

A SHOP-BUILT VACUUM PRESS FOR FORMING THERMOPLASTIC MOUNTS

For a recent exhibition entitled *"Inside/Out: Revealing Clothing's Hidden Secrets"* we wanted to present the interiors of historic garments, in some cases literally turning them inside out. This would allow visitors and students from our adjacent fashion design program to see and understand the structure and tailoring that was necessary to achieve the look or silhouette that the maker desired. For garments too fragile to invert we wanted to use mounts that would allow visual access to the garment's interiors, while still providing the support necessary to preserve the delicate pieces on display. We chose to fabricate clear mounts, which would allow the viewer to see the normally unseen, and sought a way to easily reproduce multiple forms of the same type/size.

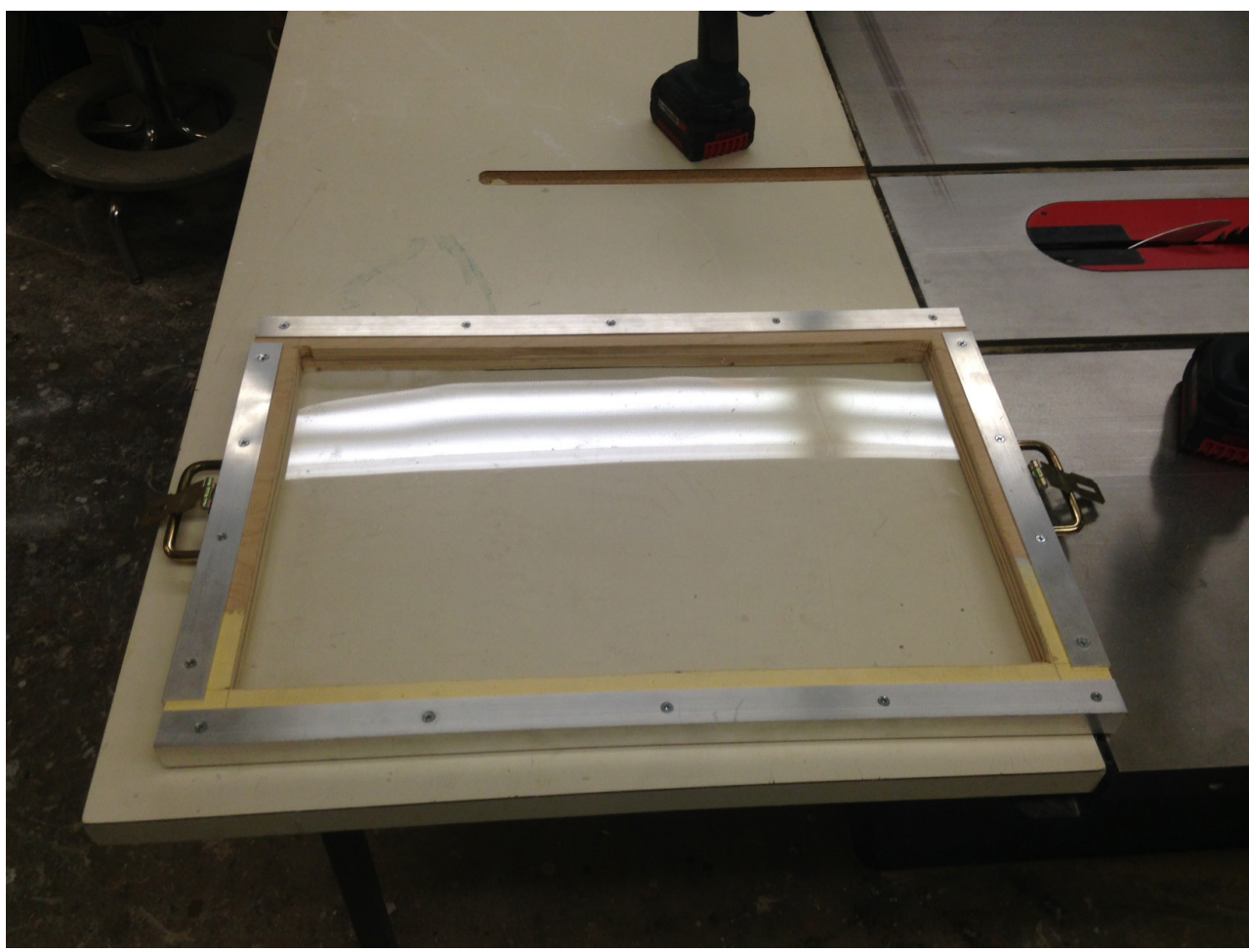
At a previous Mountmakers Forum Paul Singdahlsen had discussed forming torsos from Vivek, or PETG sheet, by using a heat gun, and he got good results making one-of-a-kind mounts in this way. Getting a consistent, duplicate product was important to us, so we wanted a system to manufacture multiples quickly and easily. Vacuum forming is often used in industrial applications to achieve this, but commercial equipment is cost-prohibitive for a small run of items. A quick Google search, however, showed many hobby-scale systems (often used for RC Cars and other models) could be made to work, so we set to work cobbling together a press using easy-to-find equipment and scrap materials.

Central to our unit is an electric infrared heater. IR is useful in this application as the radiation is absorbed by the material, which allows it to soften and stretch evenly, as opposed to using a point-source like a heat gun or torch. It also reduces the risk of fire. We purchased ours at a farm supply store for less than \$75. Using scrap lumber, we created a framework to suspend the heater above the material, and lined a MDF box with aluminum flashing to help reflect the energy toward the material. We support the Vivek within a frame between the IR lamp and the form, which sits on a vacuum platen. A shop-vac provides the suction to mold the heated PETG to the form. Once the material appears to be stretched adequately and is soft enough, the frame is released and drawn down to the platen, where the vacuum does the rest.

This system does not lend itself to very complex forms, especially if there are undercuts. Care must be used to elevate the form enough to ensure that it is fully enveloped by the material, as there is a tendency for it to fan out at the base. We have used 2, 3 and 4 mil thicknesses with success - the more complicated the form, the thinner the material. We've also used this method to slump and form expanded PVC sheet (Sintra, Celtec) and acrylic.



It's not much to look at, but it gets the job done. The IR heater is suspended above the aluminum-lined box, and the Vivek is attached to the box bottom using lock hasps. Once the material is hot and soft, the hasps are released, and the PETG is dropped to the platen, where the vacuum does its job.



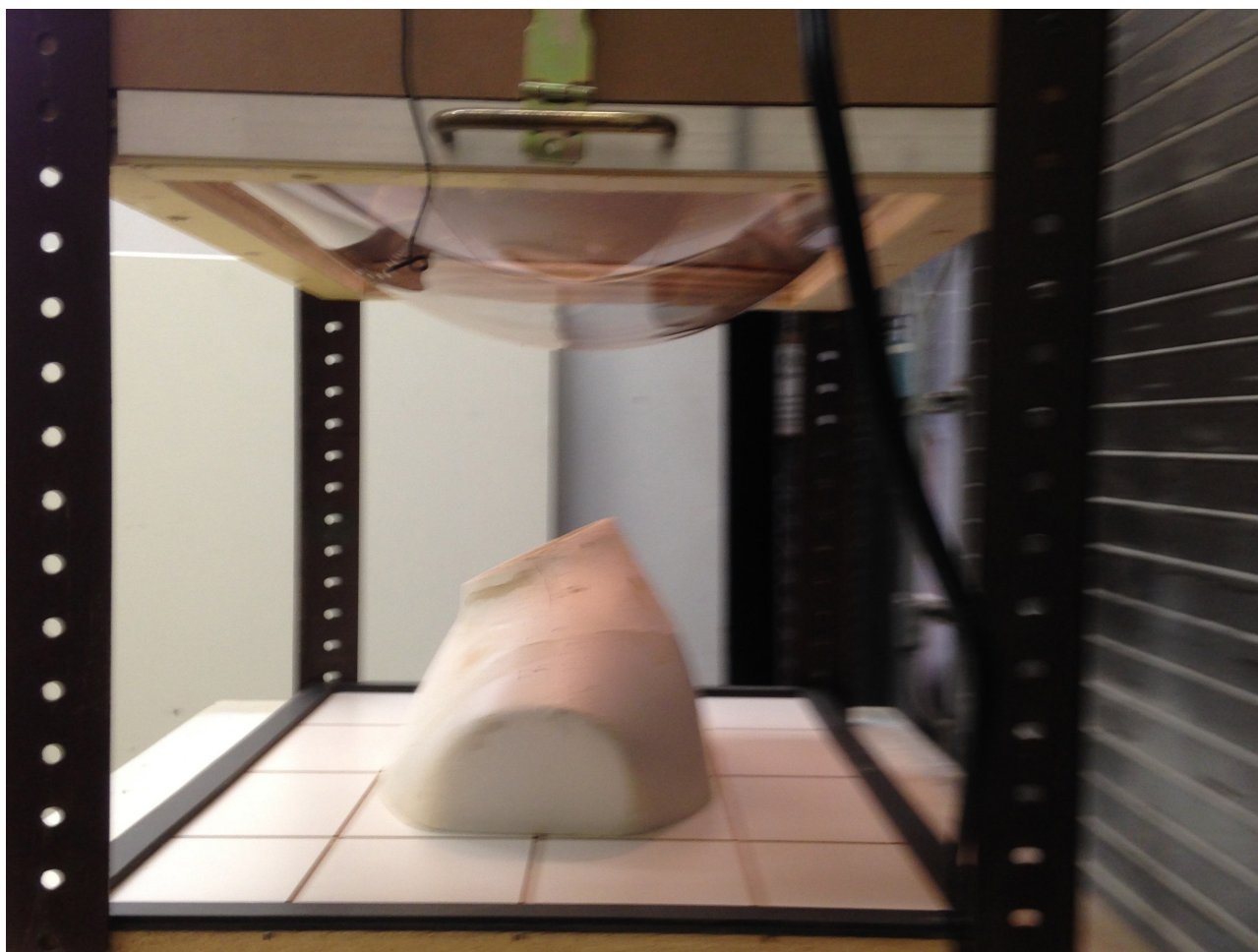
1. The Vivek sheet is attached to the frame using wood screws. The aluminum channel helps keep it rigid and in plane.



2. The Infrared heater is fired up. The process takes 5-15 minutes, depending on how much slump you want in the plastic.



3. The form sits on the platen, which has 1/16" grooves cut in a grid with a central port for the vacuum. A gasket ensures a tight seal.



4. The material begins to slump. Note that this form is directly on the platen - it was later raised to allow a deeper draw over it.



5. The hasps were released and the frame brought down to the platen. The vacuum quickly draws the material down.



6. The results. The vacuum-formed component was mounted to a stand made of clear acrylic tubing to minimize visual interference. 📌

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