

## **FUTURE IN OPTICAL TRANSMISSION SYSTEM**

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**Abstract:** - Broadband network play an important role in fiber optical Communication System low attention and high transmission system for long distance required in telecommunication system.

This paper provides an overview in the field of optical fibre communication and also development in long haul communication system for long distance.

**Introduction:** - In an optical fiber communication system in the form of discrete pulses of light information (signal) is coded. The number of Pluses that can be sent per unit time will determine the information Capacity of the fiber.

To transfer more data through optical fiber over long distances advance technology have done it.

By using wavelength division multiplexing system transmission capacity in optical communication is improved.

New techniques and classes of optical communication network are developed. Like, Code division multiple access.

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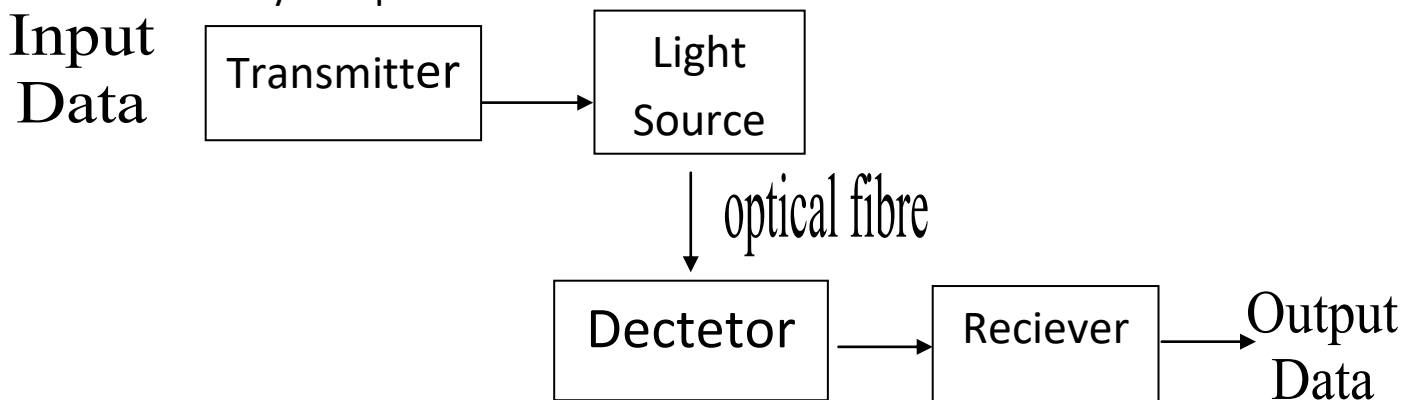
## Fiberoptic Communication

Traditionally, by sending electrical signals through copper cables, coaxial cables or waveguides electronic communication carried out.

In communication technology, fiber optic communication uses light pulses transmit to information (signal) by transducer.

An optical fiber made from low loss silica ( $\text{SiO}_2$ ). It has refractive index of 1.458 at  $\lambda = 850 \text{ nm}$ . If  $\text{SiO}_2$  is doped with Germania ( $\text{GeO}_2$ ) or phosphorous pentoxide ( $\text{P}_2\text{O}_5$ ) the refractive index of material increases. Thus pulses will guide along axis of the optical fiber through total internal reflection.

Through the optical fiber an electrical signal to an optical signal convert by an optical transmitter.

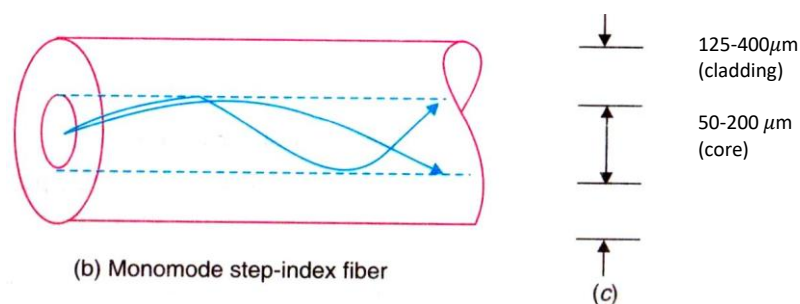
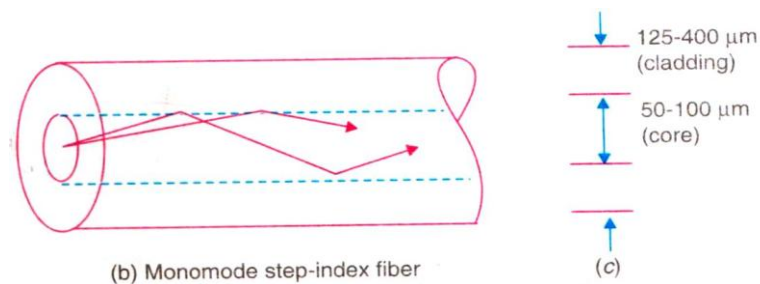
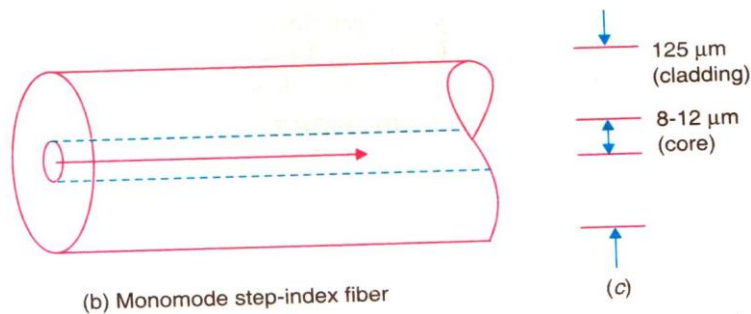


Optical fibres structure are characterize into three types namely

### Single mode step index fibre, Multimode step index fibre and Graded Index Fibre

A singal mode step index fiber has a thin core of diameter  $8 \mu\text{m}$  to  $12 \mu\text{m}$ . It is mode of germanium doped silicon and only allows one light path. A multimode step index is very similar to compare the single mode step fiber but its core is of larger diameter, which is of the order of  $50\mu\text{m}$  to  $100 \mu\text{m}$  allows several light paths. A graded index

fiber is a multimode fiber with a core made up of concentric layers of many refractive indices, thereby allowing all the light rays to reach the receiver and reducing dispersion figure.



### Future of Fiber Optics Communication –

The evolution of optic fiber communication has been derived by development in technology and increased requirement for fiber communication technology.

Below is some of the future in fiber optics communication Technology.

### **Optical Communication Networks –**

Optical communication Networks will make completely in the optical domain, giving ascent to an all optical communication network. In this network whole signals will be processed in optical domain. Optical signal firstly changed in to electrical signal before they can be transformed and routed to their destination and then reconverted in to optical signal which are transmitted through long distances to their destination. An alternate benefit about all optical networks there no need to replace the electronics devices when data increases, since whole signal routing and processing happen in the optical domain.

### **Smart Optical Transmission Network—**

Presently optical networks unable to adjust fast growth of online data services because of flightiness of dynamics allocation of bandwidth, optical networks basically for manual configuration of network connectivity, which will be duration of the time devouring and unabated with completely adjust demand of advanced network.

Smart optical network may be a future done optical network development and will bring application traffic engineering dynamic asset route allocation extraordinary control protocol for network management. Versatile signaling capabilities bandwidth on demand wavelength whole sale many differentiated services quality of services level.

## **Long Haul Optical Transmission in Network –**

In long haul optical transmission network area the limitations imposed because of imperfections in the transmission medium are subject for research, loss dispersion effect has promoted researches to research potential benefits of soliton propagation.

### **Polymer optical fibres**

Polymer optical fibers provide many benefits when analyze to other data communication system for example copper cables, wireless communication system and glass optical fiber. On comparison for glass optical fiber Polymer optical fibers gives a simple and less expensive. Optical signal processing is more flexible for plugs inter connections .The utilization of the polymer optical fibers as the transmission networking for aircrafts is under research by different research and organization due to its benefits. The German Aerospace center have concluded that the use of polymer optical fibers multimedia fibers seem on a chance to be possible for future aircraft application. Additionally, polymer optical fibers will likely dislodge copper cables for the most recent mile connection from the telecommunication companies.

### **Improvement in Optical Transmission Receiver Technology**

Erbium Doped fiber Amplifier (EDFA) is a standout amongst the incredulous technology utilized within optical fiber communication system. Later on exceptional advances to improve of the EDFA performance will be developed. In order to ascend the gain bandwidths of EDFA better gain access technology for improve accuracy optical amplification will be developed.

Also, in order to access a higher output power and lower noise figure pumping lasers of high power within output for more than +20dB and very low noise figure would imagined on exist in near future.

Research is continues how to increase wavelength range in which wave division multiplexing (WDM) systems can operate. Presently range of wavelength Window (C band) is 1.53- 1.57  $\mu\text{m}$ . Dry fiber promises an extension of range 1.30 $\mu\text{m}$ -1.65 $\mu\text{m}$  swchich has low window. Also, developments in optical sifting technology for wave division multiplexing are envisioned in the Future.

### **Conclusion**

The optical fiber communication network is an ever evolving one. The development experienced by researcher has been gigantic this previous decade. There is at present substantially fill in should a chance to be done on help the need for faster data rates. Modern switching techniques also a greater amount shrewdly network architectures that might automatically transform dynamically in response to traffic patterns and to be cost efficient at the same time.

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