



SNS College of Technology

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COIMBATORE-641 035, TAMIL NADU



Department of Aerospace Engineering

19AST202 AIRCRAFT PRODUCTION TECHNOLOGY

ADDITIVE MANUFACTURING IN AEROSPACE

Additive manufacturing materials

Additive manufacturing, also known as 3D printing, encompasses a variety of materials that can be used to create objects layer by layer. The choice of material depends on the specific requirements of the application, such as strength, flexibility, transparency, or heat resistance. Here are some common types of materials used in additive manufacturing:

Plastics:

Polylactic Acid (PLA): PLA is a biodegradable and environmentally friendly plastic derived from renewable resources like corn starch. It's commonly used for prototypes and consumer products.

Acrylonitrile Butadiene Styrene (ABS): ABS is a tough and impact-resistant thermoplastic. It's used for a wide range of applications, including automotive parts and electronics.

Resins:

Stereolithography (SLA) Resins: SLA uses photopolymer resins that solidify when exposed to ultraviolet light. These resins can produce high-resolution, detailed prints and are commonly used for prototypes and intricate designs.

Digital Light Processing (DLP) Resins: Similar to SLA, DLP uses liquid resins that cure when exposed to light. It's also known for producing high-resolution prints.

Nylons:

Nylon (Polyamide): Nylon is known for its strength, flexibility, and durability. It's used in applications that require these properties, such as gears, bearings, and functional prototypes.

Metals:

Titanium: Titanium is used in aerospace, medical implants, and high-performance applications due to its strength, low weight, and corrosion resistance.

Stainless Steel: Stainless steel is commonly used for industrial and mechanical components. It's durable and resistant to corrosion.

Metals (Powder Bed Fusion):

Selective Laser Melting (SLM) Materials: Materials like aluminum, titanium, and cobalt-chrome can be used in SLM to produce metal parts with high strength and precision.

Electron Beam Melting (EBM) Materials: Similar to SLM, EBM uses an electron beam to melt metal powders. Common materials include titanium alloys.

Ceramics:

Alumina: Alumina is a ceramic material known for its hardness and electrical insulation properties. It's used in applications requiring wear resistance.

Zirconia: Zirconia is used for dental applications and in situations where a combination of strength and translucency is needed.

Composites:

Carbon Fiber-Reinforced Polymers (CFRP): These composites combine the strength of carbon fiber with the versatility of polymers. They are used in aerospace, automotive, and sporting goods.

Biodegradable Materials:

Polylactic Acid (PLA) and Polyhydroxyalkanoates (PHA): These are biodegradable materials used for environmentally friendly applications.