

Radiation Resistance of Glass Fiber Optic Cable

Zuzana Konečná¹, Vít Plaček², and Petr Havránek²

¹*CTU in Prague, Technická 2, Praha, Czech Republic*

²*ÚJV Řež, a. s., Hlavní 130, Řež, Husinec, Czech Republic*

The good experience with optical communication and its advantages in industrial applications have led to introduction of optical communication technology into more conservative areas, such as the nuclear and aerospace industries. The number of optical cables in nuclear power plants has been increasing. Fiber optic cables are commonly used at nuclear power plants in I&C systems but they are usually used in mild environments, i.e. without radiation. Nevertheless, currently, the number of applications in harsh environments with radiation is increasing.

One of the most prevalent effects of radiation exposure is an increase of signal attenuation (signal loss). This is a result of fiber darkening due to radiation exposure and it plays a very important role in application of fiber optics in radiation environment. However, after the irradiation, the fiber optics go through a “recovery process” during which the optical properties improve again. As we discovered, this healing process can stop and switch its trend.

Test samples were kindly provided by GOC Co., Ltd (Fiber optic cable manufacturing company, Gwangju, Korea). This work was supported by the Grant Agency of the Czech Technical University in Prague, grant SGS 16/224/OHK3/3T/13. Special thanks to colleagues from VŠB (Technical University of Ostrava, Faculty of Electrical Engineering and Computer Science, Department of Telecommunications), for the initial cooperation and measurement.