***Assignment***

# What is Filament Winding:-

• o Filament winding is the process of winding fiber material and resin around a shape, known as a mandrel, to create composite product. The process of filament winding is typically used to create circular composite products with a hollow core.

# Process:-

* Precision high-speed positioning of continuous fiber in a pre-determined pattern is the basis of the filament winding process .
* There is a mandrel that the fiber and resin wound upon, is cured in room temp or in oven. After cure mandrel is removed leaving a hallow composite structure.

# Tension:-

* fibre tension is critical to the operation of a filament winding machine,
* tension required depends on type of fibre a part diameter D winding pattern
* fibre tension directly affects:
* a fibre volume fraction,
* void content,
* o strength and stiffness of the composite part.

# Materials :-

fiber (in roving form):

* E-glass. S-glass,
* Carbon / Graphite,
* Aramid,
* Borons

# Materials :-

Resins:

* Epoxy
* Vinylester
* Polyester,
* Polyurethane,
* Phenolics,
* Furans,
* Polymidies

# 

**Factors Affecting Properties:-**

* Fabrication variables
* Processing variables
* Winding variables
* Material's variables
* Environmental variables

# Advantage of winding :-

* highly reproducible nature of the process
* continuous fiber over the entire part
* high fiber volume is obtainable
* ability to orient fibers in the load direction (1 00 minimum winding angle)
* fiber and resin used in lowest cost form
* size of component not restricted by oven or autoclave size
* process automation (particularly with high volume) results in cost savings

# Disadvantage of winding :-

* part configuration must facilitate mandrel extraction
* mandrel could be complex and expensive
* inability to wind reverse curvature  inability to easily change fiber path within one layer
* wound external surface may not be satisfactory for some applications

# Application:-

* Storage tank o
* Railway tank car
* Pipe
* Aerospace Parts
* Sporting Goods
* Gas Tanks

# Refference:-

* Filament Winding Compositions forFiber/Resin Composites, P. Klemarczyk,1996
* Thermoplastic Filament Winding, Composites Manufacturing, J.Romagna, 1995