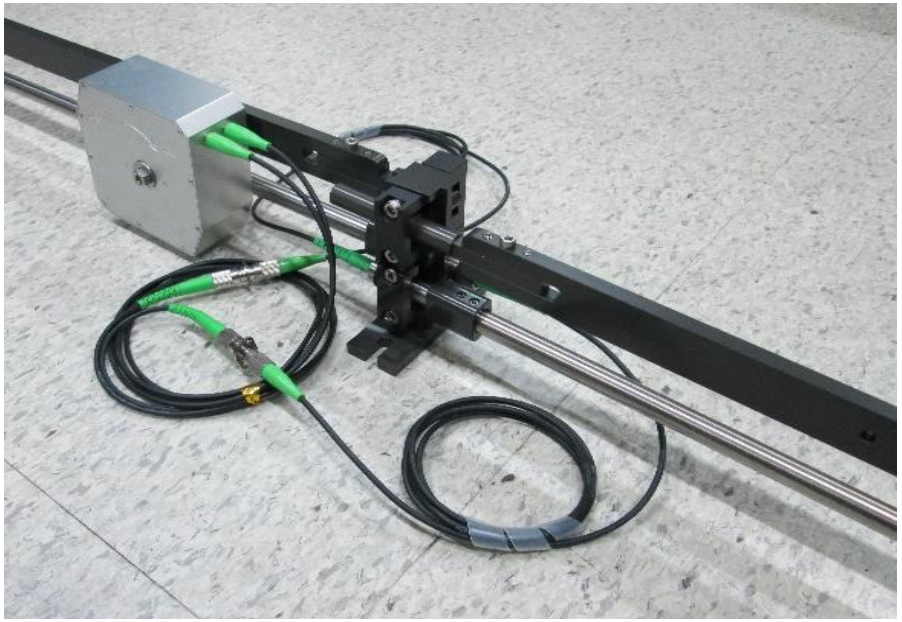
3.11 FBG Extensometer - Designation of Excellent R&D Revolutionary Product

- Certification of superior R&D innovation products
- Safety evaluation of structures
- Measurement of Tunnel Convergence and Crown Settlement
- Simultaneously measuring both angle and deformation
- Measuring based on the combination of vector diagrams
- No Effect of electromagnetic waves
- High Accuracy of measurement

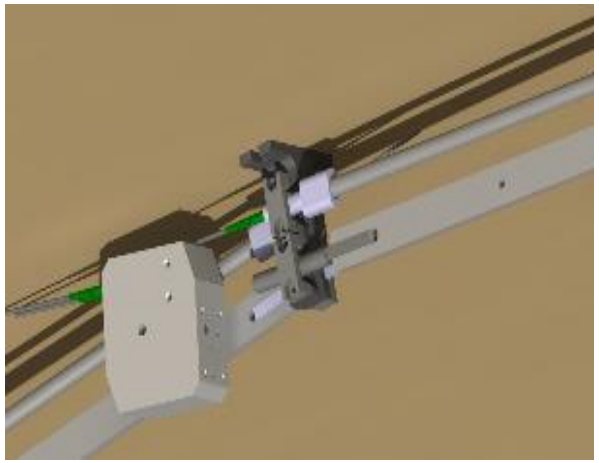
Model	FBG-EX-310
Length Deformation Measurement Range(με)	± 2,000 (Depending on the usage)
Angle Measurement Range (deg)	± 3
Gauge length (mm)	250 ~1,500
FWHM(-3 dB point)	≦ 0.3 nm
Operating Temperature(℃)	-20 ~ 80
Resolution(%)	± 0.05 %Full Scale
Accuracy(%.F.S)	± 0.3, 1 (Depending on the user's demand)
Wavelength range(nm)	1,511 ~ 1,590
Reflectivity (%)	≧ 70

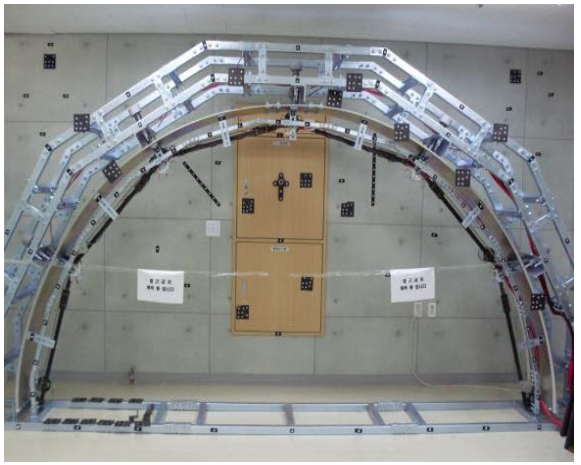
√ FBG Strain sensor(length deformation) + FBG Tiltmeter(tilt angle)

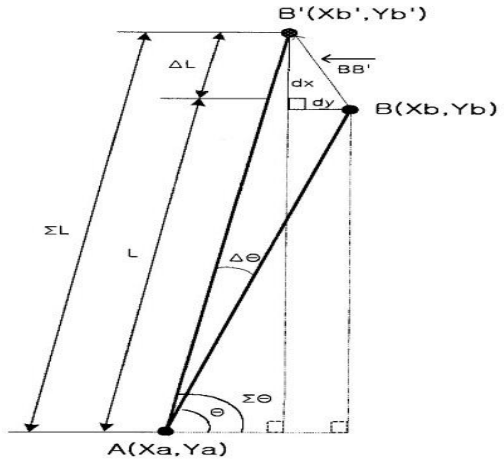
⇒ *Possible to calculate 2D tunnel deformation with 2D vector diagrams*

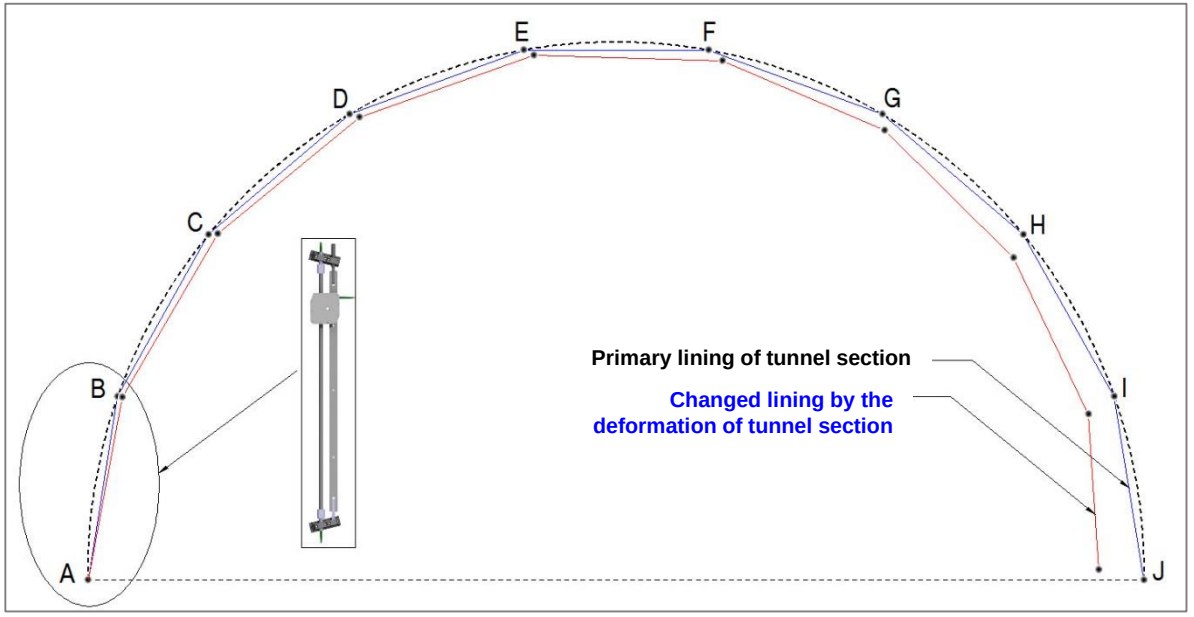


4.11 FBG Extensometer - Designation of Excellent R&D Revolutionary Product

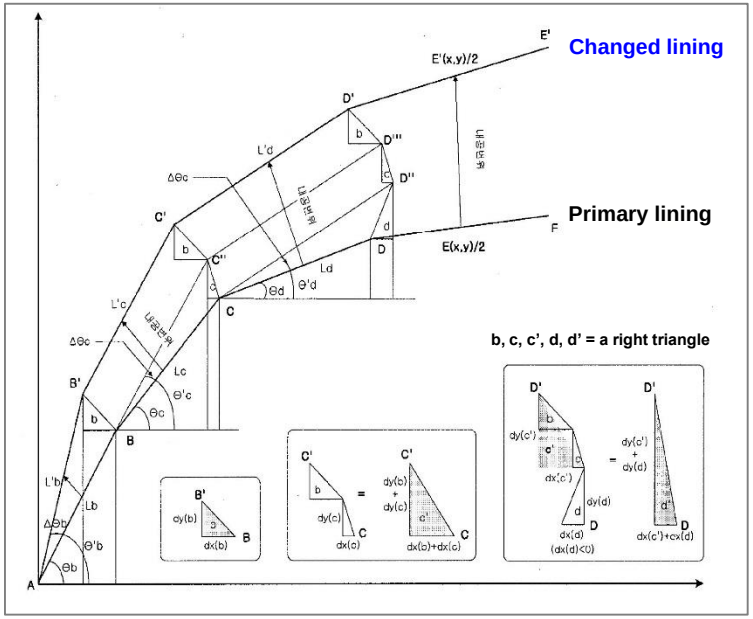






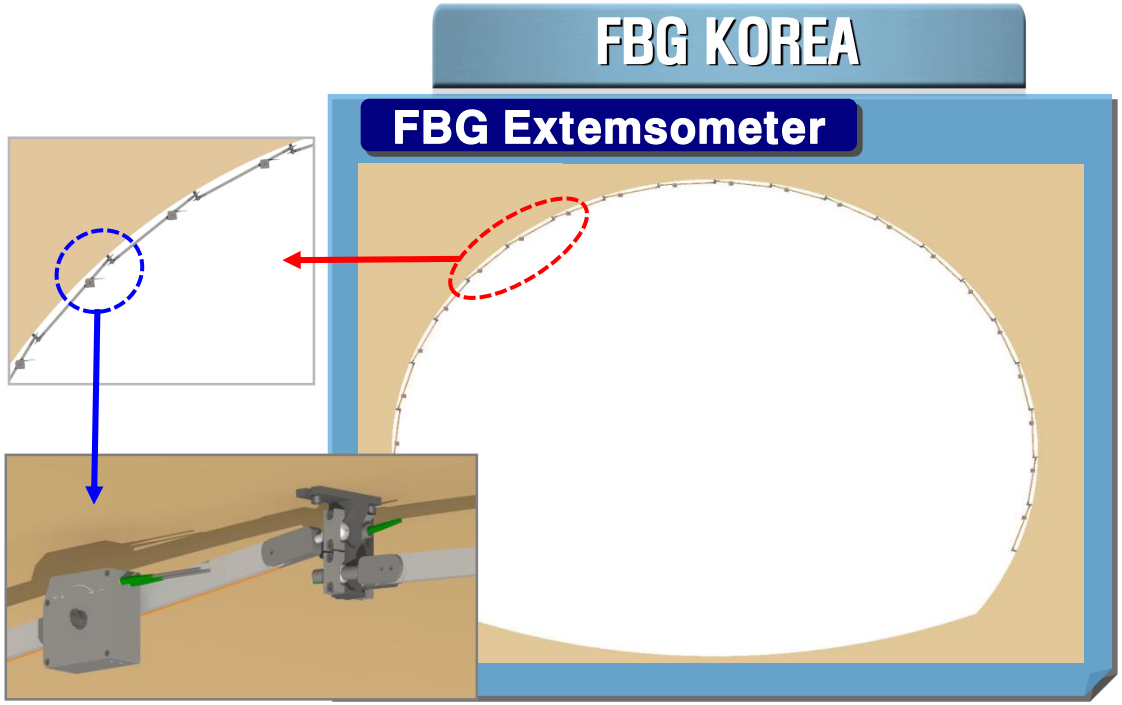


< 2D principle diagram for tunnel deformation by FBG KOREA's patent (no. 0796161)>



< Principle based on the combination of vector diagrams >

4.11 FBG Extensometer



Temperature Property	Small coefficient of thermal expansion by temperature (1/20 of Steel)	Large coefficient of thermal expansion by temperature change of stainless steel covering sensors for length measurement → Low reliability of measurement
Electromagnetic Wave	None	Causing serious electromagnetic wave interference when electric vehicles are working
System	Only One System	Need each cable for all sensors → Complicated system
Performance	Resistant to corrosion → Low maintenance expenses	Easy to be corroded by moisture → High maintenance expenses
Power supply	Available at broad area of several dozens of kilometers	Necessarily located around sensors