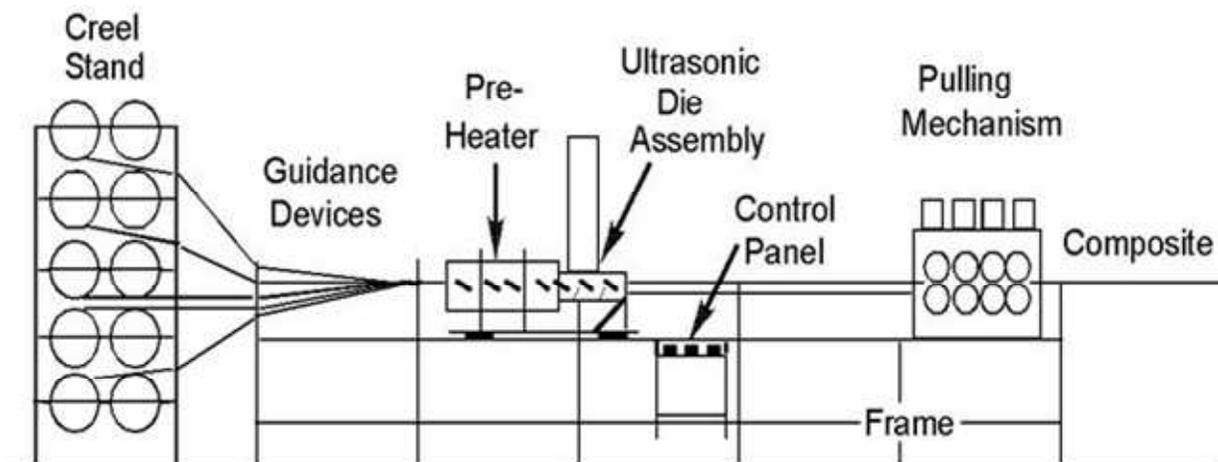


## The Pultrusion Process

FRP can be manufactured in a wide variety of methods. These manufacturing processes are selected as per the requirement of end product. FRP drive shafts are made by filament winding. Sheets can be made by casting etc.

Some of the manufacturing methods are:

1. Contact Moulding
2. Pultrusion
3. Compression Moulding
4. Resin Transfer Moulding
5. Filament Winding
6. Reaction Injection Moulding
7. And various other methods as per desired properties of final products



### Pultrusion:

Pultruded FRP sections are usually made by pultrusion process. This process creates continuous composite profile by pulling raw composites through a heated die. Pultrusion combines words “pull” and “extrusion” where extrusion is pulling of material such as fiberglass and resin, through a shaping die. Many resin types can be used in pultrusion including polyester, polyurethane and vinyl ester epoxy resins etc. Fiber is wetted or impregnated with resin and is organized and then removed of excess resin. After that the composite is passed through a heated steel die. Precisely machined and often chromed, the die is heated to a constant temperature, and may have several zones of temperature through-out its length, which will cure the thermosetting resin. The profile that exits the die is now a cured Pultruded Fiber Reinforced Plastic (FRP) composite. This FRP profile is pinched and pulled by a “gripper” system. At the end of the pultrusion machine there is a cut-off saw. Pultruded profiles are cut to the specific length and stacked for delivery.

## The Pultrusion Process (contd.)

- “Pultrusion” combines words “Pull” and “Extrusion”. Extrusion is pulling of material such as Fiberglass and Resin, through a shaped and heated die.
- Process begins with the Fibers coming from the Rovings
- Then there is wetting by Resins called as Resin Impregnation
- Impregnated Fibers and Mattings are passed through Preformers and Guidance Devices
- Emerging profile is preheated and passed through heated die
- Through heated dies polymerizing and curing takes place
- Meanwhile pulling of the formed section
- Pultrusion process is automated and **Pultruded FRP** sections of desired length are obtained by cutting at desired length.
- Generally it is produced in sections of various profiles like I, C, H etc. Beams, Angles, Tubes, Hollow Square, solid Rods of various profiles.

### **Pultrusion Advantages:**

1. Increased Strength (fiber processed under tension)
2. High Fiber Content
3. Highly Automated
4. Consistent Quality
5. High Production
6. Low Labor Required
7. Low Cost