ASTECH ELECTRONICS LTD PRODUCT DATA
ROLL DRIVE TORQUE MEASURING INSTRUMENTATION FOR STEEL MILLS

Measurement of roll drive torque in steel strip and sheet rolling mills provides a valuable aid to quality, production speed and plant protection. Shaft torsion measured by means of strain gauges has proved superior to monitoring of motor drive current and Astech Electronics have been producing rotary telemetry systems for this specialised measurement application for over 40 years.

The basic technique – torsion measurement using strain gauges bonded to the shaft and then subsequent transmission of the strain signals to remote display using radio or other non-contacting methods has not changed. However, advances in electronic components and systems have greatly simplified installation and use. This, combined with many decades of practical experience in producing rugged mechanical design – something often overlooked in this type of instrumentation – make Astech systems the sensible choice.

At the heart of the Astech system is a torque/strain transmitter specifically developed for rolling mill applications -type TX1116D. The transmitter features fully encapsulated electronic circuitry housed within a strong steel housing – which also provides electrical screening.

After installation, no access to the shaft assembly is required. Commands and adjustments including zero/offset adjust, input sensitivity scaling and calibration signals are sent remotely from the readout equipment. These are important considerations when using strain gauges in a non-transducer environment, as sensor parameters may change slightly.

Presentation of measurement data is available in various forms, usually a form of rolling or screenshot graphical display. Display software and logging packages are available and can be adapted to user requirements at reasonable cost.

Analogue voltage and process current outputs are included. Some users still prefer the fast response and instinctive feel provided by dual moving coil analogue meter displays.

Early Days of the Technology - Monitoring Torque on 7 Pairs of Rolls Using Battery Powered Strain Transmitters in 1970!

Torque Transmitters Type TX1116D - Developed for Use in Rolling Mill Applications

A Typical Split-Ring Shaft Assembly Manufactured in Heavy Gauge Stainless Steel. Houses Torque Transmitter, Power Pickup Loop & Protects Strain Gauges

Typical Screen Display of Upper & Lower Roll Torques
In operation the Astech System utilises bi-directional inductive coupling, meaning that only a single co-axial cable is required between the measuring location and the display equipment. Installed around the drive shafts are steel split-ring assemblies which provide protection for the strain gauges and house the torque transmitter together with its associated single turn loop antenna. The antenna is sandwiched between polypropylene segments, ensuring accurate location and protection.

A stationary inductive head module is mounted facing the antenna, with an air-gap of typically 20mm. This head inductively couples power into the antenna and simultaneously receives measurement data from it. A co-axial cable connects the head to a remotely located processing unit which incorporates demodulator and display electronics.

Various options of output are provided – analogue voltage and current, serial digital including RS232, RS485 & USB plus visual displays in graphical or analogue meter form.

The torque transmitter also transmits ambient temperature and power supply voltage – useful as a checking facility and is also available in multi-channel versions, providing a backup torque measurement channel if required.

Main Specifications

- **Input Range:** Remotely Selectable ±50 to 10,000 µε
- **Outputs:** ±5V, 4-20mA, USB, RS285, RS232, Various Graphical
- **Accuracy:** 14 bits 1 part in 16,000
- **Maximum Radial Airgap:** 25mm
- **Maximum Shaft Movement:** Vertical ±50mm Horizontal ±15mm
- **O/P Bandwidth:** DC -200Hz
- **O/P Noise Level:** 20mV RMS (0.2% of full scale)
- **Remote Controls:** 1) Zero/Offest Adjust 2) Input Sensitivity 3) Operate Shunt Calibration Signal 4) Operate Waveform Calibration Signal
- **Shaft Diameter Range:** Maximum Approximately 600mm
- **Temperature:** 120°C (shaft electronics)