УДК: 621.37

APPLICATION OF OPTICAL FIBER COMMUNICATION SYSTEMS

Potapov A. G., the second year student (5225), Scientific supervisor: Galyautdinova R. M., Candidate of Philological Sciences, Associate Professor A. N. Tupolev Kazan National Research Technical University

Today, optical fiber communication systems have revolutionized the telecommunications industry by providing high-speed and dependable data transmission. This article aims to examine the various applications of optical fiber communication lines and their significant contributions in modern technological advancements.

In recent years, the demand for faster and more efficient communication has led to the widespread adoption of optical fiber communication systems. This technology utilizes thinly strands of glass or plastic, called optical fibers, to convey information in the form of light pulses. These fibers have become the spine of modern communication networks, enabling high-speed data transmission over long distances.

Scope and types of tasks.

1.Telecommunications: One of the primary applications of optical fiber communication systems is in telecommunications. Optical fibers are capable of carrying vast amounts of data over extended distances without loss or degradation. This has resulted in faster internet connections, clearer voice calls, and improved video quality. Fiber optic networks have replaced traditional copper-based systems due to their superior performance and scalability.

2. Data Centers: The exponential growth of data centers necessitates efficient data transmission within and between these facilities. Optical fiber communication lines are fundamental for connecting servers, storage devices, and networking equipment within data centers. The high bandwidth, low latency, and safe transmission provided by fiber optics ensure seamless data exchange and optimal performance of these facilities.

3. Cable Television: Optical fibers are extensively developed in cable television networks due to their skill to convey large amounts of high-quality video and audio signals. Multiple television channels can be simultaneously transmitted through a single optical fiber, allowing cable operators to proposal a wide range of channels to subscribers. Fiber optic cables also allow higher resistance to electromagnetic interference, resulting in clearer signals for viewers.

4. Medical Applications: Optical fiber communication systems have found valuable applications in the medical field. Fiber optic cables are developed in endoscopic imaging, flexible fiberscopes convey high-resolution images interior the

human body for diagnosis and surgical procedures. Additionally, optical fibers enable real-time monitoring of vital signs and alleviate remote telemedicine consultations.

5. Industrial Applications: In various industrial sectors, optical fiber communication lines have proved vital for automation and control purposes. These systems enable dependable and high-speed communication between sensors, machines, and control units in manufacturing plants. By facilitating real-time data transmission, optical fibers enhance the efficiency, productivity, and safety of industrial operations.

Military military heavily 6. and Defense: The sector relies on safe and quick communication Optical systems. fiber communication lines allow highly safe encrypted transmission, making them ideal for military applications. Military organizations extensively fiber optic networks for safe data exchange, real-time battlefield surveillance, and high-capacity communication in remote locations.

7. Future Implications: The applications of optical fiber communication systems are expected to widen further in the coming years. As technological advancements continue, optical fibers will play a crucial role in enabling emerging technologies such as Internet of Things (IoT), 5G wireless networks, and bright city infrastructure. These developments will rely on the quick and dependable data transmission capabilities offered by optical fiber communication lines.

In conclusion, it should be mentioned that the application of optical fiber communication lines has revolutionized various industries by providing high-speed, reliable and safe data transmission capabilities telecommunications to healthcare, optical fibers have become indispensable for modern communication systems., We consider that optical fiber communication systems will play an increasingly significant role in shaping our connected world.

References:

1. E. M. Gryaznova, V. V. Davydov, K. Y. Malanin Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia; Bonch-Bruevich Saint Petersburg State University of Telecommunications, St. Petersburg, Russia.

2. V.A. Lopareva, S.S. Kiseleva, M.M. Shilinb a ITMO University, Saint Petersburg, 197101, Russian Federation b JSC " Concern "Sea Underwater Weapon – Gidropribor", Saint Petersburg, 194044, Russian Federation

3. Liu, C., Deng, L., Liu, D. & Su, L. Modeling of a single multimode fiber imaging system:1607.07905. 2018.

4. Dadamatova, K.T.; Nazarov, A.M.; and Gerasimenko, N. N (2019) "Problems of the efficiency of fiber optic communication lines" Technical science and innovation