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Power over Fiber Optic Cable

Sameer Z. Eskander

Abstract: **Power over fiber (PoF) is a technique that transport energy over fiber optic to power devices at remote sites. To improve the reliability of the supply power system, POF technique can eliminate the energy supplied by coper cable and batteries located at remote sites. POF technique can be integrate with technologies for monitoring, sensing, and for performance of electrical networks.**

Keywords: **Power over fiber (PoF), transport energy, power devices, supply power system, POF technique.**

1. INTRODUCTION

Power over Fiber Optic Cable

Power over Fiber optic cable, also known as POF, is a developing and innovative technology based on the fiber optic cable carrying optical power (Khawaja et al. 2010). As technology continues to advance and develop there is every reason to believe that this may be the next step in power transmission. Taking the time to assess and illustrate the strengths and weaknesses of this approach aids research to find the best path forward.

Power over Fiber technology allows energy contained in an optical cable to be used as an energy source (Jin et al. 2015). This form of innovation holds the potential for powering a wide range of future technology. Using cables and fiber, science creates the opportunity for a device to be remotely powered, in a safe manner, without a physical connection (Melkumov et al. 2017). This allows any device to be separated from the power supply yet still be charged with power. Furthermore, these systems are argued to be able to protect the power supply from voltage surges that may come from lightning or explosives. This argument seems to point out that there is a better security option as these forms of technology continue to advance. With the fiber optic cable being environmentally friendly, the applications in the environment that provide the means to avoid electromagnetic fields are created.

POF was created with the first optical fiber innovations back in the 1970s (Melkumov et al. 2017). This first form of optic link was used in Chicago, in which they operated a sound alert of a telephone. The continuation of this success brought about a further implementation in which a bidirectional speech television communication over the single optical fiber was created and used.

The year 2006 saw the science used for relation to lower power switches or actuators that allowed the assurance of path diversity in delivering upstream data (Khawaja et al. 2010). This development allowed for the provision of battery backup power in times of power outages or surges. This seems to show that as the technology continues to advance and develop there continues to be new and innovative uses for it (Munoz et al. 2010). During 2007 there was a study that combined the radio over fiber, or ROF, and POF as an optically powered radio over fiber remote system (Melkumov et al. 2017). This created new opportunities for a distributed antenna system application, a driving use in the market today. 2015 witnessed the development of a wireless sensor system, based on the POF technology, allowing the industry to realize a flexible distributed sensor process over the middle distance (Melkumov et al. 2017). This system was designed to be used in areas that contained high voltage or strong magnetic fields that may be vulnerable to flames or explosions. The bio directional ROF transmission over the optical feed shows that a bidirectional radio over fiber transmission using the double fiber is possible. Furthermore, these advances have led to further gains in areas including a high-speed optical receiver based on the POF related supply (Melkumov et al. 2017). These advances seem to indicate that this science has every possibility of remaining plausible and needed in this modern era.

Common in a generic form of POF topology is a high-power optical source, HPOS together with the optical reception unit or ORU receiving signals from the sensor unit (Jin et al. 2015). The dual optical fibers then connect the control unit to the remote. Within the remote a converter detects the amount of power transmitted by the HPOS, and then uses the electrical

energy to power up the electronic circuits or sensors that are found in the remote unit. Whilst in many cases these are seen to be safer forms of technology, they have been used in hazardous environments such as oil refineries water reservoirs deep mines, their full potential is yet unknown.

Whilst there is a host of challenges still remaining for the POF system, perhaps among the largest is the ability to transmit high levels of power (Melkumov et al. 2017). This obstacle seems to imply that at the moment there needs to be further innovation in the form of technology that allows for these processes to carry a higher center of power. Currently, the amount of power that a typical POF system can deliver is based on its elements of photovoltaic cells and fibers and the combination of these (Melkumov et al. 2017). Each element is created pursuant to their specifications in order to provide for a working process.

The connection between the remote units and the control units in the system is very similar to a telecommunications link (Melkumov et al. 2017). Built on the back of the telecommunications technology there is a definite link between the POF containing the two fibers and the way that the entire process operates (Jin et al. l2015). However, as in the case of many other evolving technologies the quantity of fibers relates to the specific application and can be a limiting factor. Other forms of topology include a tree format that allows the use of a single control unit among many remote units (Melkumov et al. 2017). This form of innovation allows for a single source to provide power for a number of different sources leading to further applications.

Applications in telecommunications include the area of extenders that aid in the recovery of downstream and upstream signals (Jin et al. 2015). These signals in turn can be used by the splitters and by the elements in any POF to modify its passive characteristics and thereby supply power. This in turn can eliminate batteries that are located at many telecommunications remote sites, thereby improving the reliability and the security of the system. Furthermore, this system can diminish the theft or misuse of the copper cables that have been associated with a telecommunications industry.

Power over Fiber optic cable has a very plausible future in the technology industry. With uses that could include better monitors, better fiber powered cables and transmission lines the improvement of cameras in the non-continuous regions aiding the ability for the transmission of communications, there is a wide range of potential. Power transmissions along these same fiber lines may provide power to long forgotten places. Furthermore, utilities benefit by this technology is just barely known and that area of innovation may lead to further future developments. Each advance can then improve the ongoing service. In every case Power over Fiber optic cable holds the potential to provide what modern technology has not been able to today, leading to the next generation of power supply and transmission across the world.

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