

Design & Manufacture

Homework 36

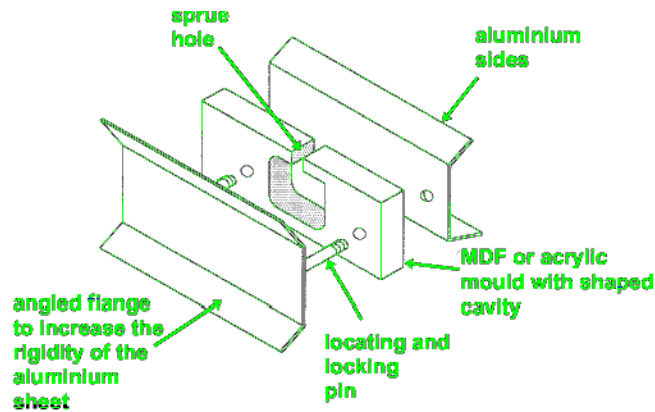
Injection Moulding

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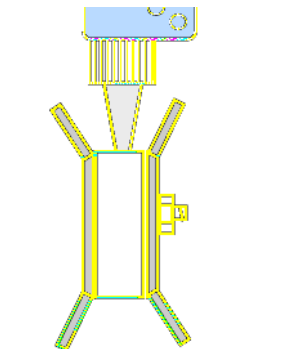
In industry, injection moulding is one of the most common methods of producing products in thermo-plastic plastics. e.g. school chairs, TV cases, toothpaste tube caps etc. Thermoset plastics cannot be injection moulded because any plastic left in the machine would set hard permanently and block the nozzle.

Glue Gun Moulding

In school, simple small injection moulded products such as plastic feet for a jewellery box and knobs for drawers in the box can be made by using coloured glue stick

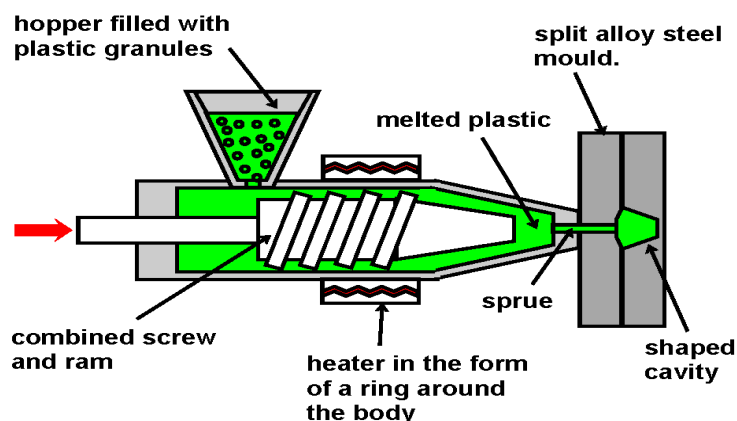


GLUE GUN



Coloured glue sticks can be used to fill the cavity in the mould through the sprue. If MDF is used for the mould the walls of the cavity need to be thickly pencilled over. The graphite in the pencil lead prevents the hardened glue from sticking to the MDF.

Section view of an Injection Moulding machine



1. Plastic granules from the hopper are forced by the combined screw and ram into the heated area.
2. The plastic melts and is then forced under high pressure through the sprue hole into the split mould.
3. The mould is cold and the plastic cools and sets quickly.
4. The mould is opened and the product is ejected.
5. The sprue is cut away. The product is now ready for use.
- 6.

Glass Reinforced Plastics (GRP)

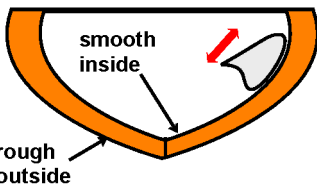
Fibres of glass are mixed with the thermoset plastic called **Polyester**, in liquid (resin) form. The resulting material, after the resin has set, is very tough because any crack that starts in the polyester stops getting longer and larger when it reaches a glass fibre.

Making a model boat hull in GRP (the lay-up process)

Plan view

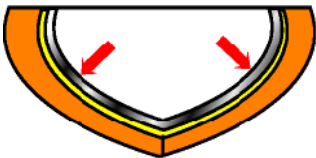
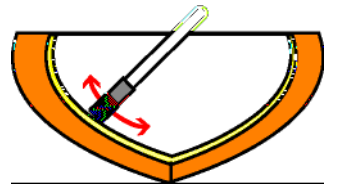


enlarged section view of split mould



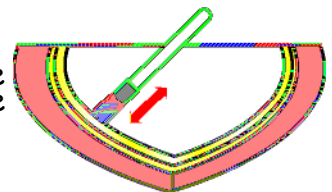
A. A layer of release agent is applied to the inner surface to stop the new GRP from sticking to the mould. The release agent can be in wax form.

B. A thick layer of coloured gellcoat resin is painted over the release agent.



C. A sheet of glassfibre is laid by hand over the dry but sticky gell coat layer.

D. Polyester resin, the same colour as the gellcoat, is stippled onto the glassfibre until it is covered with resin. This is then allowed to set before the hull is taken out of the mould.



Questions

1. How can a glue gun be used to create six identical plastic counters for a board game?

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2. Why cannot thermoset plastics be used in an injection moulding machine?

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3. How does an injection moulding machine work?

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4. Explain the stages used in the lay-up process, when making a product from GRP.

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