fibers Reinforced composites

Fiber reinforced composite is the most important composite in which the dispersed phase in the form of fiber such as aramid, natural fibers which embedded in the matrix.

Critical fiber length is necessary for effective strengthening and stiffening of the composite material.

Critical length l_c is dependent on the fiber diameter and ultimate Tensile strength or bond strength to resist load

for

Fibers which fiber length $l >> l_c$ are termed as continuous fiber i.e fiber length is greater than critical fiber length termed as continuous fiber.

for Discontinuous fibers, length of fiber significantly less than critical length

Continuous & aligned fiber composites

the properties of continuous and aligned composites are highly anisotropic, that is they depend on the direction in which they are measured.

The maximum strength is achieved along the direction of fiber alignment is longitudinal

(ii) Discontinuous fiber composites

There are two types of discontinuous fiber
(a) Discontinuous & aligned fiber
(b) Discontinuous & randomly oriented fiber

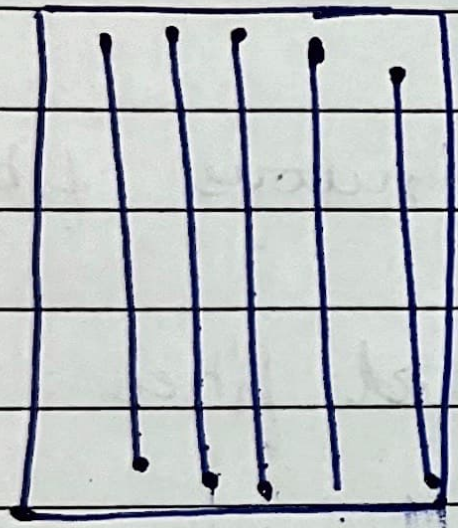
→ The discontinuous fiber have lower reinforcement efficiency than that for continuous fibers.
→ The discontinuous and aligned fiber composites have greater application in the commercial market compared to continuous.

Application of continuous

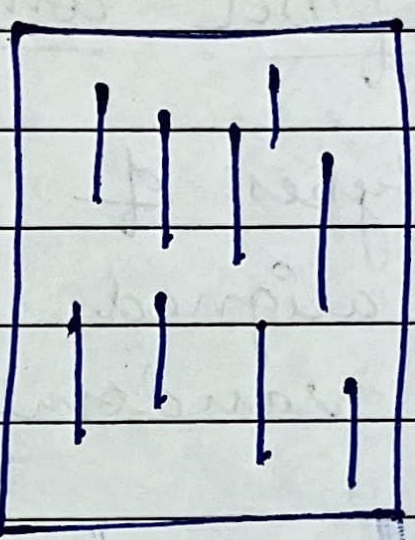
1) Aerospace → used in aircraft structures, such as wings
2) Automotive → applied in high performance components like panels.
3) Sport equipment → found in high-performance sport gear like bicycles, tennis rackets etc.

Application of DC_continuous.

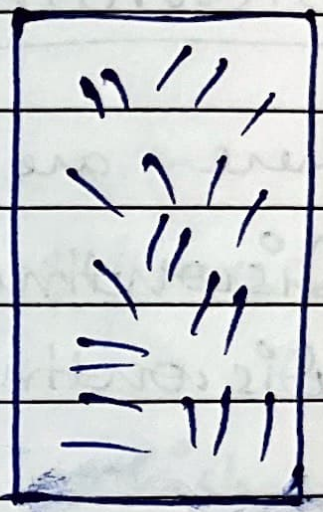
1 Construction → used in concrete and asphalt to improve strength and crack resistance.
2) Consumer goods → found in products like reinforced plastics and synthetic fibers in textiles.
3) Automotive → In interior components where cost & ease of manufacturing are important.



Continuous (aligned) fiber



Discontinuous (aligned) fibers



Discontinuous Randomly oriented fibers.