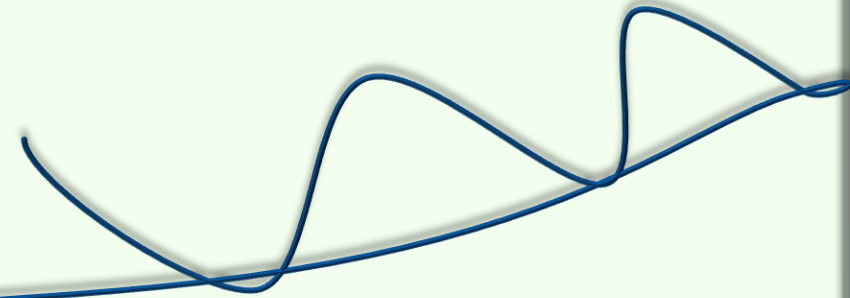


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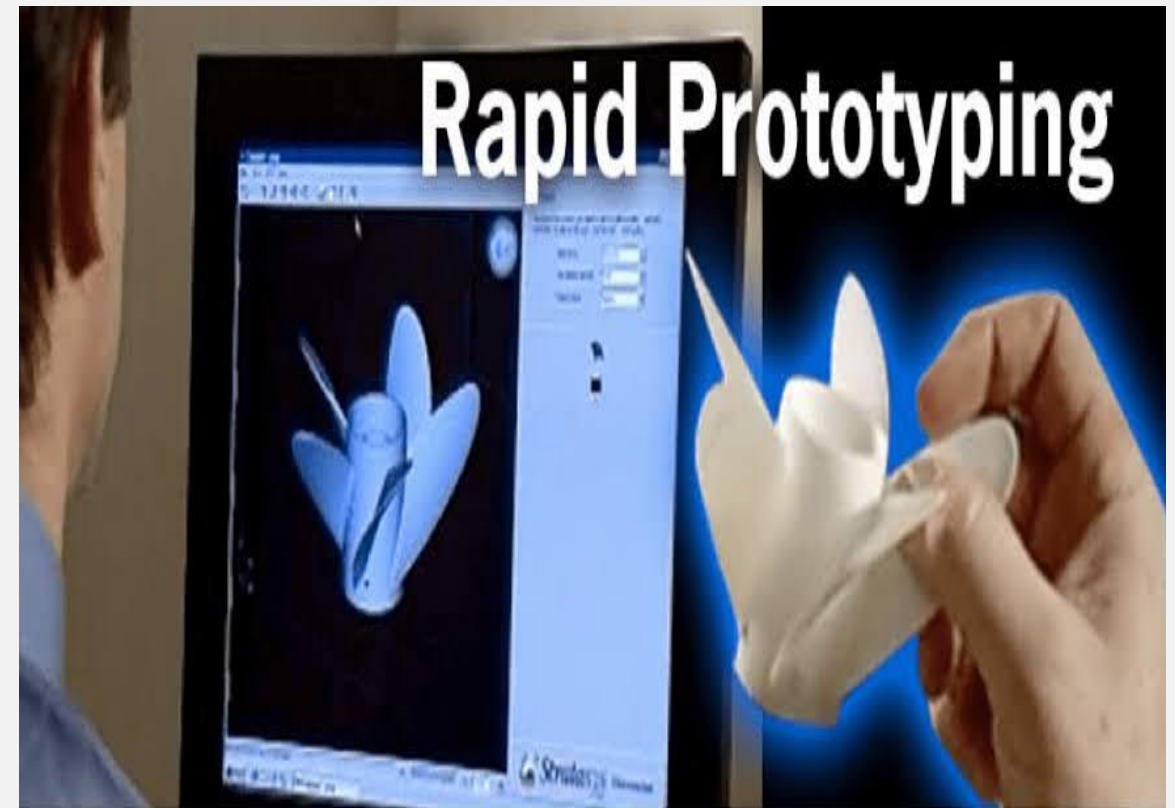


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***Global Engineering Solutions
presents,
introduction to :***

**“RAPID
PROTOTYPING
TECHNOLOGY”**





WHAT IS RAPID PROTOTYPING ?

‘RAPID PROTOTYPING’ is a family of fabrication processes developed to make engineering prototypes in minimum lead time based on a CAD model of the item.

- ❑ Traditional method is **‘Machining’**
 - Can require significant lead-times - several weeks, depending on part complexity and difficulty in ordering materials.
- ❑ RP allows a part to be made in hours or days, given that a computer model of the part has been generated on a CAD system.





RP - Two Basic Categories :

1. **Material removal RP - 'Machining'**, using a dedicated CNC machine that is available to the design department on short notice.

- ▶ Starting material is often wax
 - ▶ Easy to machine
 - ▶ Can be melted and re-solidified
- ▶ The CNC machines are often small - called desktop machining

2. **Material addition RP** - adds layers of material one at a time to build the solid part from bottom to top.



Classification of RP Technologies:

- ✓ There are various ways to classify the RP techniques that have currently been developed
- ✓ The RP classification used here is based on the form of the starting material:

1.Liquid-based (Stereolithography, Solid Ground Curing, Droplet Deposition Manufacturing)

2.Solid-based (Laminated object manufacturing, Fused deposition modeling)

3.Powder-based (Selective Laser Sintering ,Three Dimensional Printing)



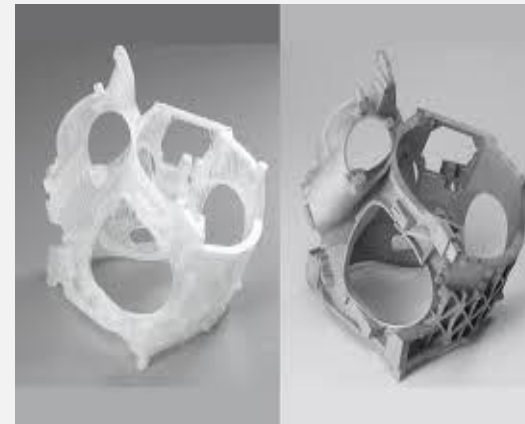
RP Applications :

Applications of rapid prototyping can be classified into three categories:

1. Design
2. Engineering analysis and planning
3. Tooling and manufacturing

DESIGN APPLICATIONS OF RP:

- Designers are able to confirm their design by building a real physical model in minimum time using RP
- Design benefits of RP:
 - ✓ Reduced lead times to produce prototypes
 - ✓ Improved ability to visualize part geometry
 - ✓ Early detection of design errors
 - ✓ Increased capability to compute mass properties .





Problems with Rapid Prototyping:

➤ Part accuracy:

- Staircase appearance for a sloping part surface due to layering
- Shrinkage and distortion of RP parts

➤ Limited variety of materials in RP

- Mechanical performance of the fabricated parts is limited by the materials that must be used in the RP process





Thank you for your attention

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