SMARTEC - Fiber Optic Sensors for Structural and Geotechnical Monitoring

Daniele Inaudi
General Manager
Roctest Group

SMARTEC – a Roctest Group Company

Roctest Group focusses on sensing for structural and geotechnical monitoring, based on optical fiber sensing and traditional sensors

Sensing Technologies:

Vibrating-wire sensors

Fiber optic point sensors: FBG and FP

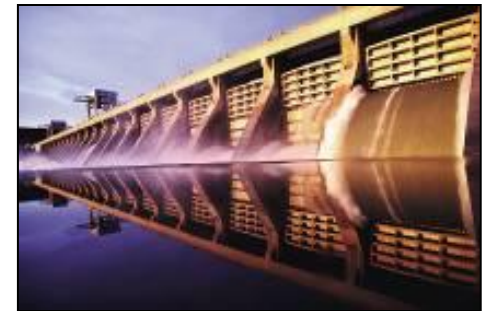Long-gauge Fiber optic sensors: SOFO

Distributed Sensors: Brillouin and Raman

In-situ testing

Roctest designs, manufactures and markets sensing systems and components

Industries

- **Roctest Group is involved in 4 major markets:**
  - **Civil Engineering**
  - **Geotechnical**
  - **Energy**
  - **Industrial**

Markets

- **Dams**
- **Bridges**
- **Tunnels**
- **Mines**
- **Buildings**
- **Monuments**
- **Mines**
- **Pipelines**
- **Cryogenic**

Roctest Group Unique Know-How

- **Fabrication of FO and traditional sensors for civil, geotechnical and other harsh environments**
- **System integration of FO and traditional sensors**
- **Field support services**
- **Examples of application expertise:**
  - **Distributed strain sensing for bridges and tunnels**
  - **Pipeline strain monitoring**
  - **Seepage monitoring for Dams and Dykes**
  - **High-reliability leak detection for Ammonia and LNG**
 - **Long-gauge sensors for buildings**

Crack detection and localization – Göta Bridge, Sweden

- **SMARTape sensors glued over 5 main girders (~1000 m each)**
- **Continuous and automated monitoring for 10 years**

Penstock deformation monitoring – Nandaz - Switzerland

- ✓ **120 meters of penstock monitored with 4 lines of DiTeSt SMARTProfile distributed sensing cable glued to the wall**
- ✓ **Secure a penstock after discovery of movements on a 120 meters section**
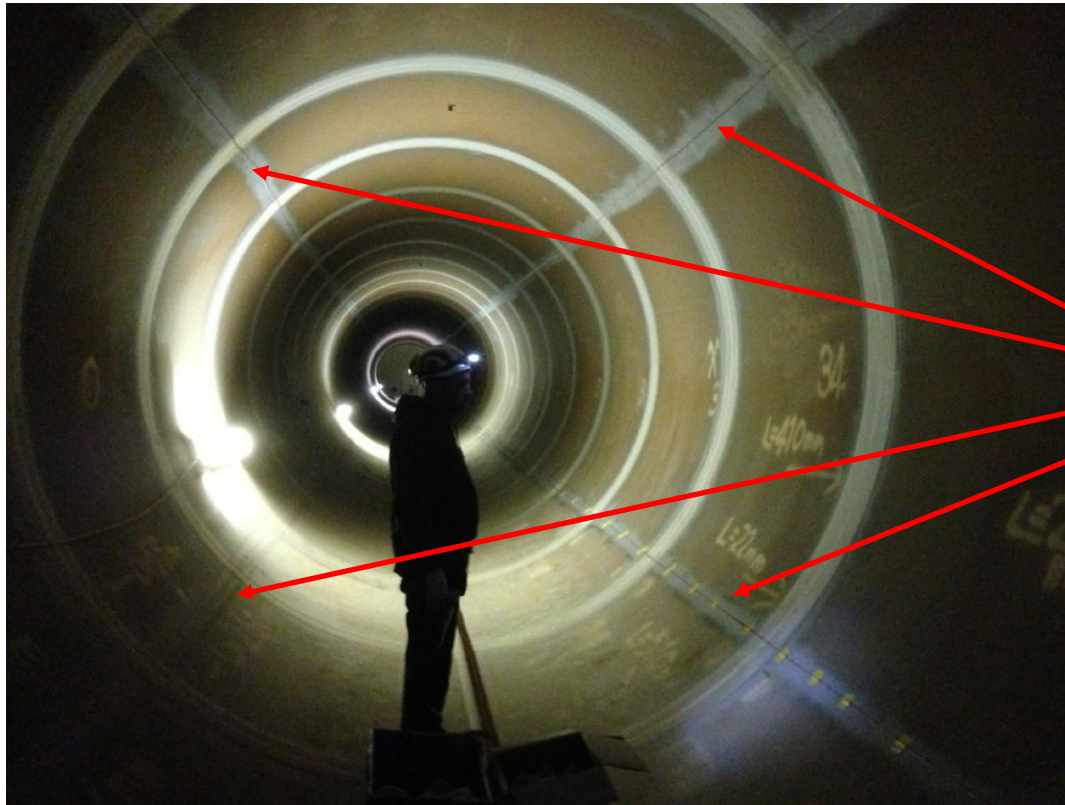
Distributed sensing cable

Seepage monitoring in Dams - Laos

Ammonia Leak Detection with SIL2 – Yara France

Future Challenges and Needs

- **Fiber optic sensing interrogators are still not up to par with traditional dataloggers for:**
  - **Durability, environmental conditions**
  - **Power consumption**
  - **Interoperability, Standardization and ease of use**
- **Further improvements are needed in (semi-) automated data analysis. Existing AI algorithms are not adapted for SHM data analysis due to the rarity of adverse events**
- **Civil and Geotech Engineering industries not ready for widespread adoption of SHM**

SMARTEC
Where instrumentation technologies meet

www.smartec.ch
www.roctest.com

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