

Optical fibres essay sample



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Originally, a device known as the ‘ photophone’ was used to transmit sound. This replaced Thomas . A. Edison’s ‘ phonograph. Since the development of optical fibres ‘ photo phones’ and ‘ phonographs’ are no longer used or needed.

Optical fibres have many advantages; they enable the sound messages to carry for 50km without any need for a repeater unlike other optical communication systems, which need repeaters at 1km intervals.

Optical fibres have replaced other methods of communication for many reasons, some listed below.

*Capacity

Optical fibres can carry signals with much less energy than copper cable and with a much higher bandwidth. This means that fibres can carry more channels of information over longer distances with fewer repeaters required.

*Size and weight

Optical fibre cables are much lighter and thinner than copper cables with the same bandwidth. This means that much less space is requires in underground cabling ducts. Also they are easier for installation engineers to handle.

*Security

Optical fibres are much more difficult to tap information from undetected; a great advantage for banks and security installations. They are immune to Electromagnetic interference from radio signals, car ignition systems,

lighting etc. They can be routed safely through explosive or flammable atmosphere for example, in the petrochemical industries or munitions sites, without any risk of ignition.

*Running Costs

The main consideration in choosing fibre when installing domestic TV networks is the electrical bill. Although copper coaxial cable can handle the bandwidth requirement over short distances of a housing scheme, a copper system consumes far more electrical power than fibre, simply to carry the signals.

The signals sent and received are coded voice messages and computer data.

Optical fibres use light to carry information between two different sources. This system works on two key optical properties: Total internal reflection and refraction.

Optical fibres are used to carry the electric signal created and received by telephones. The use of optical fibres has improved the quality of the messages we hear.

When a light wave passes from one density of medium to another, its speed may change. When the speed of the light wave changes speed, it causes the wave to also change direction. If a medium is dense it causes the light wave to bend toward the normal. In optical fibres, light rays are refracted so that when they hit the boundary between different optical densities, the light is at a certain angle, causing total internal reflection. This angle means that light

rays cannot leave the medium so they are reflected back into the optical fibres.

The density of the optical fibres is thick so not much of the light information escapes the fibres. Therefore, the light rays are guided down the fibre reflecting off each off the walls.

The idea of using light to relay messages is not a new one. It has been used since the early 1960's.

Because the electrical information is carried by light, it can be exchanged from one place to another very quickly (199, 861, 639 m/sec).

Optical fibres are used throughout the world, in telephones, cable TV, security systems, computers and other communication devices. They are particularly useful because computers on the other side of the world can communicate in a matter of seconds.