Project - Fabrication of Hand Injection Mold for Chair Leg Floor Protector.

Objective - To design and fabricate a low-cost, manually operated hand injection mold capable of producing durable plastic floor protectors for chair legs. The project aims to enhance floor safety, reduce noise, and protect surfaces from scratches using precision-molded plastic components

Project Approach - This project involves the design, manufacturing, and testing of a hand injection mold intended for producing chair leg floor protectors. The mold is designed for manual plastic injection molding, allowing for cost-effective, small-scale production of parts using thermoplastics such as polypropylene or polyethylene.

Design Approach:

1. **Requirement Analysis:**
    - Shape and size of the chair leg.
    - Load-bearing capability and fitment accuracy.
    - Material properties for floor protection (durability, flexibility, wear resistance).
2. **3D Modeling:**
    - CAD software (e.g., SolidWorks/AutoCAD) used to model the cavity and core of the mold.
    - Design considerations for shrinkage, draft angles, ejector mechanism, and uniform filling.

3. **Mold Structure:**
    - Two-plate mold system: one cavity and one core plate.
    - Provision for sprue, runner, and gate design.
    - Alignment features like guide pins and bushings to ensure accurate mold closing.

Fabrication Process:

1. **Material Selection:**
    - Mild steel used for mold plates due to machinability and thermal conductivity.
    - Aluminum also considered for inserts due to ease of machining and weight reduction.
2. **Machining Operations:**
    - **Milling:** Used to create the cavity, core profile, and guide slots.
    - **Drilling & Reaming:** For guide pins, sprue bush, and alignment holes.
    - **Turning:** For handles, ejector rods, and cylindrical features.
    - **Surface Grinding:** For ensuring flatness and surface finish of mold faces.
3. **Assembly:**
    - Assembled core and cavity plates with dowel pins and guide bushes.
    - Integrated a manual clamp system to hold plates during injection

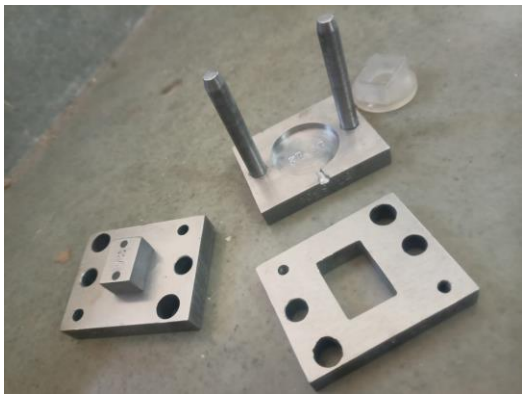
Testing and Quality Control:

- Manual injection of molten plastic (heated separately).
- Parts checked for surface finish, dimensional accuracy, and fit on various chair legs.
- Tolerances verified using Vernier calipers and micrometers.
- Modifications made based on trial results to improve gate design and flow.

Outcomes and Benefits:

- Developed a **low-cost solution** for producing protective chair leg covers.
- Acquired hands-on experience with mold design, machining, and testing.
- Demonstrated importance of **precision in mold fabrication** and **quality control** in injection molding.
- Enhanced understanding of **thermoplastic behavior**, mold cooling, and part ejection.

Images of Final Result:



Glimpse of Final Finished Mold and Product