

USE FIBER OPTICS TO TRANSMISSION CCTV CAMERA VIDEO SIGNAL

The principle reasons for using optical fiber as the transmission media in CCTV applications are:

- **The maintenance of picture quality and control data integrity over extended distances:**

This is the major reason for using fibre optics which have superior signal amplitude loss characteristics than copper cable. Typically co-axial cable attenuation at a signal frequency of 5 MHz can be 20 dB/km. In comparison fiber attenuation is between 0.3 and 3 dB/km meaning that fiber optic transmitter distances of 60 km+ can be achieved, depending on the precise details of the application. In addition this low fibre signal attenuation is achieved over a very wide signal frequency range so that optical fiber can be used for the transmission of multiple video signals over long distances.

- **Immunity to electromagnetic interference:**

Optical fibre transmits signals as light pulses rather than electrical pulses. This light transmission is unaffected by the presence of electro-magnetic fields. As a consequence fiber optic transmission can be used in applications where links are routed near electrical conductors and electrical machines. This includes applications such as railways, tramways, power generation and vehicle manufacture with welding machinery. In addition the fibre cable usually has a metal free construction so that there are no ground loop problems between terminal equipment and the cable will not transmit lightning pulses. This elimination of ground loops makes fibre cable the media of choice for inter building links of whatever distance.

- **Security of Information and Operational Safety:**

Unlike copper cables fiber cables do not radiate any signals as a consequence fiber optical cables are virtually immune from “tapping” and so the signal content is difficult to access for unauthorised parties. As there are no emissions from optical fibre cable there is no risk that a fibre installation will act as a ignition source. This means that fibre can be used in explosive atmospheres such as chemical and petro-chemical sites providing a truly “Intrinsically Safe” transmission path. Note however, that this Intrinsic Safety, would not extend to the electro-optic termination modems which would need to be safety certified and protected the same as any other electrical equipment.

- **Efficient use of duct space :**

Optical fibre itself is very small, each glass fibre being only 0.125mm diameter. Protective sheathing is then applied in stages, depending on the application area, to make up the fibre into a usable cable. Typically resulting cable would have a diameter of 3mm for a single fibre core patchlead or 8mm for a 8 fibre cable suitable for internal or external use. In contrast 75 Ohm CT100 coaxial copper cable has a diameter of 6.5 mm. It can therefore be seen that the small size of fibre cable gives significant savings over copper where installation space is in short supply or where duct space is limited. Along with the small fibre cable size comes a weight saving both of which give savings in storage and transportation costs prior to installation.

- **Multi-channel capability and “Future Proofing”:**

While most CCTV fibers today will be used to transmit one video signal and perhaps a control data signal, the user may wish to upgrade the system to support more camera and control channels. Any glass

optical fiber used today is able to transmit multiple optical channels either by using different optical carrier “colours” i.e. wavelength division multiplexing or by increasing the signal frequency using electrical multiplexing techniques. The transmission media is hence “future proofed” and the link will need only additional fiber optic converter equipment to expand the link capacity.

Source : <http://voscom.wordpress.com/>