

splicing and connection performance essay sample

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Three Factors that Affect Splicing Performance

Attenuation can cause performance issues because of dirty fiber end faces, excessive gaps between fibers or improperly installed connector offsets of fiber cores when mated. The second factor affecting splicing performance is called Angle Acceptance also known as Modal Dispersion. This has to do with a differential delay between the modes, which can cause for a lower bandwidth. The last and final factor is Chromatic dispersion which is the limited bandwidth of certain single mode optical fibers. This has to do with the length of light that is emitted through wave lengths. The best way to avoid these affects is to make sure the ratings match and the splicing is perfect, as well as the end faces meet. Three Intrinsic Factors

The first factor is the Core Diameter Mismatch which has the greatest effect on intrinsic coupling loss than other types of fiber mismatches. Coupling loss from core diameter mismatch results only if the launching fiber has a larger core radius (a) than the receiving fiber (Integrated Publishing, Inc., n. d.). This type of loss is only associated with multimode fibers. To avoid the core diameter mismatch, the integrator should use the same size core diameter and preferably from the same manufacturer. The second factor is the Numerical Aperture (NA) mismatch. This mismatch can occur when the NA of one optical fiber is different from the NA of the other optical fiber. Lastly, in mode field diameter mismatch occurs when there is a difference in the mode field diameters of two single mode optical fibers. To avoid these issues you want to make sure that the mating sleeves are clean and free of dirt. To be clean of any issues use proper cutting equipment for splicing for the appropriate diameters of each end faces match. Three Extrinsic Factors

Fiber End Preparation is an optical fiber-end face. These end faces must be flat, smooth, and perpendicular to the fiber's axis to ensure proper fiber connection. Light is reflected or scattered at the connection interface unless the connecting fiber end faces are properly prepared. The quality of the fiber-end preparation is essential for proper system operation. To avoid this type of loss within a fiber-to-fiber connection the integrator must first begin by removing the fiber buffer and coating material from the end of the optical fiber. Removal of these materials involves the use of mechanical strippers or chemical solvents. The next step involves cleaving the fiber end to produce a smooth, flat fiber-end face.

The score-and-break, or scribe-and-break, method is the basic fiber cleaving technique for preparing optical fibers for coupling. (Integrated Publishing, Inc., 2007) Angular Misalignment occurs when the axes of two connected fibers are no longer parallel. The axes of each fiber intersect at some angle. The use of index matching gel usually increases the fiber's coupling loss sensitivity to angular misalignment. Thus, in reducing the couplings loss from angular momentum, the angle should be less than 1 degree. (Integrated Publishing, Inc., 2007) Lateral Misalignment occurs when the two optical fibers are offset when light from the core of the transmitting fiber enters the cladding of the receiving fiber creating a loss. To avoid these issues make sure the core of the two end faces match perfectly and the core axes are perpendicular to one another.

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