

FOS4R is a nonprofit association composed of technology suppliers, rail infrastructure companies and scientific institutions which aim at enabling Fiber Optic Sensing to become a beneficial operating technology for railways.

The railway market records constant growth due to the need for ecologically viable public and freight transportation that is capable of handling the evermore demand for higher capacities. This trend consequently formulates challenging requirements for the railway sector. Higher velocities, shorter signal headways as well as higher reliability need to be obtained to meet the required capacity, while still considering the demand for increased comfort. Digitization and automation are meant to be promising means to oppose these challenges and we are convinced that Fiber Optic Sensing can be an essential part of this challenging endeavor.

There are two main areas to focus on when increasing a railway's maturity in digitization and automation: Applicable and reliable real-time information as well as security.

Information about the current condition of rolling stock and infrastructure as well as the location of every train at every time supports predictive maintenance, efficient use of dispositional slack and automated operations. Predictive maintenance reduces costs, decreases idle times and ensures high reliability by keeping track of the deterioration of technical parts as well as their economically best moment for maintenance or replacement.

Security is also a hot topic in digitization and automation. Considering every possible disruption of the train route, the knowledge of a hostile intrusion and where exactly it took place is essential to quickly return to a good state.

For all of these challenges, companies' strategies are currently focusing on Digital Twins, which is a viable way for having an exact digital copy of reality and being able to design the right strategies for it. In this context, the biggest challenge for every company and strategy is the data source. Fiber Optic Sensing can support and deliver these processes and information neutrally and independently from operators with very little initial investment. It uses the existing infrastructure of fiber buried or laid in the cable duct next to almost every track.

Being proven in different countries all over the world, Fiber Optic Sensing is easy to apply, can be constantly improved while in use and creates new fields of applications every single day. And the best thing: The main principle is the same – all over the world – independent from the gauge, voltage or height over sea level.

Almost every rail infrastructure company acknowledges the potential benefit of fiber optics for their daily business. However, installation only pays off with a mixture of valuable applications and successful integration. Evermore suppliers view railways as a strategic industry and come up with high-performing technological solutions. However, resources are limited and transferring rail-specific requirements into operation can be challenging. A lot of fundamental research has been done during the last years. From a scientific point of view, standards do not exist and some important gaps remain. We, as FOS4R, want to support the further development and implementation of FOS to railways by offering a platform where railway undertakers, suppliers and research institutes like universities are brought together and getting connected.

The purpose of FOS4R is to coordinate the development, save development time and cost for everybody and to support common research programs. Furthermore, FOS4R will drive standardization so the customer and the supplier will have solid basis for investment decisions. And last but not least FOS4R will give a forum to share experience, information and will offer consultation to every partner in the society and interested partner.

Fiber Optic Sensing will change the railway world. FOS4R will accelerate the benefit for every member!