# UNIT : 7 SPLICES, CONNECTORS, COUPLERS, GRATINGS.

An important factor in any fiber optic communication system is the interconnection of fiber with low looses.

A permanent joint formed between two individual optical fiber in the field or factory is known as fiber splice. Fiber splicing is used to establish optical fiber link where smaller fiber length are joined, and there is no requirement for repeated connection and disconnection.

Splices are of two types: Midspan and Pigtail

Midspan : It is the connecting of two optical fiber.

Pigtail : It consist of a fiber that has been factory installed into a connector at one end where as other end is free for splicing a cable.



## TYPES OF SPLICING :

There are two types of splicing:

1. Mechanical splicing
2. Fusion splicing.

Mechanical splicing: During mechanical splicing two pieces of stripped, cleaved and cleaned fiber are inserted into the splicing device where their ends are directed towards each other. They are brought into optical contact and are held by an adhesive or clamp. The quality of splicing depends upon the allingment of fiber, better the fiber alignment, the higher the quality of the splice and less is the connection loss.

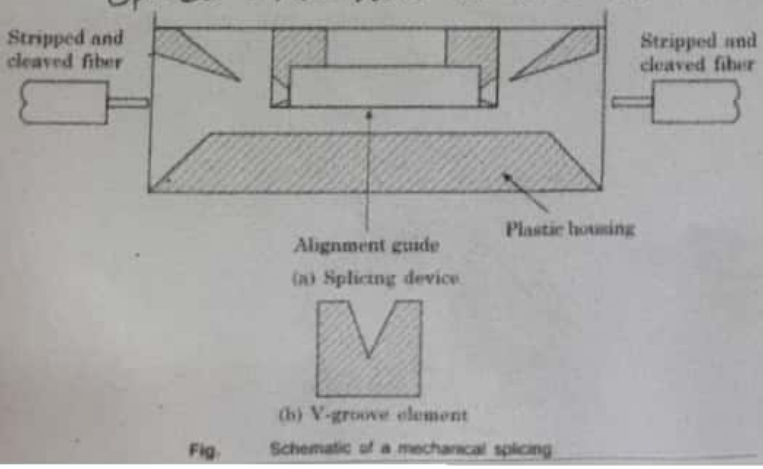


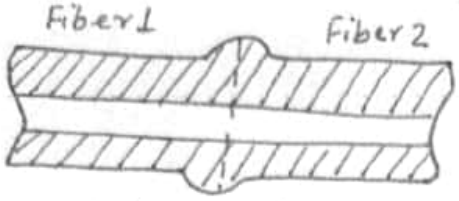

Fig. Schematic of a mechanical splicing

A number of arrangements are used for alignment guides in whic V-groove is the most popular. (Fig.: Mechanical splicing is usually used for quick repair and when only a small number of splices are required. other mechanical splicing do not use any adhesive but instead fix fiber end mechanica

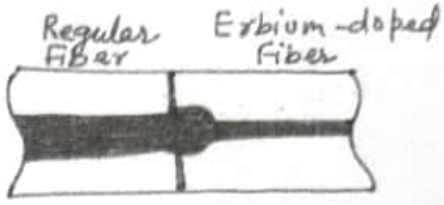
## FUSION SPLICING:

Fusion splicing connects fiber without a gap by melting two fiber ends usually done by use of an electric arc It has no reflection loss, Insertion loss is minimum in the range of 0.01dB to 0.15dB.

Fusion splicing is done by special machines called fusion splicers which is a fully automated machine




a) Regular Fusion splicing.



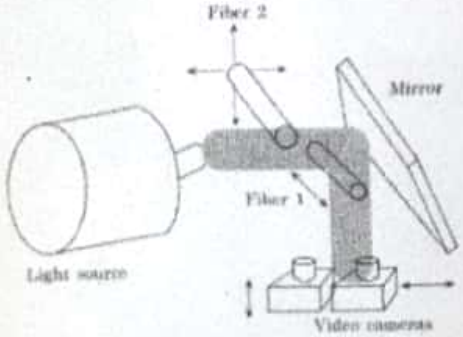

b) Fusing splicing of erbium fiber.

Commercially available fusion splicers can be found with Passive or active fiber alignment. Passive alignment is done mechanically usually with Very Precise V-grooves. They are less costly, easy to operate and less bulky than active alignment splicers.

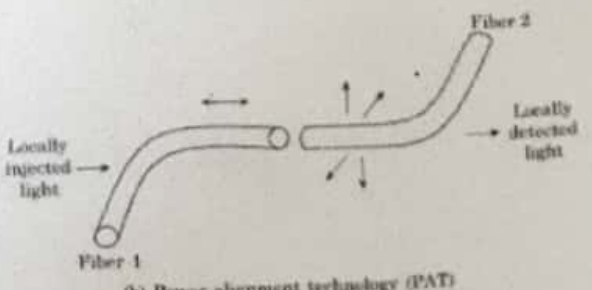
Active-alignment splicers use two technologies to align the fiber for splicing i.e profile alignment system (PAS) and local injection and detection (LID). Power alignment technology (PAT) is the Latest generation of the LID method.

In the PAS system, video camera capture image of the two fiber ends, a microprocessor interprets these pictures and positioners align the fiber under microprocessor control. The goal of a PAS System is to align the core of fiber.

In LID or PAT System, fibers are bent and light is locally injected and detected where the bending occurs. A microprocessor commands the positioners to move the fibers until maximum power transmitted through a connection is attained




(a) Profile alignment system (PAS)




(b) Power alignment technology (PAT)