



101 Session

Blow Molded Part Design Fundamentals

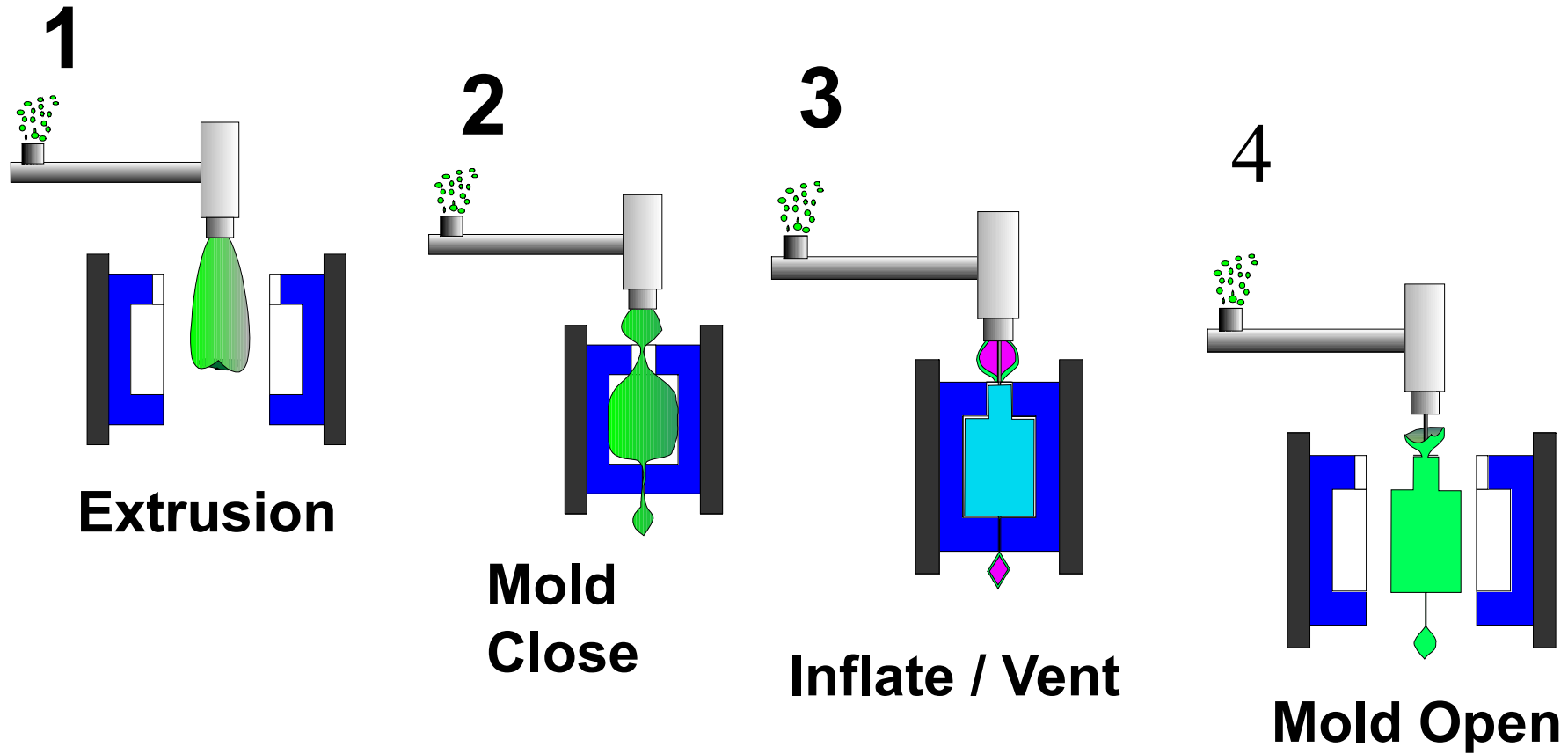
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Blow Mold Design Considerations

- Customer requirements
- Part design
- How best to finish part
- Plastic resin specifications
- Which blow molding process to be used
- Blow molding computer simulation

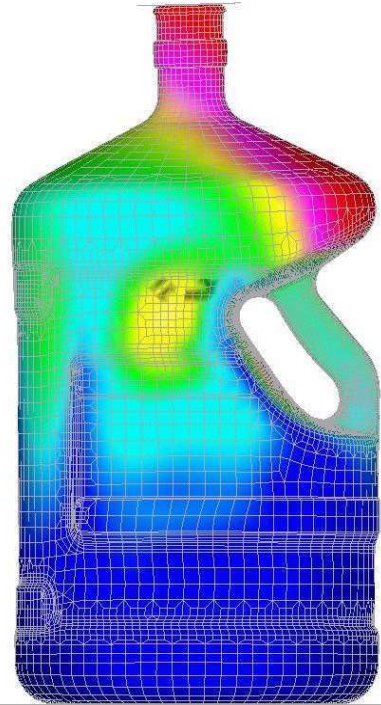
BLOW MOLDING CYCLE





Part Design

Designing parts for the blow molding process requires a thought pattern different from that of injection molding. Designers and engineers must think in terms of hollow, double wall structures. Understanding the advantages of a blow mold configuration and the fit for the process are the first steps to successful part design.



Don't forget about the flash

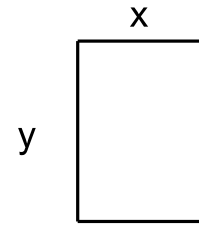
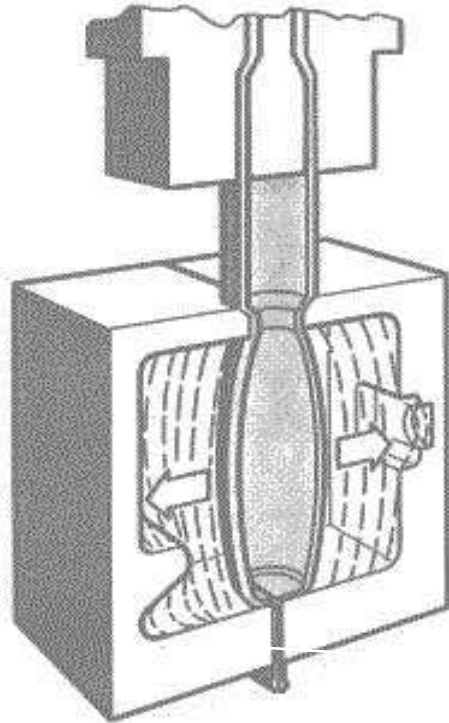




Design/Process Relationship

Blow molding forms parts by blowing a hollow parison outward to conform to the shape of a mold. Inherent in this process is stretching of the thermoplastic resin melt.

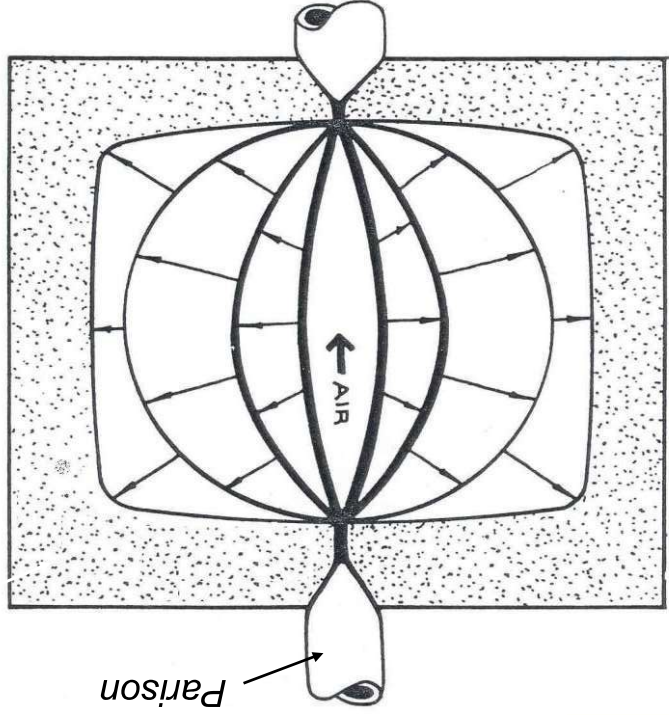
Stretching thins the walls of the melt, thereby thinning the walls of the part. Forcing material to stretch too far may cause rupture.



Typical Blow Ratio:

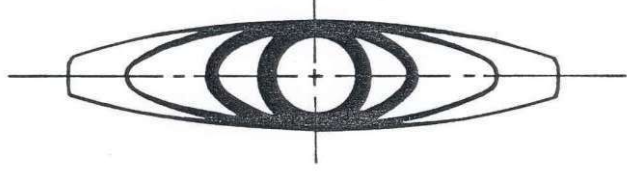
$$x \leq y$$

High stretch area



Mold Cavity

*Material thins out dramatically as it
moves further away from the parting
line*

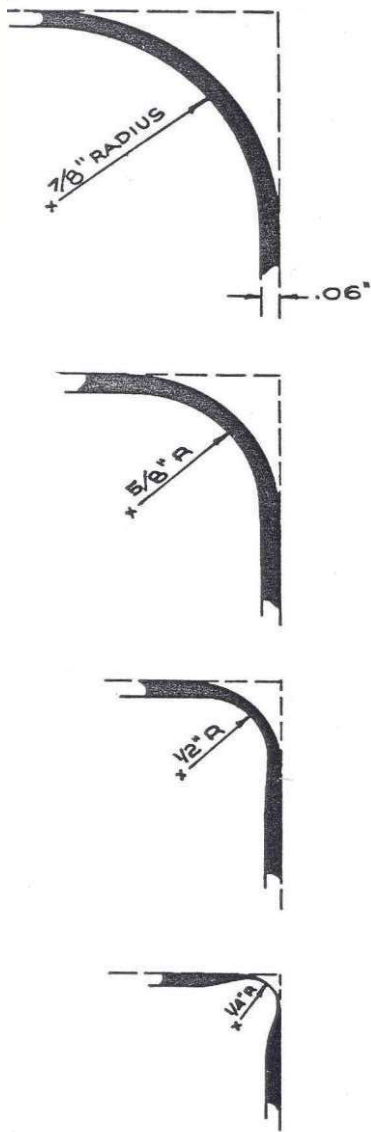


Cross Section



Blow Ratio

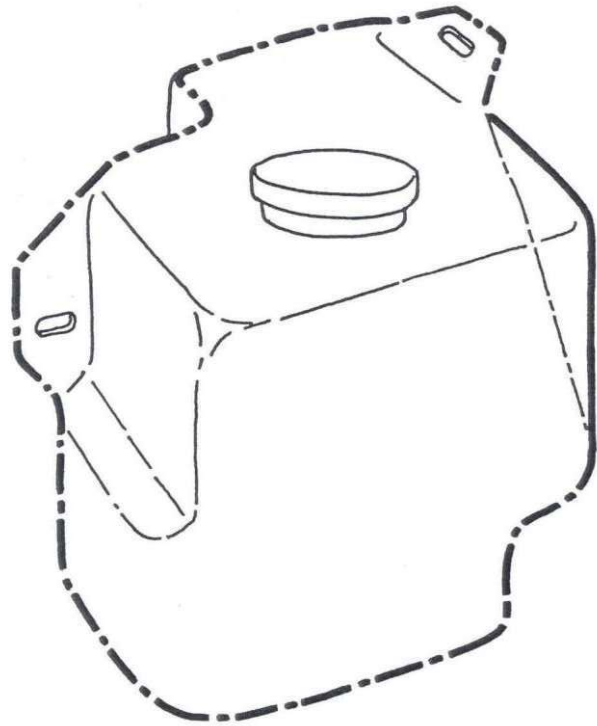




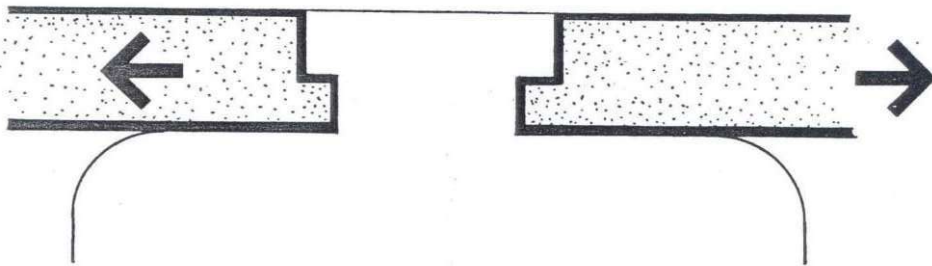
Effects of decreasing the corner radius on constant thickness of material.

Blow Molds





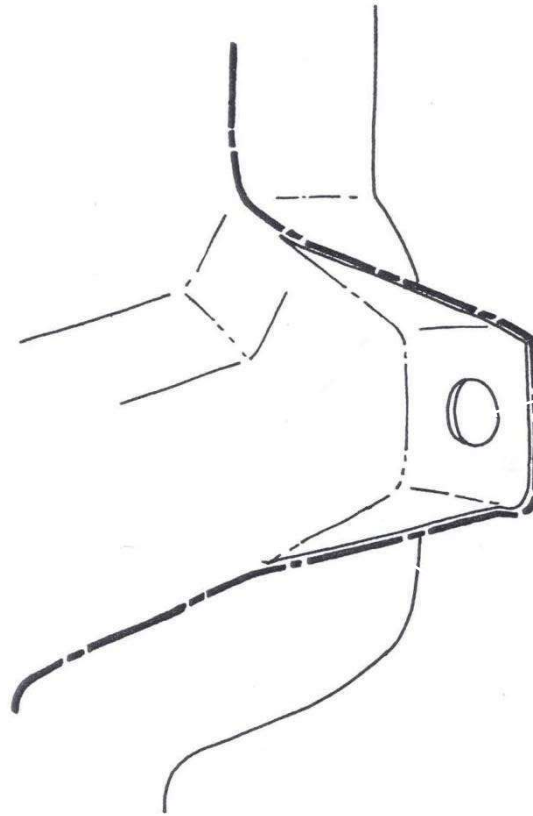
Die Lock Situations



Retracting Slides

Neck Profile

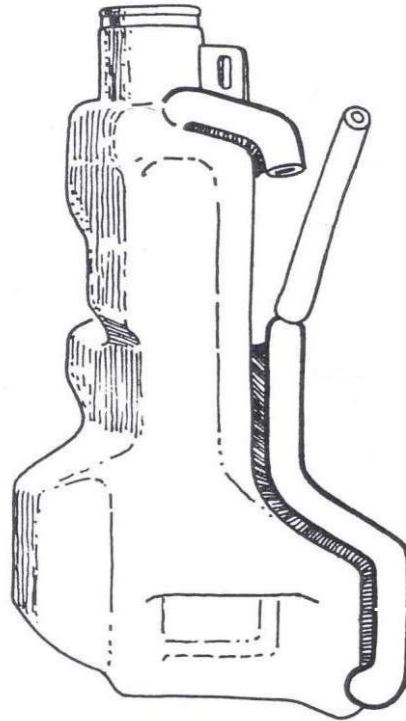
Double Wall Mounting Tabs



Compressed Tab

**Gussets added
for additional
strength**

Molding in Channels

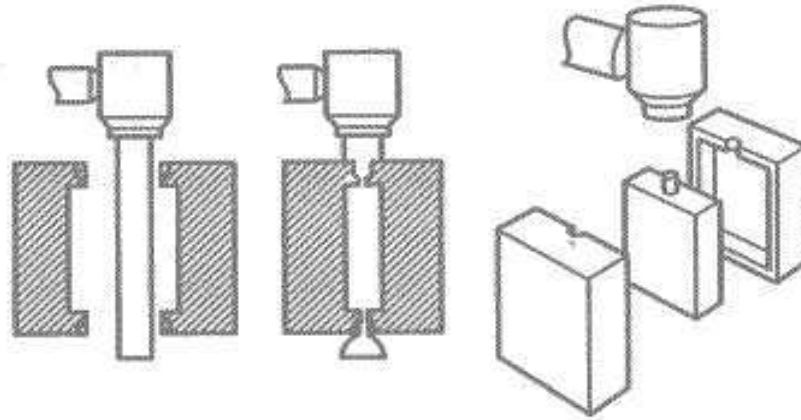


Compressed Double Wall



Cross Section

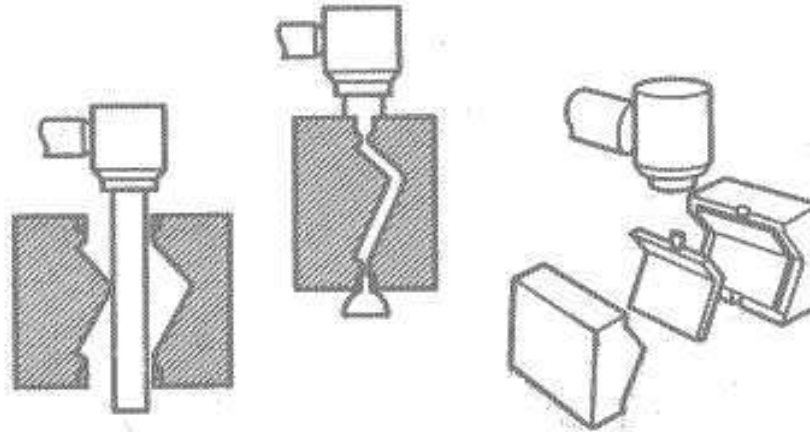
Designing for Basic Shapes



- *part is oriented so that the longest side is parallel to the parison drop*
- *parison is pinched and pre-blown before mold is closed*
- *corners tend to thin the most*

Designing for Basic Shapes

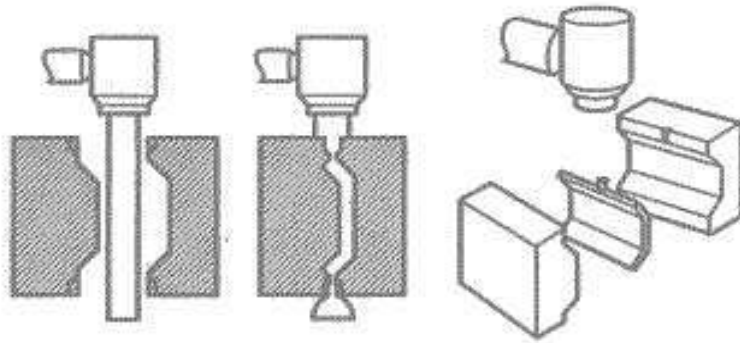
L - Shape:



- *part is oriented at an angle to minimize the amount of stretching*
- *thinning occurs and at angles and corners*
- *some L – Shapes cannot be molded because they require too much stretching*

Designing for Basic Shapes

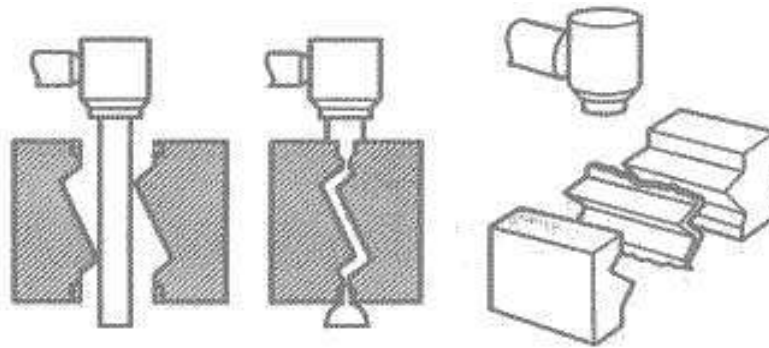
U - Shape:



- *“legs” cannot be too long – material distribution problems*
- *tool balance is critical*

Designing for Basic Shapes

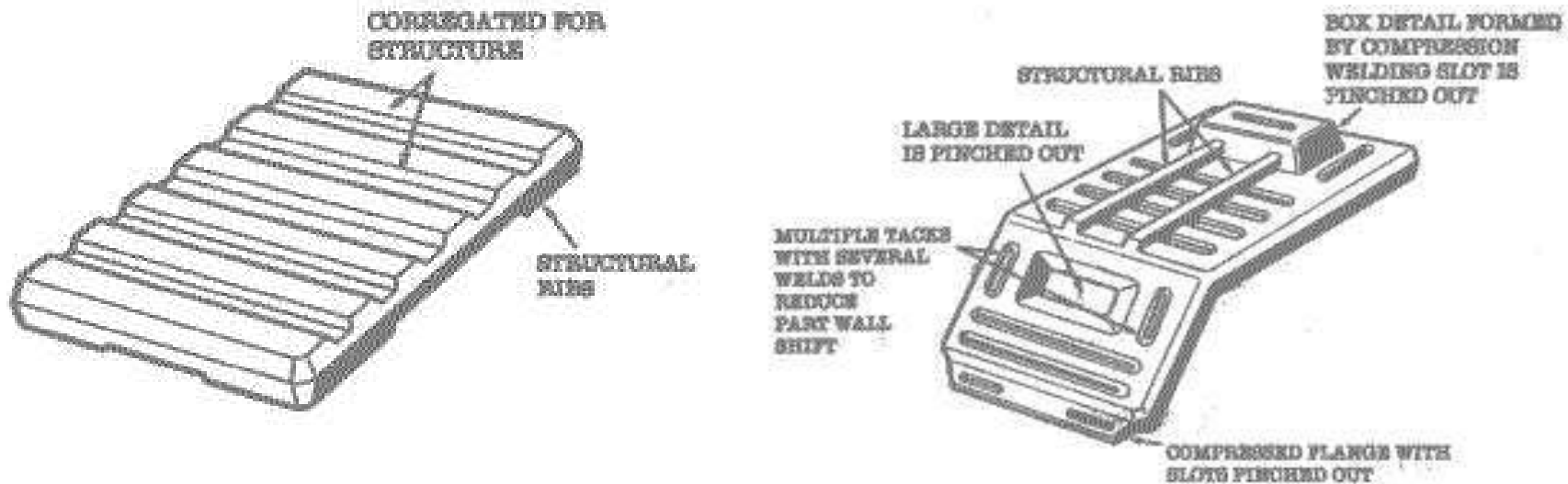
S - Shape:



- *orient to minimize parison travel*
- *material thinning occurs at the edges and corners*

Hollow Shapes

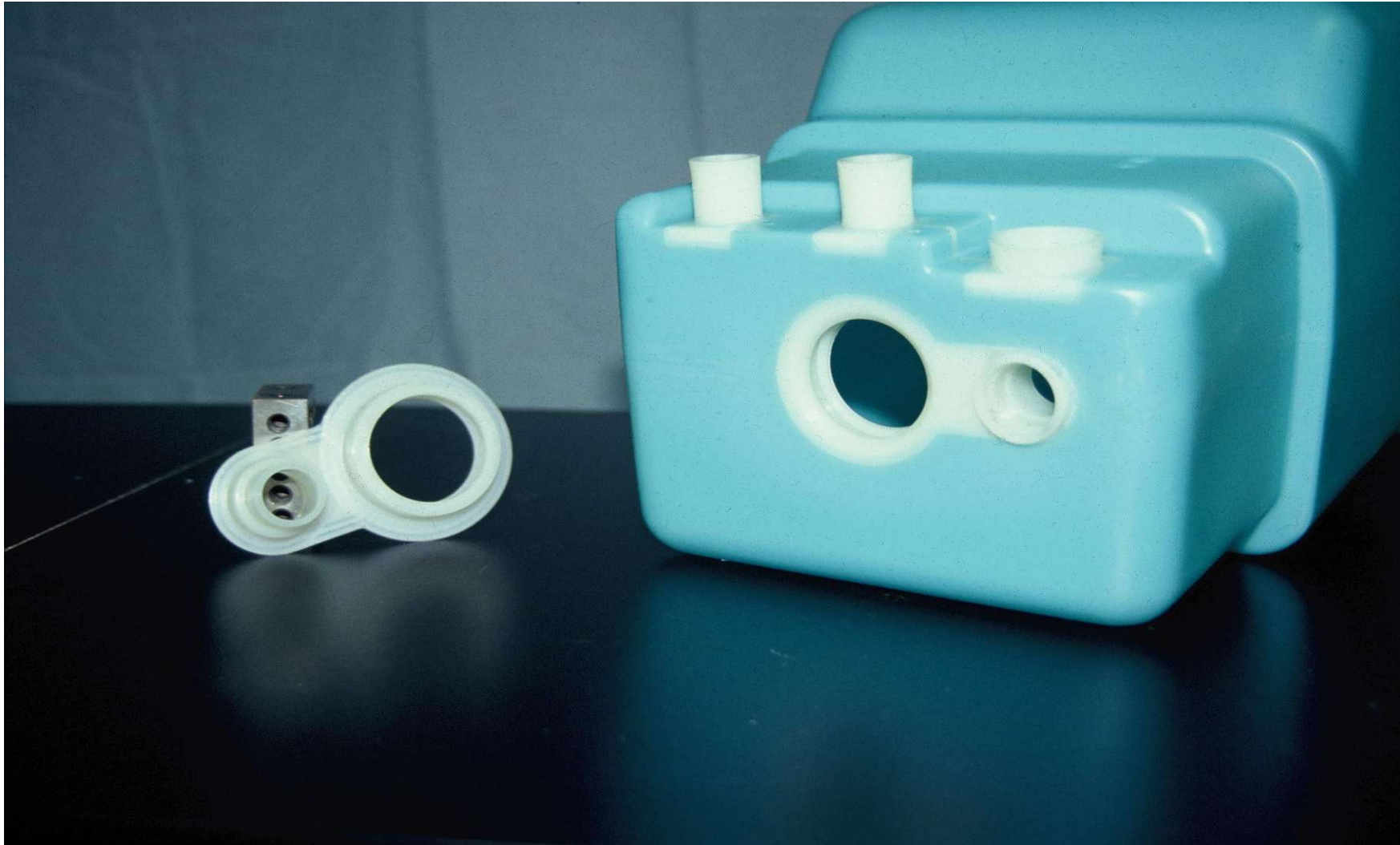
Hollow shapes are inherently stronger because of their structure.



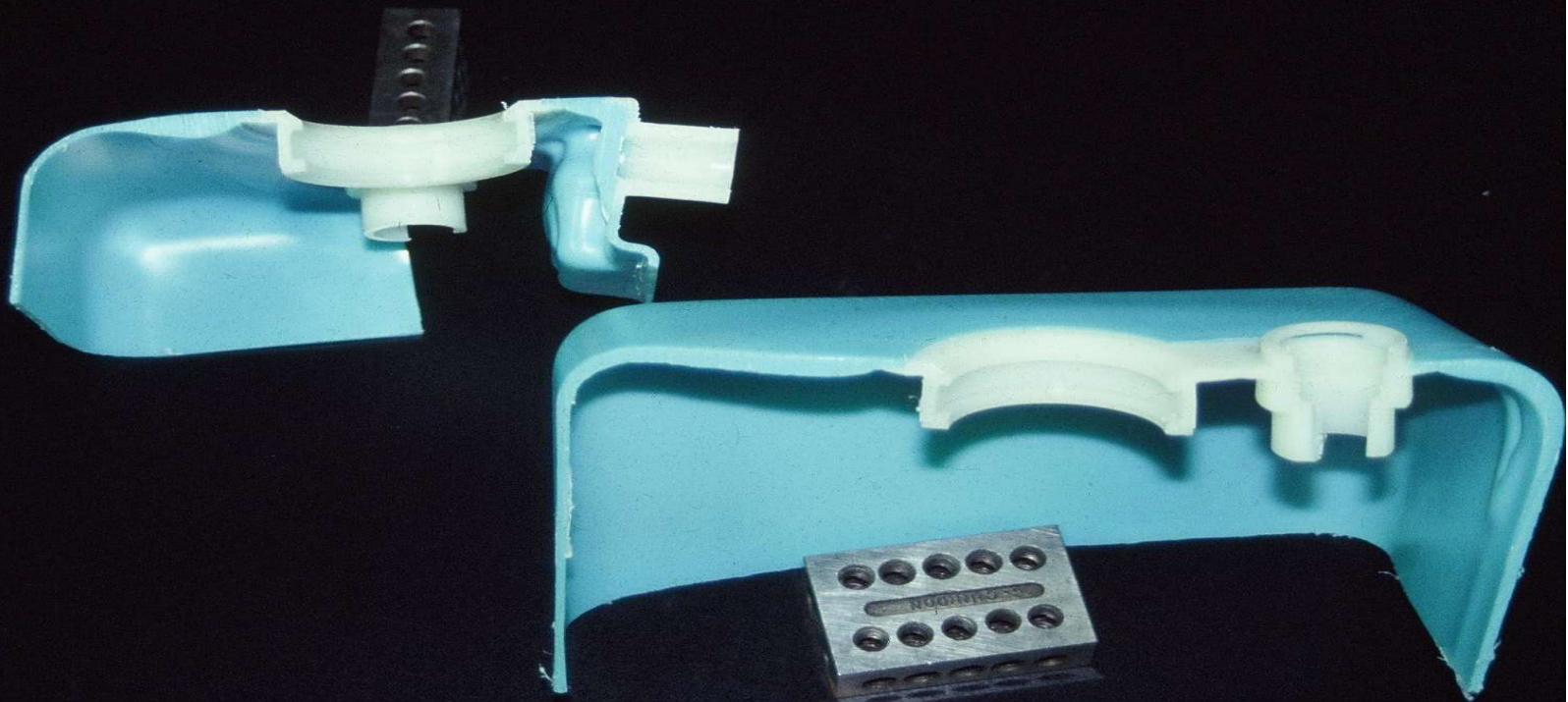
The existing structure can be enhanced without changing material:

- *Increase part wall thickness*
- *Increase section modulus through ribbing*
- *Develop compression tacking details or patterns*

Insert Molding



Cross section for Insert Molding



Injection Blow Molding Examples



Extrusion Blow Molded Examples





Applications-Industrial Packaging



Applications-Transportation





More Applications





Large Parts



10,000 Liter Tank and Blow Molding Machine





Really Large Parts-Septic Tanks



Bob Delong-Division Emeratus



Q & A Session

www.blowmoldingdivision.org