

WHAT IS RAPID PROTOTYPING(RP) ?

- Prototyping is a typical iterative process in which a serial of products will be designed, constructed and tested to progressively refine the final design.

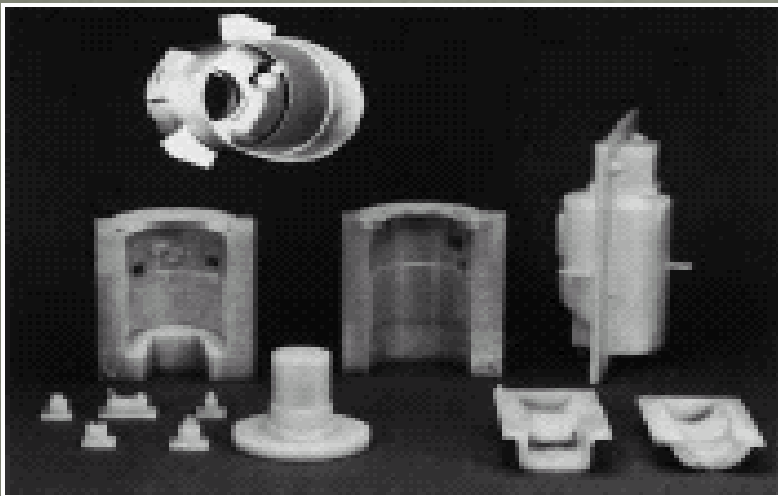


Fig: a) Examples of parts made by rapid prototyping b) Stereolithography model of cellular phone

WHY DO WE USE RP ?

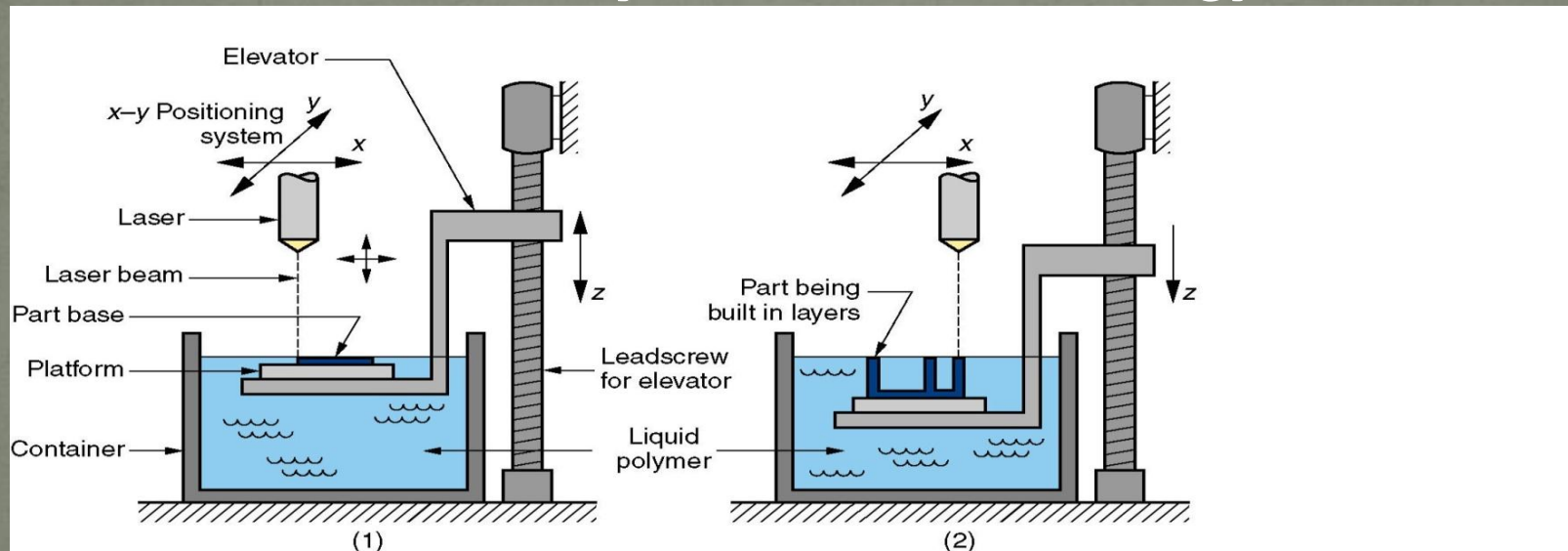
- The obvious benefit of RP is speed.
- RP quickly delivers a better design communication tool.
- The physical prototype quickly and clearly communicates all aspects of the design.
- RP help to the early detection and correction of design flaws.

CLASSIFICATION OF RP

- Rapid prototyping is classified to 3-major groups
 - Subtractive (Removal of material)
 - Additive (Adding of material)
 - Virtual (Advanced computer base visualization)

STEREOLITHOGRAPHY(SLA)

- RP process for fabricating a solid plastic part out of a photosensitive liquid polymer using a directed laser beam to solidify the polymer.
- SLA is the most widely used in RP technology.

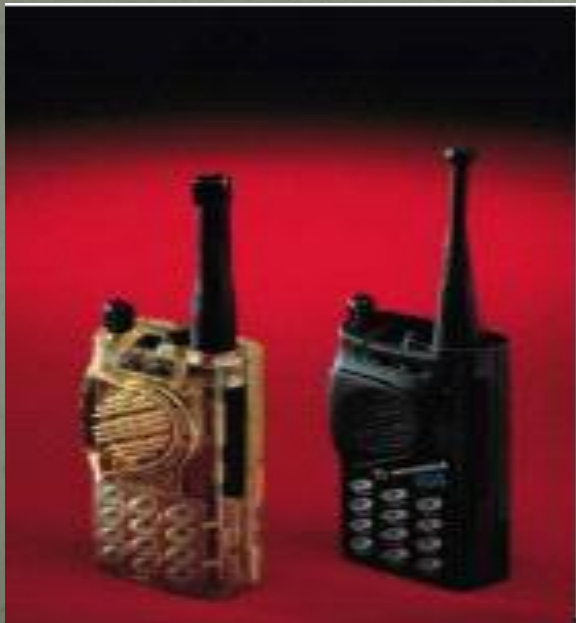


Stereo lithography: (1) at the start of the process, in which the initial layer is added to the platform; and (2) after several layers have been added so that the part geometry gradually takes form.



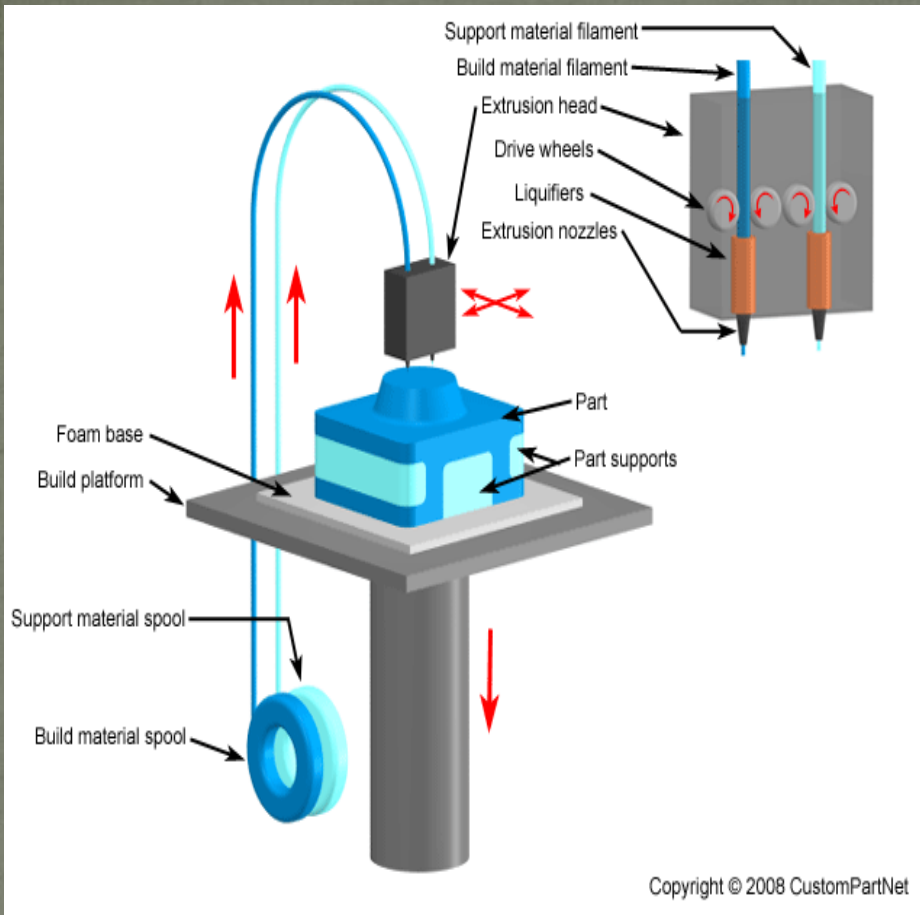
Figure A part produced by stereolithography (photo courtesy of 3D Systems, Inc.).

Stereolithography model of cellular phone



FUSED DEPOSITION MODELING(FDM)

- FDM is the second most widely used RP technology, after stereolithography.
- FDM is fairly fast for small parts on the order few cubic inches.
- Can be used in any office environment without special venting or facility requirements.
- Materials used typically is ABS.
- The materials out of which CDs and CD-ROMs are made.

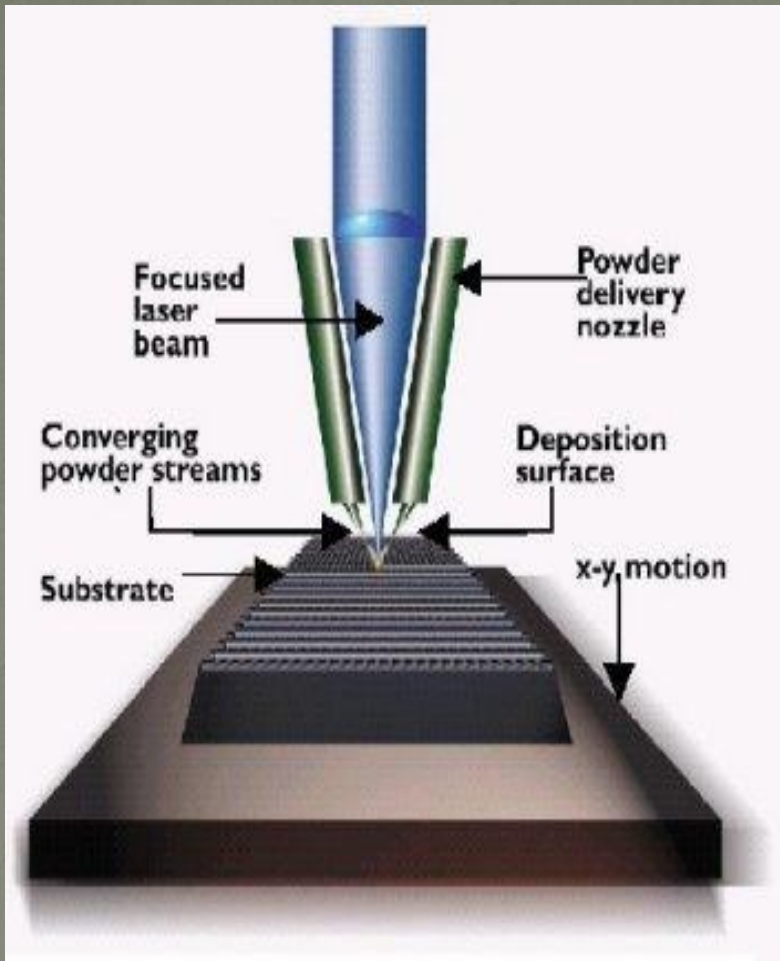


➤ Process of FDM

➤ Machine used in FDM

LASER ENGINEERED NET SHAPING(LENS)

- LENS technologies are in early stages of commercialization.
- A variety of materials can be used such as stainless steel, inconel, copper, aluminum and titanium.
- Objects fabricated are near net shape, but generally will require finish machining.
- Selective Laser Sintering(SLS) is at present the only other commercialized RP process that can produce metal parts directly.
- LENS also be used to repair parts as well as fabricate them.



➤ Process of LENS



➤ Machine used in LENS

ADVANTAGES OF RP

- The Prototype gives the user a fair idea about the final look of the product.
- The user can get a higher output and high quality
- The deficiencies in the earlier prototypes can be detected and rectified in time.
- Rapid prototyping enables development time and costs.
- There are many innovative ways in which Rapid prototyping can be used.
- The speed of system development is increased. It is possible to get immediate feedback from the user.

DISADVANTAGES

- Prototyping tool may influence design
- Prototype can be overworked (reason for prototype is forgotten)
- Possibility of over-promising with prototype

CONCLUSION

- Finally, the rise of rapid prototyping has spurred progress in traditional subtractive methods as well.
- Advances in computerized path planning, numeric control, and machine dynamics are increasing the speed and accuracy of machining.
- Rapid prototyping will not make machining obsolete, but rather complement it.

THANK YOU





QUESTIONS?

