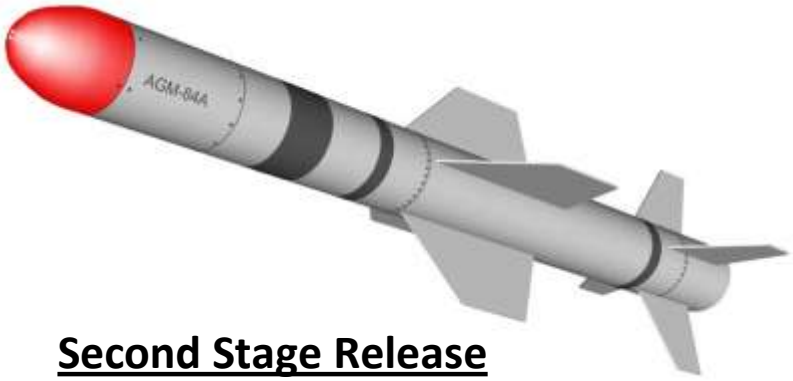
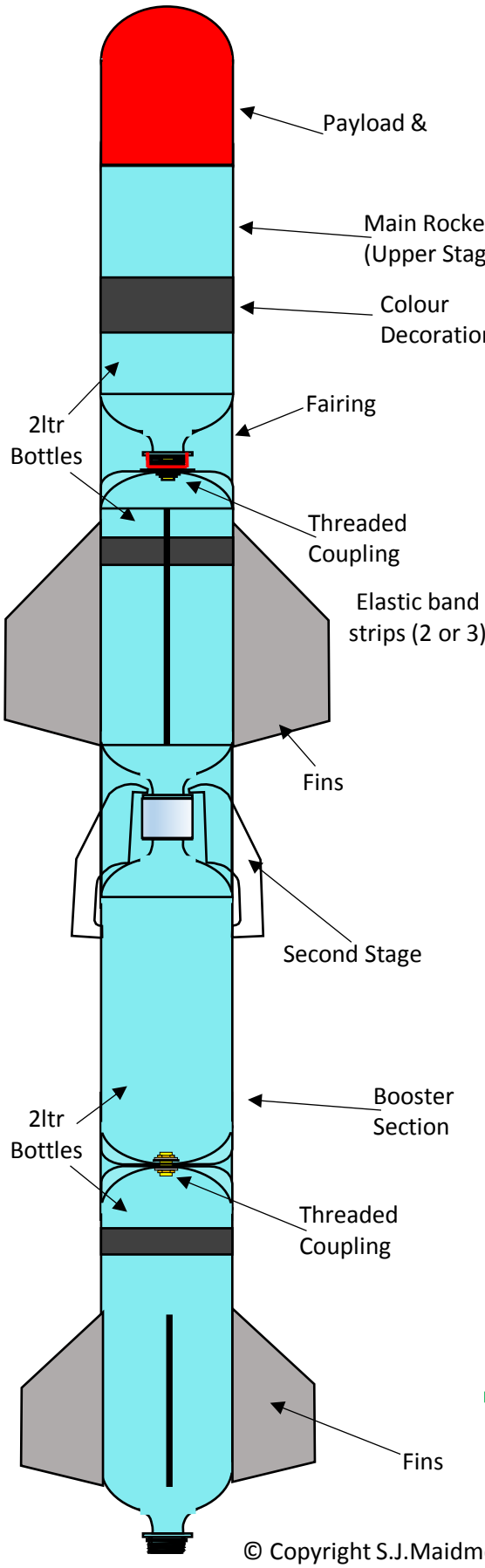
Second Stage Release idea

Stage release from the booster section and the main rocket with payload and parachute.
The rocket will be based on the Harpoon AGM-84A missile with a red nose (just for the colour!).





Second Stage Release

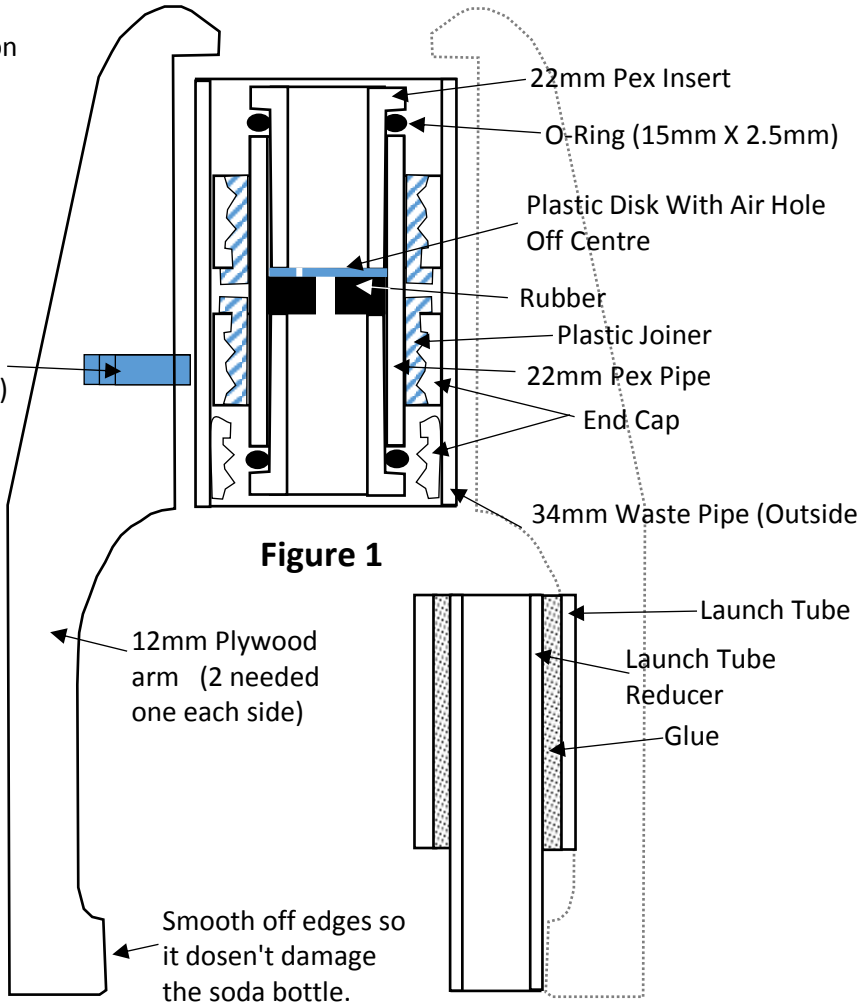


Figure 1

Threaded pipe Joiner

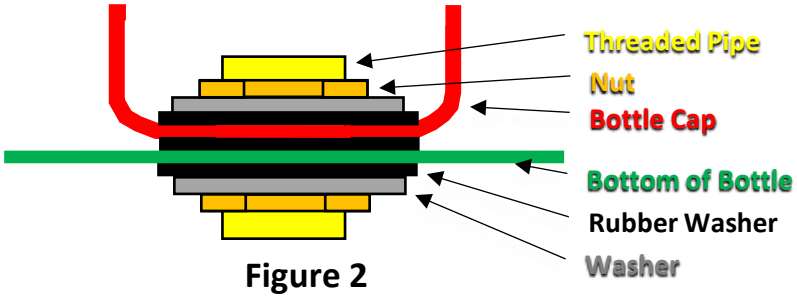


Figure 2

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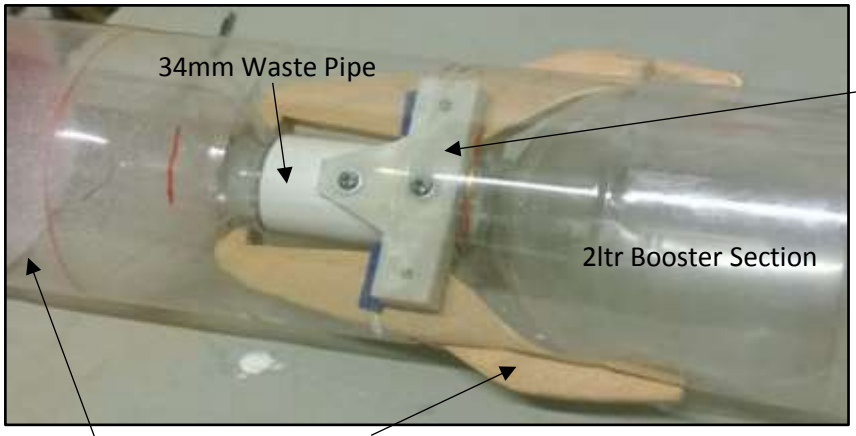
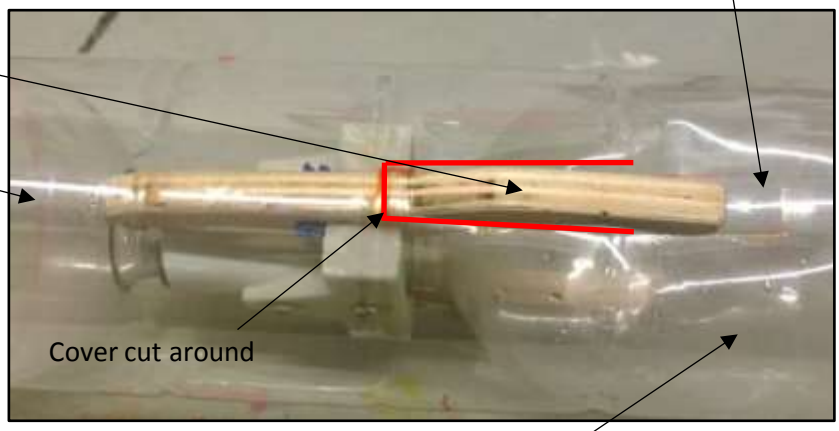
The idea is that the joiner connects to the booster section with 12mm plywood arms down each side. The water is put in the booster and put on the launcher, then the second stage is filled to the required amount of water and put on the top of the booster. You then pump air in to the rocket which pressurises both the booster and upper stage. The upper stage is released when the booster section runs out of water / air and the pressure inside the booster returns back to normal, then releases the upper stage when the arms squeeze against the booster sides.



Squeezed booster section

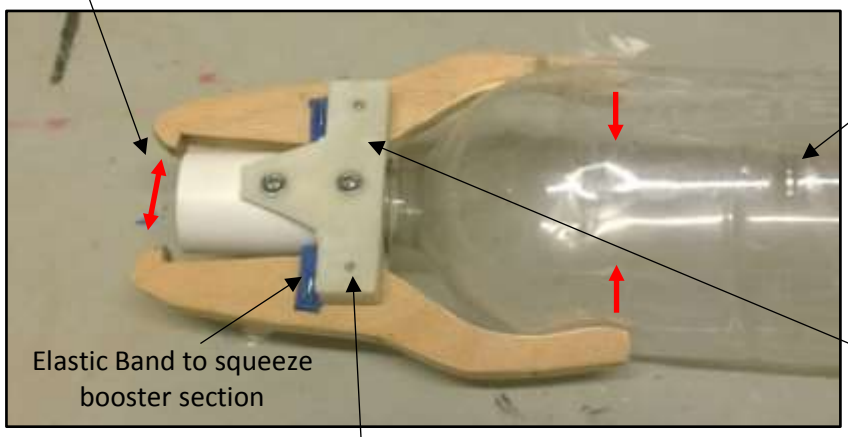
12mm Plywood arm (2 needed)

2ltr Upper Stage



When the booster section is squeezed the upper stage is released as the locking jaws open.

2ltr Booster Section



FULLBORE WATER ROCKET LAUNCHERS www.rocket-fun.com

Polymorph hinge holds both plywood arms to the joiner section

Hinge Pins Made From Coat Hangers

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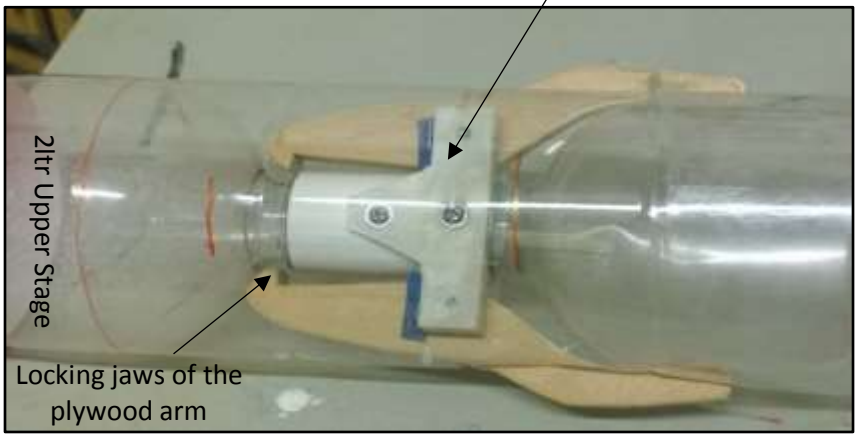
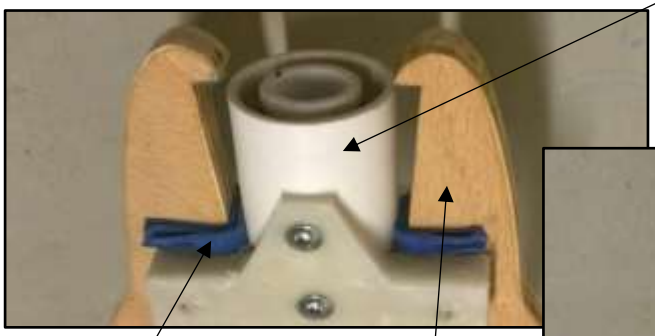


Second Stage Release Extra Photos and Info.

I used polymorph thermoplastic to make some hinges for the second stage release. The plastic was pressed into a mould made from plaster of paris so they would be the same however many I made.

Squeezed booster section

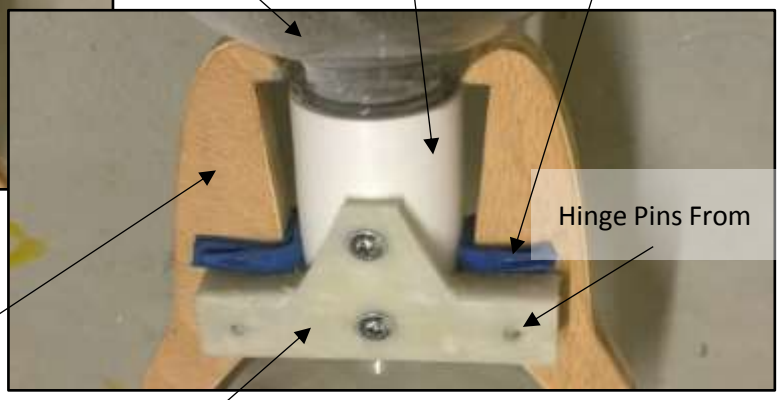
Inter-stage joiner with one way valve and no launch tube. Upper stage rests on the top and gets locked in to position.



Elastic Band to squeeze booster section

2ltr Upper Stage

Elastic Band to squeeze booster section locked in to position by a staple.



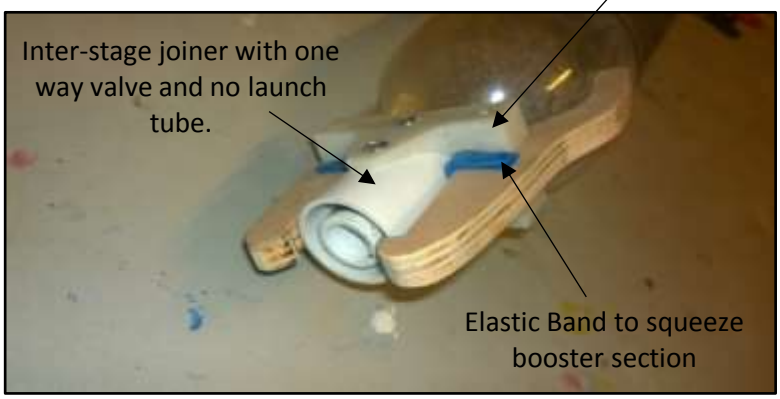
Hinge Pins From

12mm Plywood arm (2 needed)

Plastic moulded hinge and fixing made from Polymorph

2ltr Upper Stage

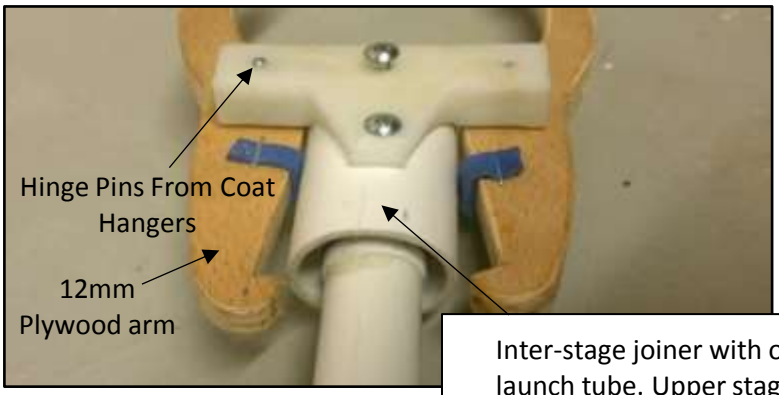
2ltr Booster Section

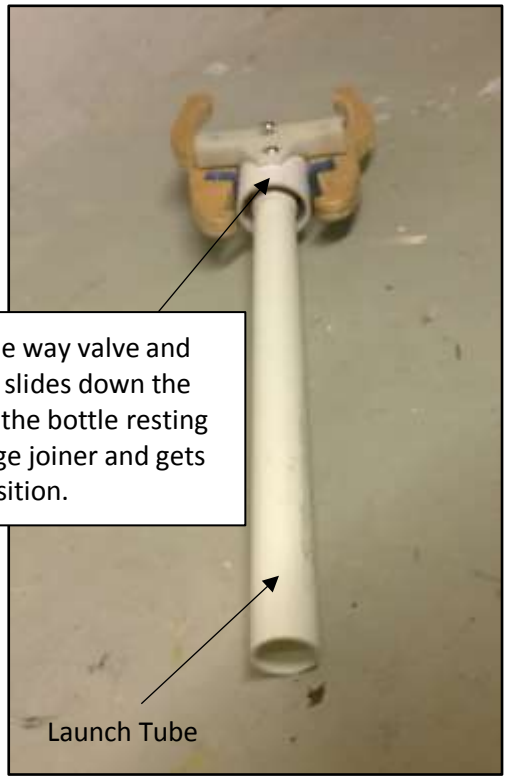


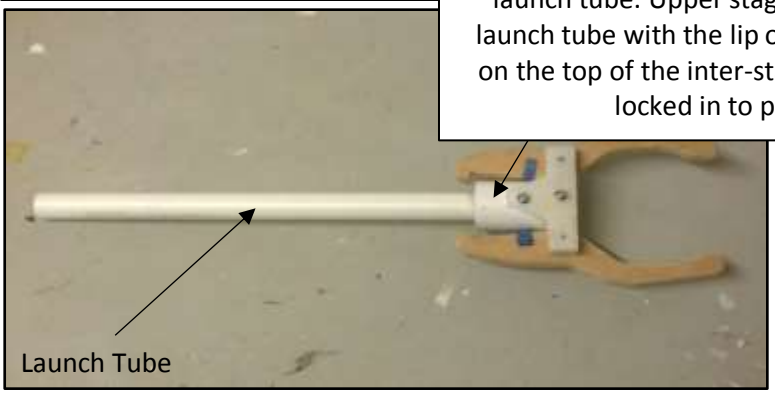
Inter-stage joiner with one way valve and no launch tube.

Elastic Band to squeeze booster section

As the pressure builds up inside the booster and upper stage, the bottle sides push outwards against the 12mm plywood arms and lock the upper stage on top of the inter-stage. When the rocket is released, the water and air pressure are used up as the rocket flys upward. The 12mm Plywood arms squeeze against the booster sides because of the elastic bands on the arms which now push back against the bottle sides and the locking jaws of the plywood arms move outward.







Inter-stage joiner with one way valve and launch tube. Upper stage slides down the launch tube with the lip of the bottle resting on the top of the inter-stage joiner and gets locked in to position.

Recovery of the booster section

You can use a parachute to recover the booster section so it does not land on anyone or anything, a great parachute release is one the Air Command Water Rocket website use.
Below is a link to the website about the parachute release
http://www.aircommandrockets.com/construction_5.htm

Polymorph thermoplastic
(also known as Instamorph, Shapelock, Plastimake)

Easy to use DIY plastic material, melts in boiling water (62°C to be more precise), can be re-used thousands of times! Fix broken parts, add handles, grips, create parts and prototypes from moulds.
Polymorph is very strong once it sets, comparable to Nylon.
It is fully biodegradable, it is non-toxic,.

Still not sure what it does? Check out youtube for hundreds of videos.

QR Scan Code

Usage:
1. Grab a mug, bowl, or any container, and add as much plastic as you need.
2. Add boiling water.
3. Wait for pellets to become transparent.
4. Carefully remove from hot water (you can use fork), drain it, and squeeze out water trapped in between the pellets.
5. Start moulding!

Don't worry if it sets before you get it into right shape -- just pour some more boiling water over it and repeat the process. Easy!

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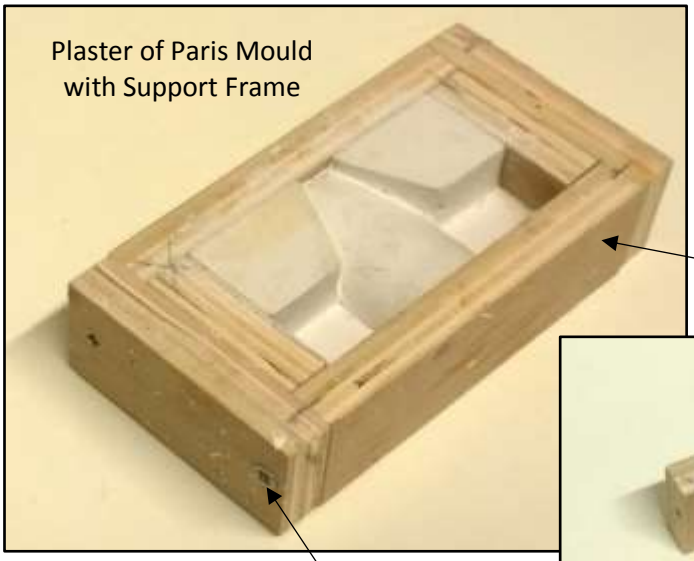
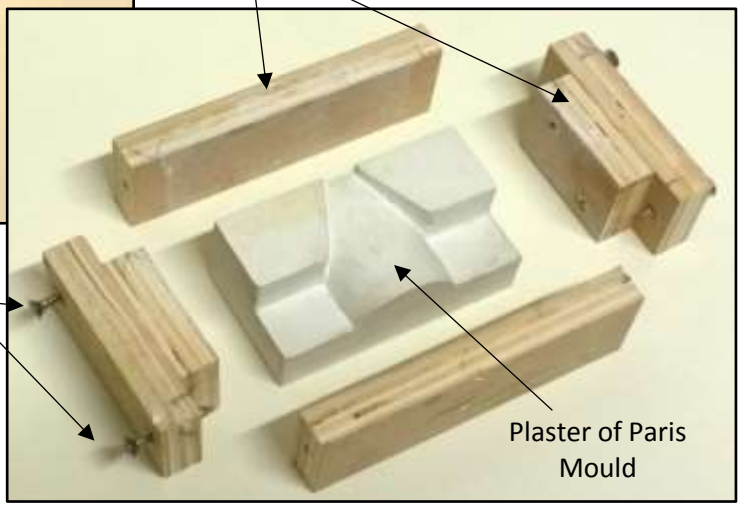
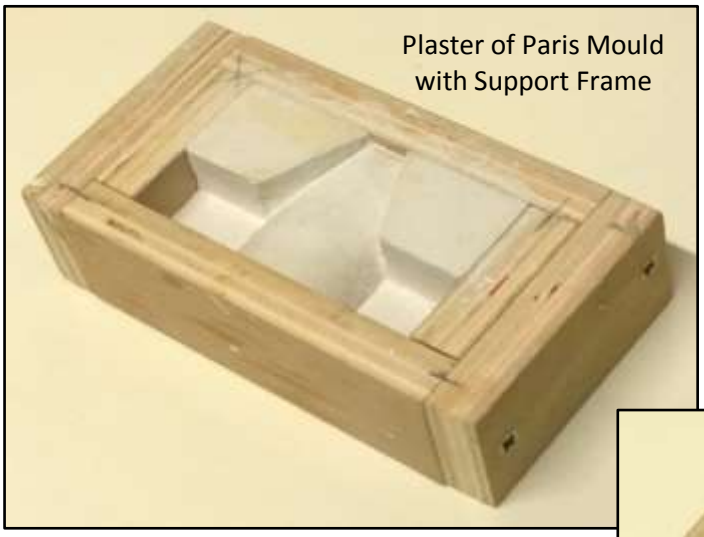
Hinge mould Photos and Info.

As I mentioned before I used polymorph thermoplastic to make some hinges for the second stage release. The plastic was pressed into a mould made from plaster of paris so they would be the same however many I made. Here are a few pictures of the mould made from plaster of paris and the plywood support frame that surrounds it.

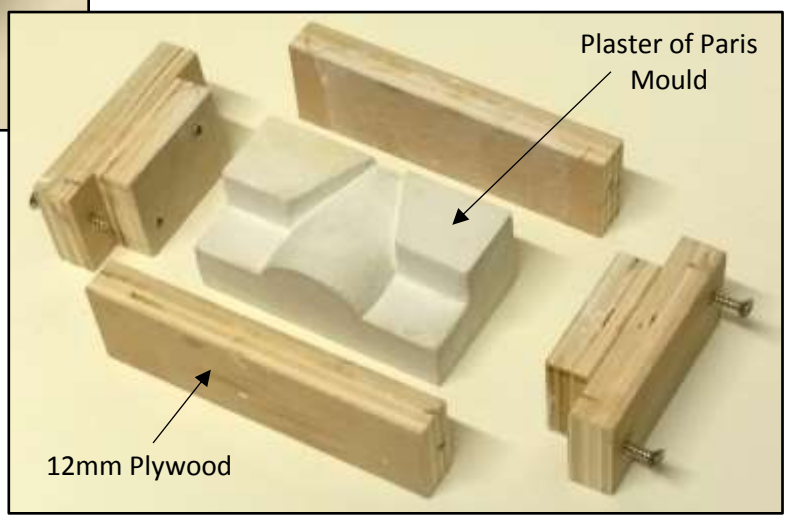






How to use the mould and Polymorph

1. Grab a mug, bowl, or any container, and add about 18g of plastic.
2. Add boiling water.
3. Wait for pellets to become transparent.
4. Carefully remove from hot water , drain it & squeeze out water trapped in between the pellets.
5. Press the polymorph into the mould using fingers and wooden tools, then press a flat surface down on to the mould and leave to cool.



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