Composites

Composite materials consist of different materials which are combined to improve their properties.

They are usually a combination of natural and synthetic materials but fall into three main categories:

- Fibre-based composites
- Particle-based composites
- Sheet-based composites

Fibre-based composites:

Carbon fibre:

Advantages	*Disadvantages*
• Lightweight • High tensile strength • Durable • Corrosion resistant • Good electrical conductor	• Can break/shatter • Relatively expensive

Uses: F1 Cars, Bicycles, Tennis rackets, Carbon fibre

Glass Fibres (GRP):

Advantages	*Disadvantages*
• Good strength to weight ratio • Strong • Corrosion resistant • Durable	• Brittle/can shatter • Not very heat resistant

Uses: Piping, Boat hull, Fighter planes

Particle-based composites:

Concrete:

Advantages	*Disadvantages*
• Good compressive strength • Can be poured • Durable/impact resistance • Excellent fire resistance	• Very poor tensile strength • Energy/water intensive • Expensive • Not environmentally friendly

Uses: Buildings, Roads, Pavements, Foundations, Outdoor furniture

Fibre cement:

Advantages	*Disadvantages*
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Uses:

Sheet-based composites:

Medium density fibreboard (MDF):

Advantages	*Disadvantages*
• Cheap • Finishes well	• Weak • Splinters/cracks easily • Poor woodworking properties

Uses: Furniture, Flooring, Storage units

Hardboard:

Advantages	*Disadvantages*
• Stiff • Resistant to scratches and moisture • Easy to finish with veneers	• Can't be used outside • Not waterproof

Uses: Furniture components, Wall panelling, Door skins

Chipboard:

Advantages	*Disadvantages*
• Cheap • Eco-friendly • Strong • Variety of finishes	• Prone to cracking and splintering • Hard to cut • Adhesive problems under stress cause splintering

Uses: Packaging, Flooring, Furniture

Plywood:

Advantages	*Disadvantages*
• High uniform strength (cross-grain) • Can be easily finished • Less susceptible to moisture damage then MDF • Good availability	• More expensive than MDF • Difficult to cut • Splinters easily

Uses: Construction, Cabinets, General product making