amplifiers
- Protection for the Amplifiers from Moisture Ingress
- Delivered An Amplified Signal

The bespoke LVDT system delivered accurate displacement monitoring of the joints within the tunnel.

These SGA series of load cell amplifiers are capable of delivering highly stable, high speed, industry standard analogue outputs, such as 0-10Vdc or 4-20mA, from very low-level input signals.