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# Laminated Object Manufacturing

Laminated Object Manufacturing (LOM) is a RP process first developed and commercialized by Helisys Corporation, U.S.A. Lamination means putting down of layers of sheet material which are adhesively bonded to one another. Thickness of sheet can be as thin as 0.05 mm.

## Process Description

The diagram of the process and the machine is shown in Fig. 6.1. LOM builds shapes with layers of plastic or sheets of

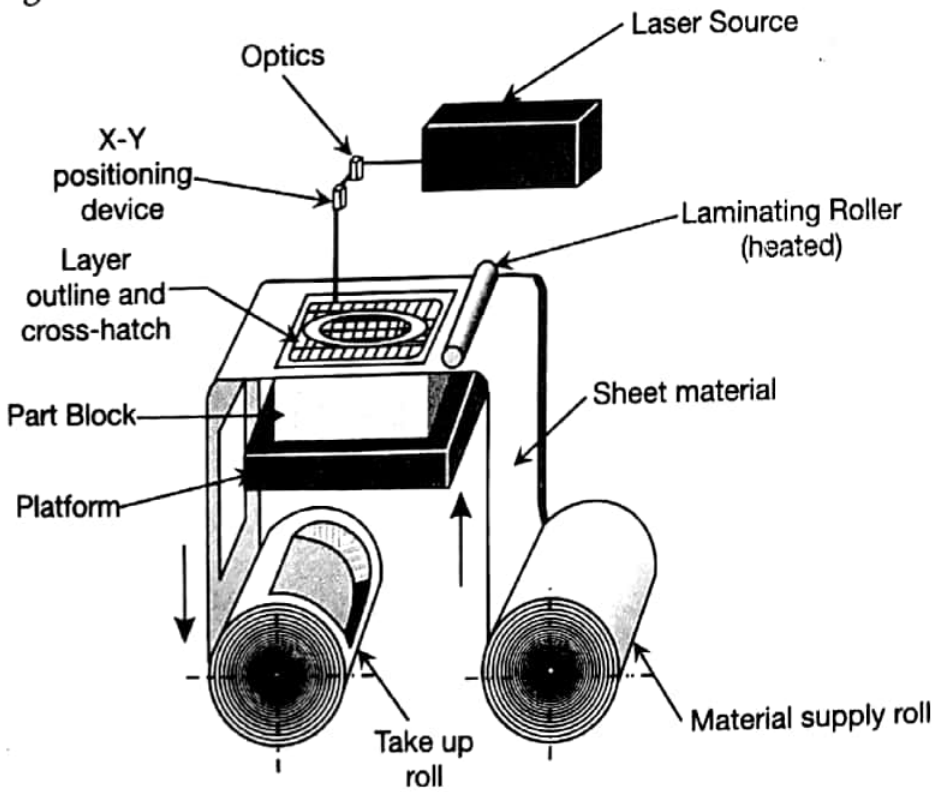


**Fig. 6.1:** Laminated Object Manufacturing (LOM)

ing facilitates removal of this support st
completed.

The laser is used for 5% of the time in cutting the contours of the part, while the remaining 95% of the time is spent in cutting the stock. The removal of the stock is called "decubing" to extract the RP part after building of the part (Fig. 6.2). Depending on the complexity of the shape, decubing may take a few hours.

Optimization of the process parameters will result in less time for cutting and stock removal.

LOM builds up large parts rapidly since only contours are to be scanned and thicknesses of laminates get adhered.

### Advantages

- Only the outline (contour) is cut and no time is spent in building the interior of the layer. Therefore, this process faster.
- The materials used for building the parts (viz. wood and paper) are less expensive among all RP processes.
- Cost of the machine is the lowest.
- No external support structures or post-curing is required.
- It is suitable and economical for making large parts to be used as patterns for sand castings.
- The process can be carried out automatically.
- LOM is also a direct Rapid Tooling process. It has been successfully used in making metallic laminated tools dies for sheet metal forming operations.

### Limitations

- Building and removal of support structure is time consuming.
- Parts are weak along Z-direction (i.e. in thickness direction).
- Paper parts have poor surface finish and absorb moisture.
- The process is not suitable for making small intricate parts. As the stock needs to be chipped out during decubing, it requires a fair amount of skill.
- There is a lot of material wastage.

- Internal cavities are difficult to form, since it is difficult to remove the sacrificial material from the internal regions.

### Tolerances Obtainable

Depending on the thickness of plastic or paper, close tolerances similar to that of SLA and Fused Model Deposition processes can be obtained.

The compressed and adherent layers of paper will have the strength of soft wood. Paper parts are easy to further finish or coating.

### Desk Top Rapid Prototype Machines

These machines (LOM machines) are available in small sizes and these are referred to as Desk Top Rapid Prototyping machines. They use standard sheets for processing into RP parts.

## EVALUATIVE QUESTIONS

1. How will you decide the appropriate orientation to be selected for making a decorative coffee-mug in LOM process?
2. (a) What is the material used to form a prototype in LOM process?

   (b) In what form the material is fed into the system?
3. What is the heat source employed in Laminated Object Manufacturing?
4. What is meant by "decubing" with reference to Laminated Object Manufacturing?
5. What are the advantages of LOM process?
6. What are the limitations (or disadvantages) of LOM process?
7. Which factor(s) influence(s) the tolerance/accuracy obtainable in Laminated Object Manufacturing?