DEPARTMENT OF AEROSPACE ENGINEERING

Laminated Object Manufacturing (LOM): Gluing and Adhesive Bonding

Definition:

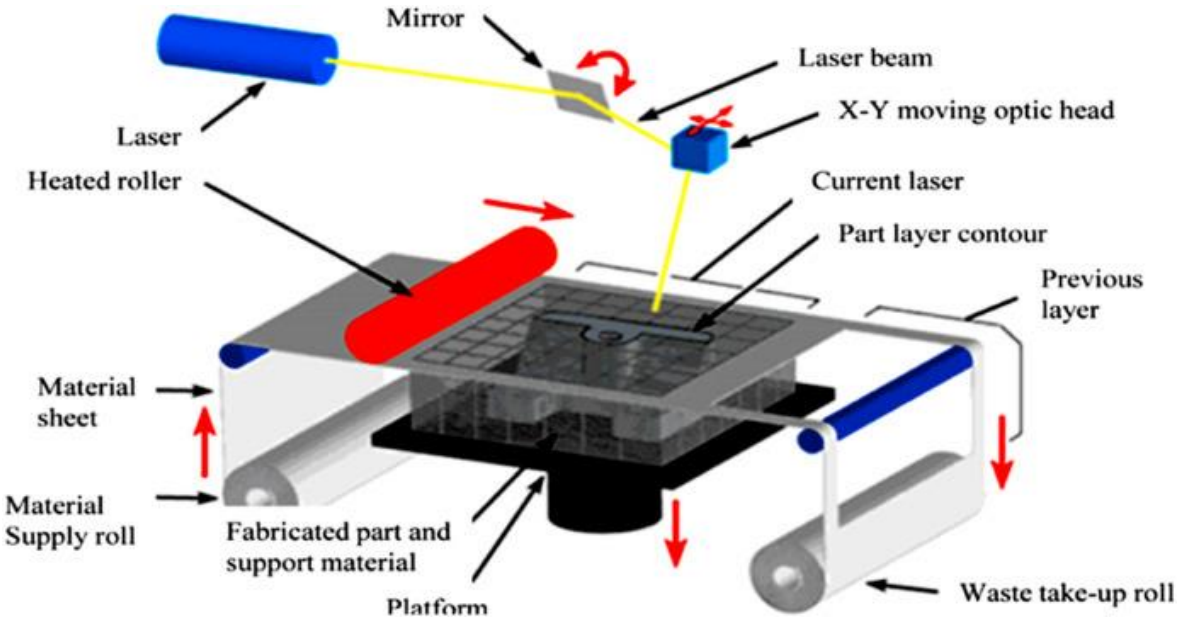
- **Laminated Object Manufacturing (LOM)** is a rapid prototyping process that involves layering sheets of build material (usually paper, plastic, or metal).
- **Bonding Method**: These sheets are bonded together through heat and pressure, creating a 3D object.
- **Additive and Subtractive**: LOM is unique because it combines additive (like 3D printing) and subtractive processes.

How LOM Works:

1. **Continuous Sheet of Material**:
   - An LOM machine uses a continuous sheet of material (e.g., paper, plastic, or metal).
   - The sheet is fed onto the building platform using heated rollers.
2. **Adhesive Application**:
   - Adhesive (usually applied through a nozzle) ensures the layers stick together.
   - Heat and pressure help bond the material sheets.
3. **Layer-by-Layer Carving**:
   - After each layer is rolled onto the platform, a computer-controlled laser or blade carves a 2D pattern into it.
   - The process repeats layer by layer, creating the 3D structure.
   - Excess material is crosshatch-sliced for easier removal later.

Advantages of LOM:

1. **Inexpensive and Accessible**:
   - LOM uses readily available materials (like paper).
   - Machines can operate in non-industrial environments.
2. **Colorization**:
   - LOM parts can be colorized, making it suitable for full-color models (e.g., toys).
3. **No Chemical Reactions**:
   - LOM doesn't involve chemical reactions, so no enclosed chamber is required.



Disadvantages:

1. **Accuracy Limitations**:
    - LOM is less accurate than most 3D printing processes.
    - Internal geometrical limitations may affect complex designs.
2. **Sealing Paper Models**:
    - Paper LOM parts need to be treated with a sealant to keep out moisture.

Applications:

- LOM finds its niche in various areas:
    - **Rapid Prototyping**: Creating visual prototypes for demonstrations.
    - **Architectural Models**: Faster and more accurate than manual model making.
    - **Sand Casting Patterns**: Creating single-use patterns for sand casting.