

The Prop Makers Construction Guide Latex & Foam Weapons for Cosplay & Larp



- The most comprehensive step by step guide to working with foam & latex weapon props
- INCLUDES: Design, Materials, Construction, Tools & Techniques

- An in depth collaboration of works, techniques, guidance and advice from one of the worlds leading latex & foam weaponsmiths Sean Maguire (of Skian Mhor) one of the leading authorities in the industry having created tens of thousands of larp and cosplay weapons over the last 20 years.

Alex Agricola
(Author of The Crystal Anvil)



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supplied with any tools or chemicals you may use as they may be
slightly different to those we use.**

Published by Alexander Agricola

ABOUT THE AUTHOR

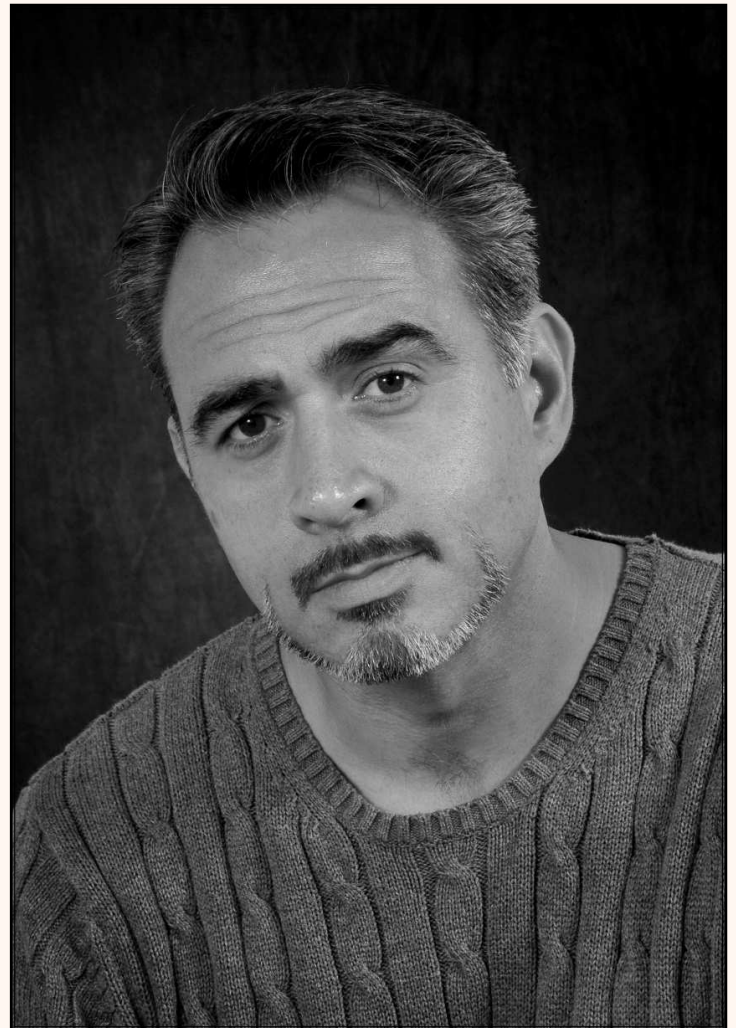
Alex Agricola was born in London, England and moved 20 years ago to the West Sussex coastal city of Chichester, until 2014 when he relocated to the bustling city of Birmingham.

He was a theatrical Graduate of the Italia Conti Academy of Theatrical arts where he was trained as a classical actor and went on to feature in “ Film stage and TV as a child actor.

A true spirited entrepreneur, Alex has always pushed the boundaries, believing firmly “anything is possible” if you want it enough.

As well as the founder of Lederkraft Studios which became a leader in the production and design of costumes, props and armours for various industries including Film, TV, Cosplay, LARP & Re-Enactment. Alex has always been and remains totally passionate as a fan, and began his journey in sharing his lifelong experiences with his first bestselling book “The Crystal Anvil”.

Sharing over 20 years of experience and a wealth of knowledge brought together by not only himself but also a passionate team of followers and contributors, he continues his journey of sharing once again, but this time as a collaboration of creativity with world renowned weapon smith Sean Maguire of Skian Mhor, creator of tens of thousands of larp, cosplay and theatrical weapons and props over the last 18 years.



ACKNOWLEDGEMENTS

Over the last 20 years it's been nothing less than a journey of discovery when it comes to the various arts involved in creating anything. Whether a prop for a major motion picture or a weapon for a simple console game cut scene, the same care and need for ingenuity has been called for and I guess it's very much thanks to the demands of the Larp & Cosplay world that craftsmen all over the world have strived to push the bar on what's possible.

Over those years I have had the honor of working with many of these people (far too many to list), but above all others my thanks has to go primarily to Sean Maguire,

one of the original and most respected creators of larp & Cosplay props in the world. His tireless passion for R&D having assisted many on their journey of creation and I count myself as one of the lucky ones to have been gifted his time and encouragement.

So I put together this tome of learning offering Sean heartfelt thanks for his support, guidance and thousands of words of wisdom in an attempt to securing a legacy in the birth of the next generation of crafters, his support and passion for this industry more than a match to mine.



Sean Maguire

<http://www.skianmhor.co.uk/>

Original Harley Quinn Hammer design by Nerfenstein

<https://www.facebook.com/Nerfenstein>

Cover Photo of Twerkin Gherkin as Harley Quinn

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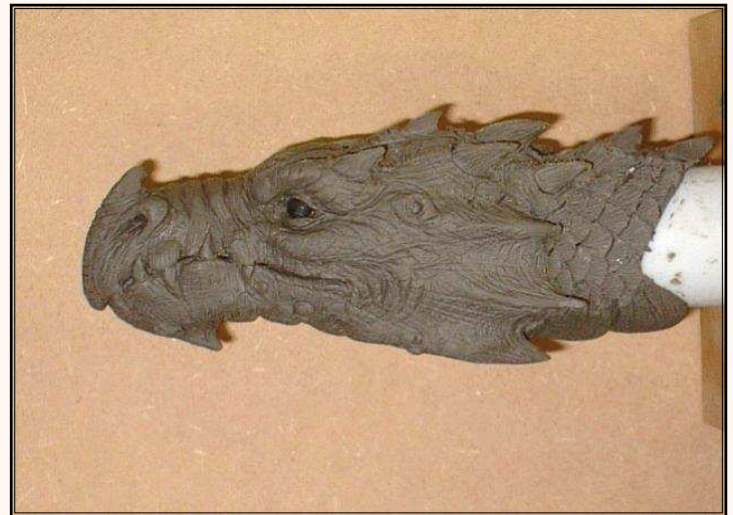
INTRODUCTION

Now as many who have known my work over the last 20 years or so has been predominantly supplying and creating to the Film, TV, Larp & Cosplay, my one greatest passion of all has been “The Future” of just what’s possible.

It’s to this end that I’ve campaigned to keep developing “new” ways of doing things and along the way come into contact with innovators such as Sean Maguire of Skain Mhor and it was with huge excitement that over 15 years ago, we began collaborating on projects and in many ways, discussing the merits of this very book.

Over the 15 years, so many advances have been made, not only in the techniques used to construct latex props but more so in the materials available. where once larp props were simply layers of camping mat foam glued to a core and taped with duck tape or covered with a fabric sleeve, now you will find a multitude of possibilities, using state of the art technology to create almost life like creations but born of fantasy.

I personally constructed my first latex weapons & props over 18 years ago and these spelled the beginning of a journey of true discovery. From the traditional to



the scientifically engineered, to this day I am obsessed with the “how far can we push this” when it comes to weapons.

This book, I have very much put together as something you can refer to as you work, my aim to give you as much detail as I can as a starting point and Sean and I wanted to make sure you have enough detail to work with, be it a one man or woman set up in their garage, or a team of buddies wanting to be the next great house of creation !





INDEX

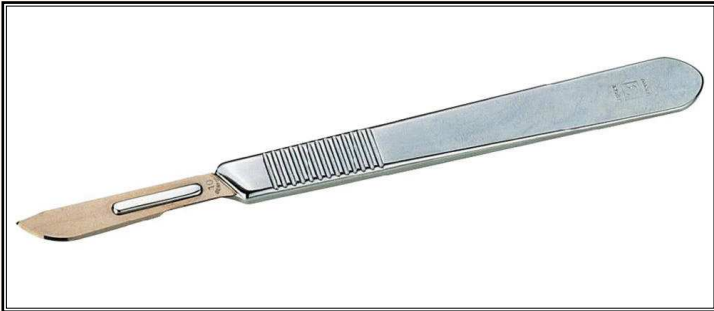
3	About the Author
4	Acknowledgements
5	Introduction
8	Tools
11	Optional tools and equipment
14	Safety
16	Materials - Foams
18	Is it soft enough ?
19	Materials - Cores
20	A Guide to Latex & Foam Coated Prop Weapon Core uses
21	Weapon Core Sizes
22	Creating a Blade
24	Spear Heads
24	Core embedding, gluing and reinforcing
26	Batting up
35	Adding the Bevel.
37	The Crossguard.
39	Hafted weapons & Polearms
41	Core wrapping, Glueing and reinforcing.
49	Axe Heads
53	Mace Heads
55	Hammer Heads
57	Spear Heads
58	Thrust Safe Tips
59	Handles
61	The Pommel
62	The Leather Handgrip
63	Detailing
66	Latexing & Painting
71	Cosplay Vs LARP
76	Suppliers
76	Foam
77	Cores
78	Clear sealant
78	Glues

GENERAL EQUIPMENT



TOOLS

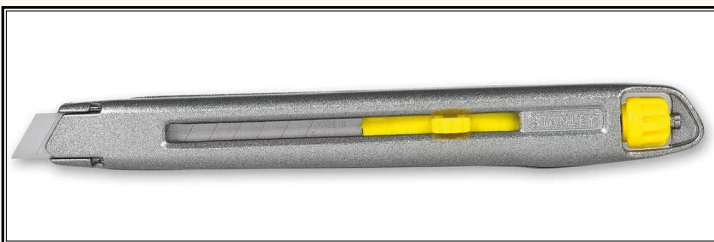
The common tools used in making latex larp & Cosplay weapons are;



Scalpels (number 3 and 4 handles with number 11 and 26 blades)



Craft knife with 18mm (3/4") snap off blades



Craft knife with 9mm (3/8") snap off blades

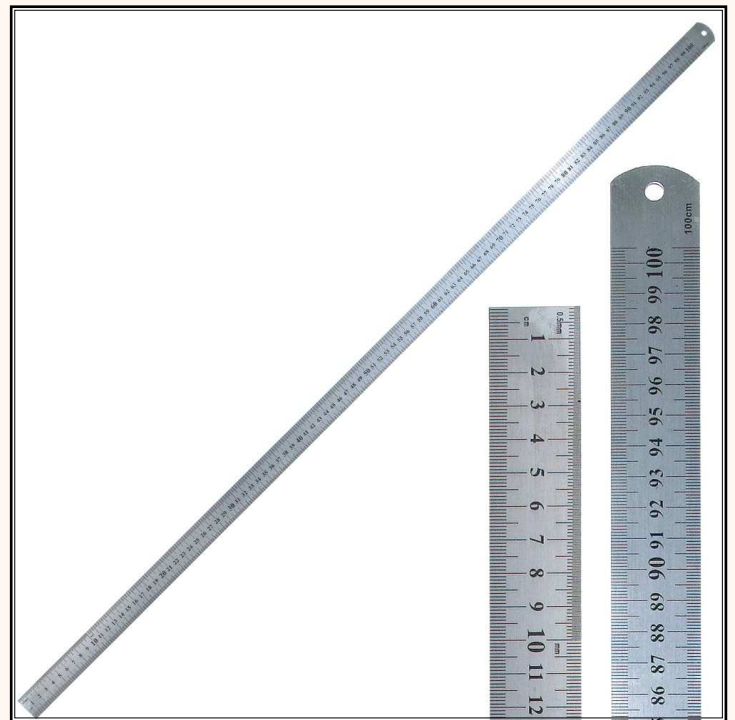


Hacksaw

Junior Hacksaw



Steel rule (1M and 30cm)



Sanding block and a supply of coarse abrasive (commonly 80 grade)





Hot Glue gun with a flexible hot glue



Hand drill or power drill with 2mm bit



Small hammer or better yet a mallet with changeable heads

Plastic glue spreaders for use with solvent based contact adhesive
Paint brushes ½” (13mm) and 1” (25mm)
Try disposable foam brushes which avoid bristles getting in the glue or latex
Clean empty cans and jars for glue and latex
Rags for cleaning



OPTIONAL TOOLS AND EQUIPMENT

Band saw or Electric carving knife





Dremel (or similar tool) with flexible drive shaft & Assorted bits for Dremel



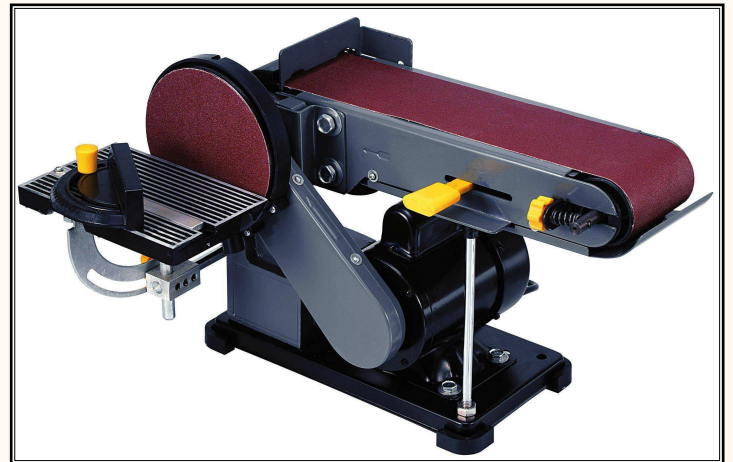
Airbrush, Compressor & Spray gun



Hot air gun



Belt sander



A Soldering Iron can be used to melt plastazote.
Lastly a Fan, it can help to cool things down or
accelerate paint drying

SAFETY



Before attempting to build an LRP weapon you must ensure that you are familiar with the materials that you will be working with. Latex sword making involves the use of several highly volatile and flammable chemicals as well as very sharp tools.

Toluene based contact adhesives are highly flammable having a flashpoint of only 32 Degrees, they should not be exposed to naked flames or very hot surfaces. Never smoke in the area where they are being used! These adhesives also act as respiratory sensitizers; they can attack the respiratory system bringing on Asthma attacks. In extreme cases and through continued use they can cause complete respiratory failure and therefore should not be used in poorly ventilated areas.

Isoflex special primer contains iso-cyanates and it is also a very powerful respiratory sensitizer.

When using Contact adhesives or Isoflex we strongly advise you to do so in a very well ventilated space where there is no possibility of fumes building up, if you must work with them in a less well ventilated space you should purchase a full face respirator with a suitable rating to prevent the fumes entering your system, even if working outside having a full face filter is desirable to prevent your breathing in the sanding particles from glassfibre cores and plastazote foam which can potentially get in lungs and eyes.

Even when simply cutting out materials (especially using break off blade knives) you should always wear safety glasses to protect your eyes, choose a pair that wraps around the face and that are rated to take high speed impacts

Hot glue guns can reach very high temperatures, at our workshops we use high temperature professional glue guns; contact with the tip can remove skin!

Liquid Latex contains a small amount of ammonia, although this is only 6% of the overall volume, it has a very strong smell. Whilst it is relatively harmless, the smell can offend!

The whole process can be very messy and extremely smelly. Be sure that you do not upset friends and family (or even neighbours) when you choose where and when to make your latex weapons.

If you suffer from asthma then please re read these warnings and consider whether or not you should be making weapons.

If these warnings do not frighten you out of making your own weapons then please read these instructions through several times before starting. Pay particular attention to the warnings and hints in italics. Please make sure that you understand each step of the process before starting.



MATERIALS - FOAMS



Over the years many different types of foam have been used to make props, be it for larp, cosplay or stage many experiments have been conducted in terms of workability, durability and cost, ranging from the use of closed cell evazote (EVA) foam (rubbery to cut) to the far advanced Polyethylene (PE) closed cell foam (crisp to cut)



In the early days the home based DIY market of prop makers favored the former EVA (mainly due to cost and availability), however over time (especially in the UK) This has very much become far more a case of using the right foam for the right project.

There are many types of foam available, in a wide selection of colours, densities and sizes however in general three types of foam tend to be used in three different densities each.



- The basic foam used for sword construction is a polyethylene (PE) closed cell foam, trade name “Plastazote”, (45 gramme per litre (LD45)
- Club weapons or hafted types, (33 gramme per litre (LD33)
- Smaller hammerheads and clubs, (18 gramme per litre (LD18)
- For axe and mace heads, use an EVA crosslinked foam “Evazote” (EV50)
- For larger softer hammer heads and mace heads it is recommended that you use softer polyurethane (PU) open cell foams around 80 – 130 gramme per litre.

There are no rules with regards which foam to use for which type of weapon but, years of experience have created the earlier list. Something many of us totally agree on is “the larger the striking surface area”; the softer the foam you should use.

Now one thing that commonly does not occur to people is to think about where in the world you will be using the weapon? (I’ve assumed the standard foam selection based on the moderate temperate climate of the United Kingdom) however from experience we’ve learned that in hot Mediterranean climates the foam and latex becomes much softer, so needing to use a harder foam and as Sean pointed out “I have seen an Italian weapons maker use LD70 for sword blades which wouldn’t be considered safe in the UK”

For the same reasons it’s going to mean that in Scandinavian climates the foam and latex becomes much harder and so softer foams should be used (like Evazote for sword blades)

So, in short just because your prop or weapon may pass safety checks in your home country, this doesn’t mean it will pass in others (worth checking in advance)

- Minimum padding on all Striking surfaces is ½” (13mm)
- Minimum padding on all Non-striking surfaces is ¼” (6mm)



- Minimum padding from end of fiberglass core to weapon tip is 1” (25mm)

These are generalised figures for an average sword

Slightly less padding could be used for small daggers and conversely the padding thickness should be increased as the weapons overall size increases however the final thickness of the foam padding must be a balance between safety and aesthetics making both something that has a realistic look, while still being able to be wielded safely.

IS IT SOFT ENOUGH ?



NOTE: “Secondary handles on larger weapons should be considered as striking surfaces”
Unbroken striking surfaces (ie. Not wood grained) as on Baseball bats & clubs, should be padded with softer foams such as LD18 Plastazote or LD50 Evazote.

Its easy to forget that as the striking surface gets bigger, so the padding should get softer. Just imagine how it could feel using a standard LD45 for something with a wider striking surface such as an axe head, as opposed to the 2-3mm edge of a sword?? Yup... Damn hard !

Instead using something softer like a nice LD33 or an EV50 (Evazote) for an axe, “trust me” says Sean, “it makes all the difference”.

Then there are hammers to think of, as the striking edge moves up (head) at which point, you will need to switch to an open cell foam such as a 120 GPL Polyurethane

Remember, when making any large hammer head, a polyurethane furniture foam may feel nice and squishy (and softer than a closed cell Plastazote) BUT it is actually made in a far higher density, ending up weighing a lot more! (Especially covered in latex)



This effort can be reduced in several ways;

- The first and most obvious is to make the head smaller!
- Secondly consider making the shaft and handle longer and use a wide grip giving you more leverage to slow the momentum.
- A counter weight in the tail end of the shaft will also help in balancing the weapon which will make it easier to control.
- A combination of foams and construction techniques in the hammer head can be used such as the main structure in closed cell foam with soft PU striking surface, hollow head construction or even a soft PU center with Plastazote skins and detail.

MATERIALS - CORES



It's to this end the best we can do is advise and guide since we have no idea your height, size, experience or any other of the factors that dictate the outcome of wielding a cored prop, and while I'd be more than happy to build and supply this 42" Larp safe, hammer to a 5ft 3" Cosplayer of slight demeanor knowing its intended use, I would have some "pre" advice to offer the client should the same person wish to swing it at me, during a Larp event!

The bottom line is "Think" about its intended use, "Think" about the practicalities of hefting such a thing about all day, "Think" about how it would feel to get thumped with it!

Over time, just like you will begin to understand the many different uses and types of foam, the same will be said for cores. Be they Fiberglass, Carbon fiber, leather or any of the dozens of things you can use for cores, very similar rules will apply when it comes to the appropriateness for the task at hand.

In the hobby of larp, we have always been super conscious about having the right solid pointy thing in our weapons for many reasons, but as always the first rule is "Safety" OR the ability for a player to wield a prop safely (yes... it's as much to do with the wielder as the wielded!!) we all know (I hope) you could just as easily do serious damage with a coreless, latex prop as you could with a cored version.... "in the wrong hands"



"The foam will make a difference, to the feel of it in terms of weight, look etc, BUT the core will be the difference as to whether you can control it (if you intended to swing it)"

A GUIDE TO LATEX & FOAM COATED PROP WEAPON CORE USES



The weapon sizes that follow, are based upon general experience and tolerance of materials but usable sizes of weapons and the required amount of padding should be checked with your games system before deciding on finished weapons specifications.

Core materials are described as Fiberglass or Glass Reinforced Plastic (GRP) and Carbon Fibre (CF).

Fiberglass is the most commonly used core materials being resilient and comparatively economical while Carbon Fibre by comparison is much more expensive but lighter and less flexible (allowing for thinner cores for the same weapon length)HOWE VER, the tradeoff is brittle and prone to snapping if used inappropriately.

Care must also be taken when working with carbon fibre as it can be prone to splintering or throwing off sharp shards when worked with power tools.

The trade names of Plastazote and Evazote are used in these instructions. Plastazote is a closed cell polythene foamed with nitrogen and available in a range of densities designated by the numerals in the name e.g.; LD45 is a Plastazote having a density of 45 grammes per litre. Evazote is polythene/EVA combined foam using the same density designation. The EVA softens the foam and gives it a more 'rubbery' feel but it is denser than Plastazote.

WEAPON CORE SIZES

Fibreglass (GRP)

3mm Rod	Micro knives and guard reinforcing	Up to 4" (100mm)
6mm Rod	Daggers & Knives	8" to 12" (200mm to 300mm)
8mm Rod	Large knives & Short swords	10" to 32" (250mm to 800mm)
9.5mm Rod	Larger Knives & Swords	10" to 42" (250mm to 1050mm)
12mm Rod	Two handed Swords	36" to 60" (900mm to 1.5M)
16.2mm Rod	Great swords (some hafteds)	50" to 72" (1.3M to 1.8M)
12 x 8mm Bar	Swords	12" to 48" (300mm to 1.2M)
16.2mm Tube	Dagger handles and small hafts	2" to 12" (50mm to 300mm)
19mm Tube	Smaller handles and hafts	Up to 7 feet (2.1M)
25.4mm Tube	Large handles and hafts	Up to 8 feet (2.4M)
32mm Tube	Very large handles and hafts	Up to 10 feet (3M)

Carbon Fibre (CF)

3mm Rod	Micro knives and guard reinforcing	Up to 4" (100mm)
6mm Rod	Daggers & Shortswords	8" to 18" (200mm to 450mm)
8mm Rod	Short swords & Rapiers	18" to 39" (450mm to 1000mm)
10mm Rod	Bastard Swords	32" to 48" (800mm to 1200mm)
12mm Rod	Two handed Swords and fighting staffs	48" to 72" (1200mm to 1.8M)
15mm Rod	Large hafted weapons and staffs	50" to 84" (1.3M to 2.4M)

Useable Weapon sizes

No weapon should have less than 5" (125mm) blade

Knives and Daggers should be under 18" (450mm)

One handed weapons must be less than 42" (1050mm) total length

Two handed swords should not exceed 6 Feet (1.8M)

No normal weapon should exceed 8 Feet (2.4M)

Some systems will allow special items such as 10 feet (3M) long Dragon lances but check with your game system refs before making these!

Dagger and short sword handles should be between 4" and 6"

One hand and Bastard sword handles should be between 7" and 9"

Katanas are an exception to this as they are usually around 10" long

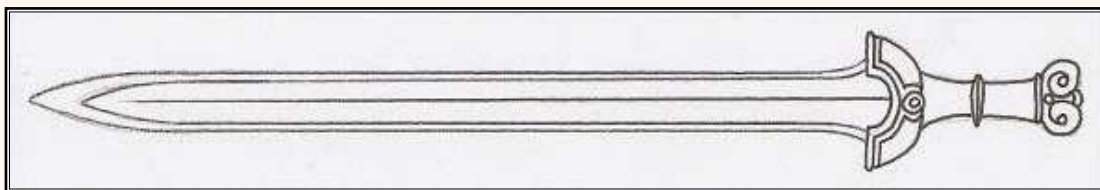
Two handed grips should be between 9" and 18" (225mm and 450mm)

CREATING A BLADE

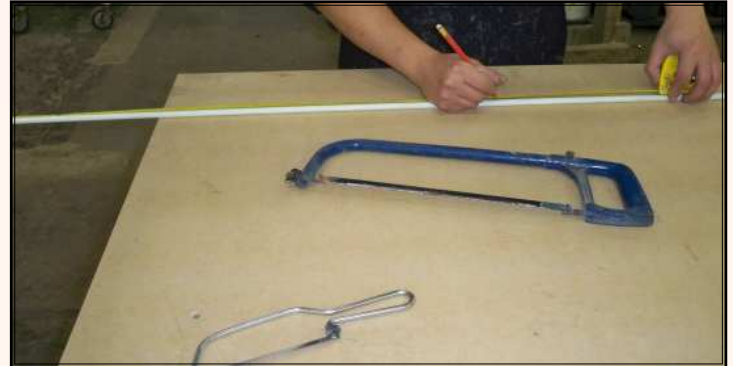
We will assume for the purpose of this session that we are making a 42" bastard sword for use by an adult in a UK based LRP system. Any other size can be made by interpolating the sizes from the tables and charts included on the table below

Core size	Common use	Safe useable lengths
6mm Rod	Small Daggers & Knives	8" to 12" (200mm to 300mm)
6.35mm square	Larger knives	8" to 18" (200mm to 450mm)
8mm Rod	Short swords	12" to 32" (300mm to 850mm)
9.5mm Rod	Swords & short hafted weapons	24" to 42" (600mm to 1050mm)
12mm x 8mm bar	Swords and hafted weapons	32" to 48" (850mm to 1200mm)
12mm Rod	Two handed Swords	36" to 60" (900mm to 1.5M)
16.2mm Rod	Great swords	50" to 72" (1.3M to 1.8M)
19mm Tube	Most sword handles	Up to 7 feet (2.1M)
25.4mm Tube	Large handles	Up to 8 feet (2.4M)

The first thing is to know what the weapon will look like and how big it is going to be, an actual size drawing is a good way to start



The first thing is to know what the weapon will look like and how big it is going to be. For instance for the sake of this demonstration we decide that we are going to make a double edged broadsword with an overall length (blade and handle combined) of 42 inches (1100mm).

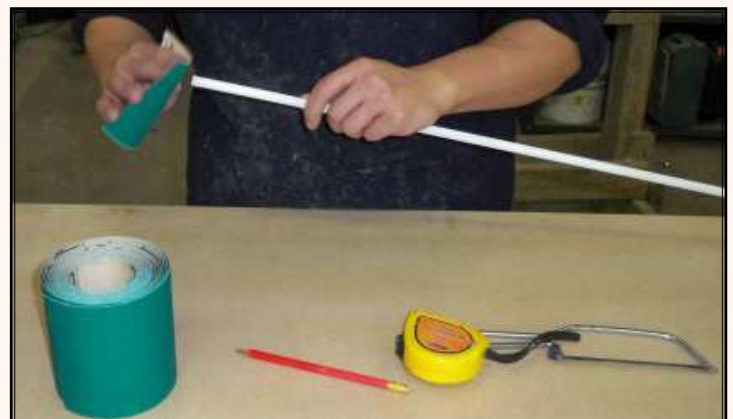


For this size of sword a core we can use either a 9.5mm diameter rod or a 12mm x 8mm bar. Cut the fibreglass core 4" (100mm) shorter than the finished weapon length i.e. 38" (1000mm) using a sharp hacksaw.



The cut edge will be left very sharp and capable of cutting through plastazote foam. To improve the core safety we round the ends of the core with a suitable abrasive (80 grade emery cloth) this will remove any sharp edges and help to prevent the core cutting its way out of the weapon during use.

Rub down the whole length of the core with the abrasive to remove any glossy finish and improve adhesion to the foam, (when using 12mm x 8mm bar the square corners of the bar should also be rounded slightly.)





Once rubbed down all dust must be removed from the core and it should then be wiped down with Acetone, this will help with adhesion to the foam by removing any remaining dust and grease from the fiberglass rod and allowing the contact adhesive to properly wet the core. The acetone is a solvent for the polyester resin used in the core construction and thus it will etch the surface leaving a slightly porous surface which will also improve glue adhesion and improve the longevity of the finished weapon.

Spear Heads

When creating a spear head we use exactly the same methods except we cut the core to be 8" (200mm) longer than the blade .

CORE embedding, GLUING AND REINFORCING

Once the core is abraded and degreased it is ready for the next step, 'podding'.



A small piece of foam of the same diameter as the core should be hot glued to one rounded end of the core and the end wrapped tightly in cloth tape, this forms a protective "pod" which will prevent any injury should the core ever part company with the foam.



Cut a small piece of foam similar in size to the profile of the core and about 2" (50mm) long. Use the hot glue gun to apply a small amount of glue to the end of this 'pod' and keep the glue gun in contact with the foam until the end of the pod is soft and coated with hot glue then working very quickly before the glue cools apply the pod to the end of the core and hold it tightly in place until the glue cools.

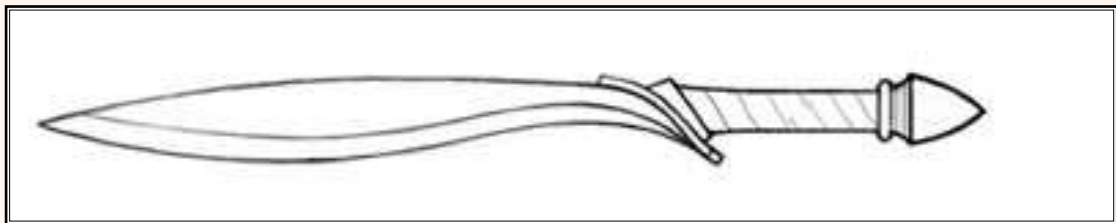
Now take a short length, approximately 4" (100mm) of 1" (25mm) cloth tape and lay it glue side up on the work bench. Place the pod end of the core on the end of the tape at a slight diagonal angle and pressing down with the flat of your hand roll the core over the tape until the end of the fiberglass and the foam pod are tightly wrapped in cloth.



Trim the taped pod off to approximately 5/8" (15mm). The podded core is now ready to use.



The Hot melt glue should be carefully chosen for this process. We use specialized high temperature melt plastic glue. This glue will remain slightly flexible even when cold. This prevents the glue joint from breaking when cold or subjected to extreme duress.



Batting up

The making of Live Role Play blades now moves to a stage we call “batting up” A piece of Plastazote of the same thickness as the core (in this case 10mm) approximately 6”(150mm) shorter than the finished sword and about 6”(150mm) wide is required. With experience the width of this ‘bat’ can be reduced but for now use these wider dimensions given here to allow for a variety of sword types. Plastazote foam is a closed cell foam, this means that it allows for no liquid uptake, if immersed in water it will float and any water will run off the surface when it is removed, this closed cell structure also gives us some problems when applying glue, the adhesive will work better if it has an absorbent surface to work on so we must create a rough surface to improve the adhesion and thus increase the longevity of the weapon.



Rub down both sides of this piece of foam with 80 grade abrasive, this breaks open the cell structure of the otherwise sealed surface of the foam and improves adhesion.



Cut a slot in the foam the width of the core (10mm) running down its length starting about 2”(50mm) from one end and running centrally.



Into this slot glue the podded core with hot melt glue



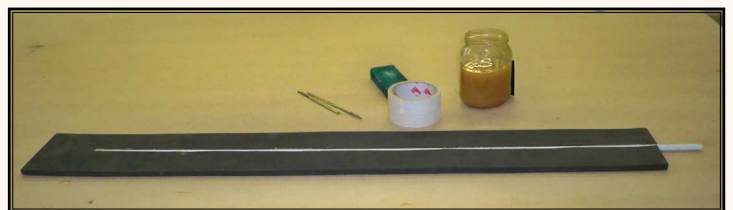
Apply hot glue to the end of the slot in the foam and using the hot tip of the glue gun heat and soften the glue and foam at the tip and extending an inch or so along either side, quickly place the podded end of the core into the tip of the slot and keeping it flat against the surface of the work bench push it firmly into place and hold it flat until it cools



Now using the hot glue continue to glue the sides of the slot and fix the core into place keeping it as flat as possible. Once the glue has cooled and the core is secured into the flat piece of foam move onto the next stage.



Lay this assembly on a flat surface and cover liberally with contact adhesive, allowing glue to fill any air gaps between the core and the foam, using a straight edged glue spreader, spread the glue over the entire surface of the foam, when the whole area is thoroughly wetted, remove all excess glue from the surface and allow to dry.





For the best results after each completed glue process the sword bat should be left overnight on a flat surface to allow for the excess solvent to evaporate. During the normal contact glue drying some 90% of the excess solvent will evaporate during the 10 – 20 minute cure time, the remaining 10% will take much longer to evaporate, bearing in mind that the plastazote foam is of a closed cell structure it will have no way of evaporating after the surfaces have been stuck together which can have devastating results in the future, a sudden increase in temperature or a drop in pressure can result in the

excitation of the small amount of solvent trapped within the weapon, this excitation could cause the solvent to expand and rip apart the weapon from the inside. Thus may sound far fetched but I have seen it happen with quite dramatic results!

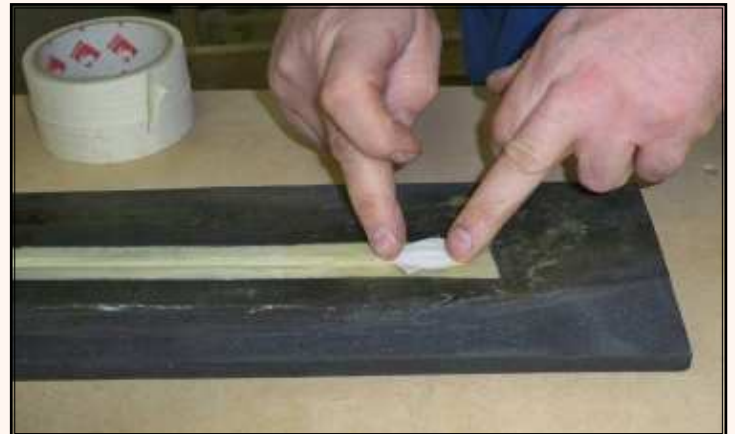


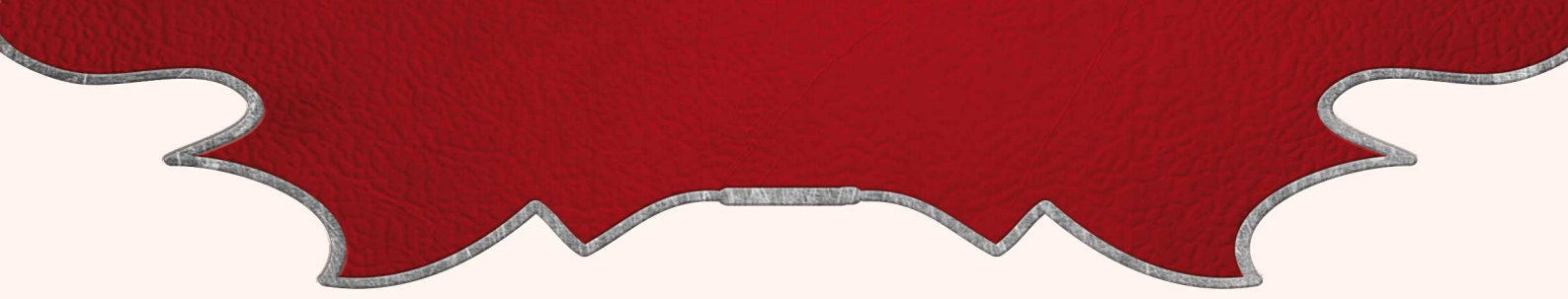
When the priming surface of glue is dry apply a fresh layer of glue along the area of the core and extending to $\frac{3}{4}$ " (15mm) either side of the core and stick a piece of cloth tape centrally down the entire length of the core extending an inch or so (25mm) beyond the end of the podded core,

cover with more contact adhesive, let the adhesive soak through the tape for a few minutes and then, using the straight edged glue spreader, squeegee the glue into the tape, again remove excess glue and allow to dry overnight.



When dry stick a small piece of cloth tape 2" (50mm) square diagonally over the end of the fiberglass core and soak with glue as before, this acts as an extra reinforcing layer to help prevent the core from coming out of the weapon.





Leave on a flat surface to dry overnight. When completely dry turn over and repeat the process of gluing and taping on the other side and leave to dry on a flat surface overnight.

This reinforcing layer of glue soaked cloth tape will work with the hot glue keeping the fiberglass core within the foam structure for longer than a single layer of glue alone. Once again this stage will increase the life of the weapon over any other structural techniques.



When both sides of the glue and tape reinforcing are completely dry cut a piece of 6mm (1/4 inch) foam to the same size as the current bat,

rub down one side with 80 Grade abrasive, cover this abraded side and one side of the “batted” core with a thin film of contact adhesive and leave until touch dry, this should take about 15 Mins.



When touch dry stick both pieces together to form something that resembles a cricket bat.



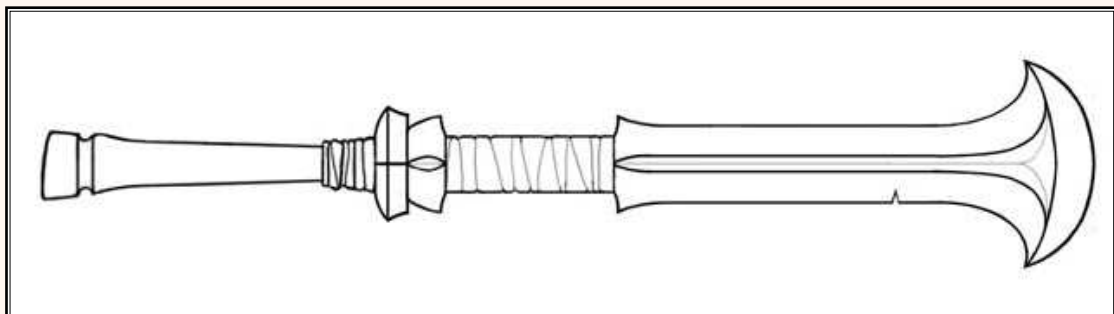


Place the bat on a clean dry surface and with a clean shoe or boot stamp hard all over (taking care to use only up and down action, any sideways motion may tear the foam) or if you have access to a press or an old style clothes mangle this would be ideal for impacting the adhesive (this will assist the bonding of the two layers), leave to dry overnight.



Applying the second layer of foam. Note how the foam curls slightly before flattening out as the glue dries.

Contact adhesives must be applied to both surfaces of the joint. The glue must be applied in a liberal coat and moved all over the surface using a smooth edged spreader, once the glue has had time to react with the foam surface then any excess should be removed and deposited back into your glue container, until a thin, even glossy coat is left behind on each surface. After a few minutes the foam will curl slightly as the solvent reacts with the surface, as the glue dries over the next few minutes the curling will relax and the foam will return flat at the same time the glue surface will dull slightly. At this time test the glue surface with the back of your hand, if the foam sticks to your clean hand then the glue is still too wet, if the surface feels slightly tacky but does not stick to your hand then it is ready to be joined. Place the two surfaces together without bending either of them. If either surface is curled when joining then a permanent curve will remain in the finished weapon, this is a useful technique when making curved shields or armour but not sought after in a flat sword! Once joined together the two surface will require some pressure for the glue to adhere properly. If pressure is not applied then the two surfaces can be separated quite easily.



The next day, with the exposed core uppermost draw the shape of your sword blade making sure that at this stage the line does not come within 20mm of the core at any point. Allow an extra few millimeters on the outline size and shape as the finished weapon will be trimmed a few times before it is finished.



When marking out at any stage of the weapons making resist the urge to use any heavy inks such as marker pens. The foam will mark very easily with a soft pencil or even a finger nail. A slight impression is all that should be needed. Inks and paints will bleed through the glue and latex, although this may not be immediately noticeable, within a few months of making your weapons you will notice dark stains appearing on the surfaces of the weapons, this will usually be the ink from markers bleeding through.



When you are happy with the blade shape cut it out using a sharp craft knife remembering to keep the knife upright and perpendicular to the surface or the finished sword will be smaller on one side than it is on the other



With the blade shape cut out you can now take another piece of 6mm foam, rub it down on one side as in the previous stage and glue it to the other exposed side of the core and stamp it down hard (or clamp in your press) now leave to dry overnight.

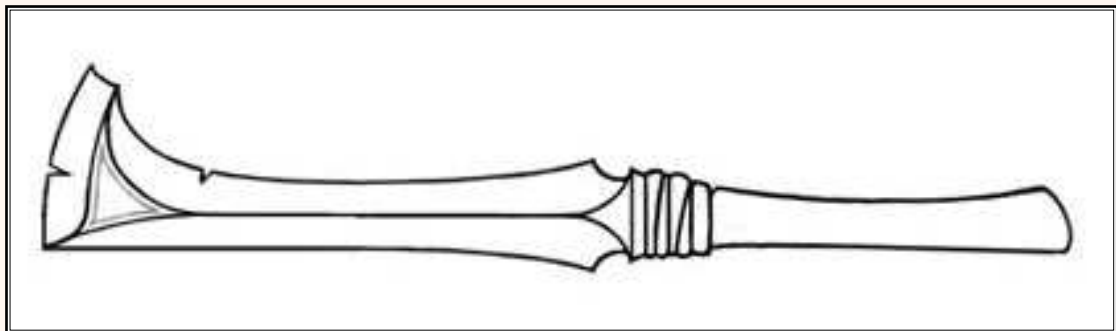
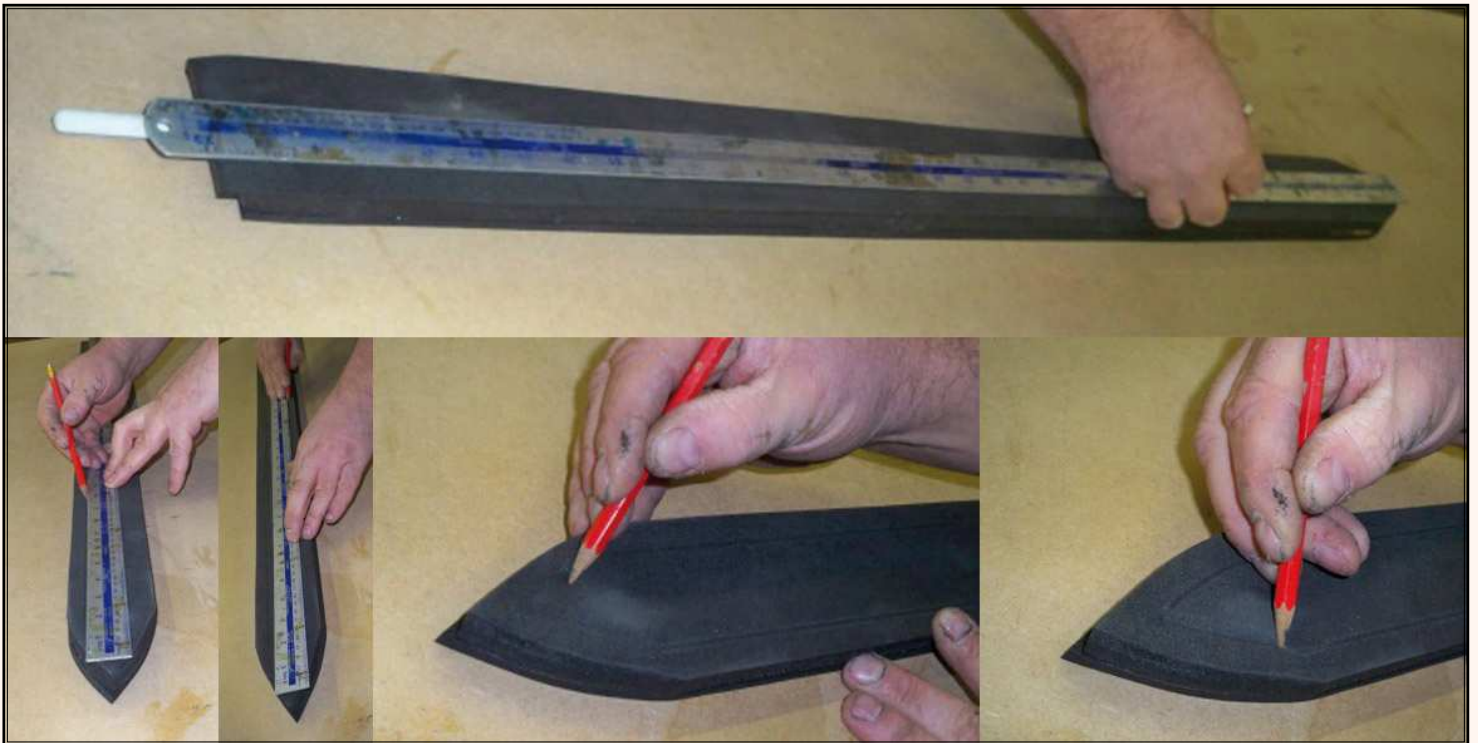


When dry take a sharp knife and trim away the excess foam from the recently added side. The result will be a three layer sandwich with the fiberglass core in the middle of two 6mm outer sides.

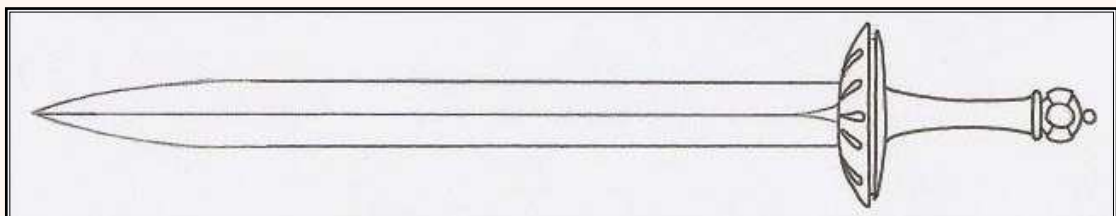
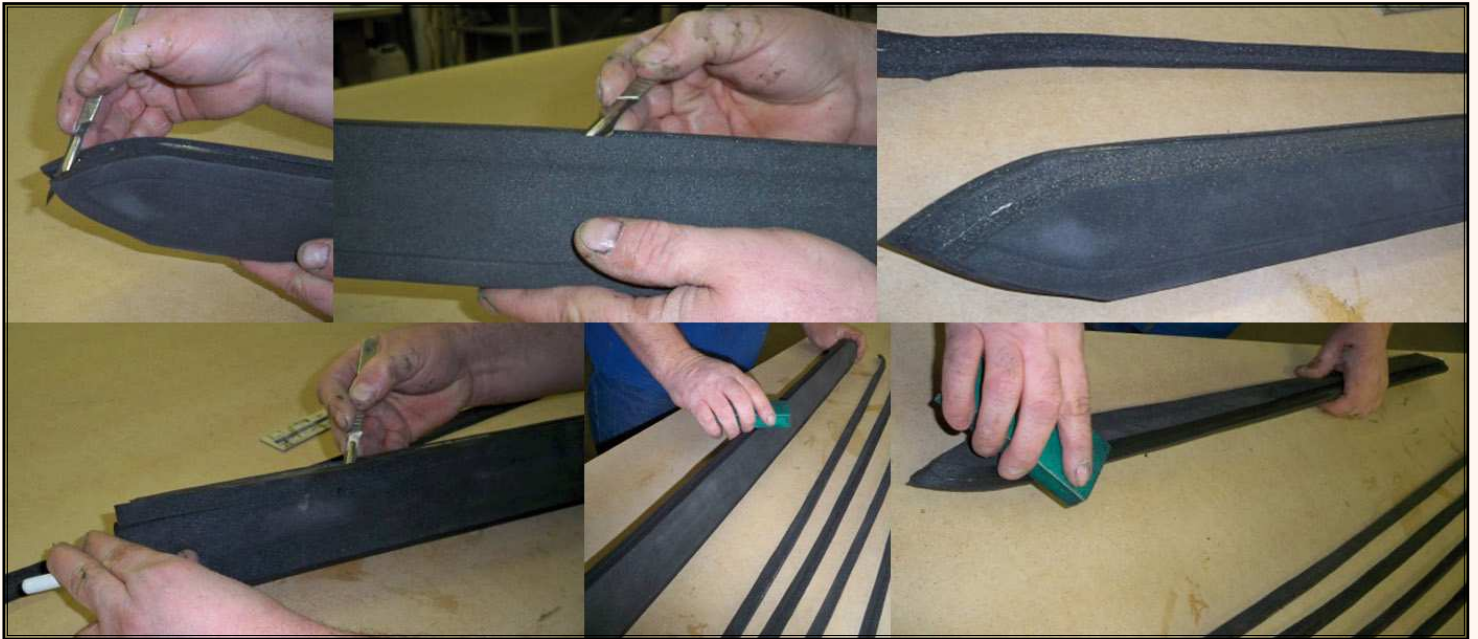


Adding the Bevel

Now comes the tricky bit! When the sword has dried completely mark out lightly on both sides of the blade where the beveled edge of the blade will come to (the sharpened edge of the sword)



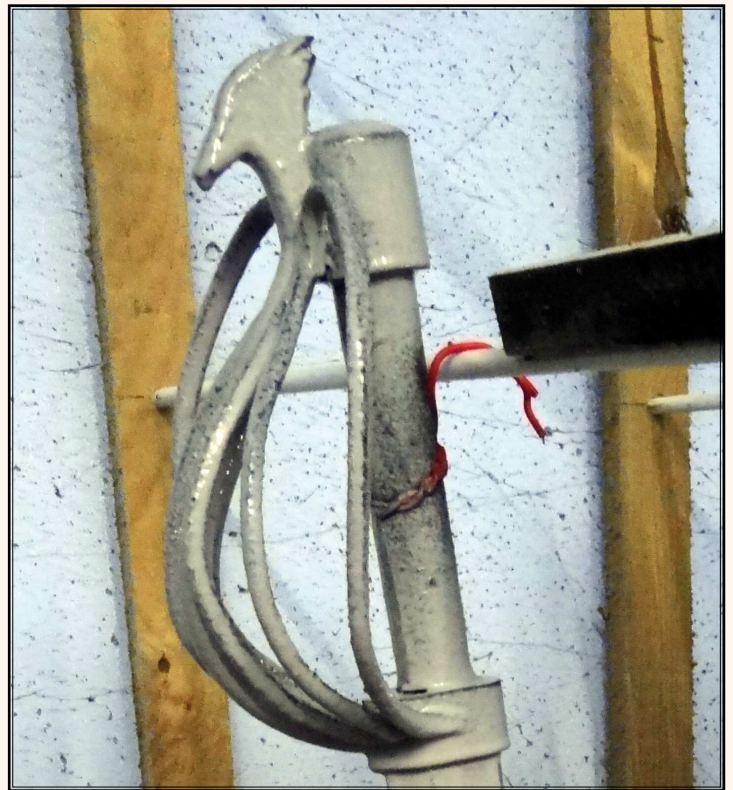
then with a very sharp blade and a steady hand cut the bevel in one go, do not try to recut the edge as this will leave a ridge in the blade, (having said this it is possible to clean up any ridges from the finished bevel. Using a fresh piece of 80 grade abrasive gently sand away any blemishes) Making this cut will be much easier if the sword bat has been left to dry for several days, it will also be easier if you use a brand new blade.



The Crossguard

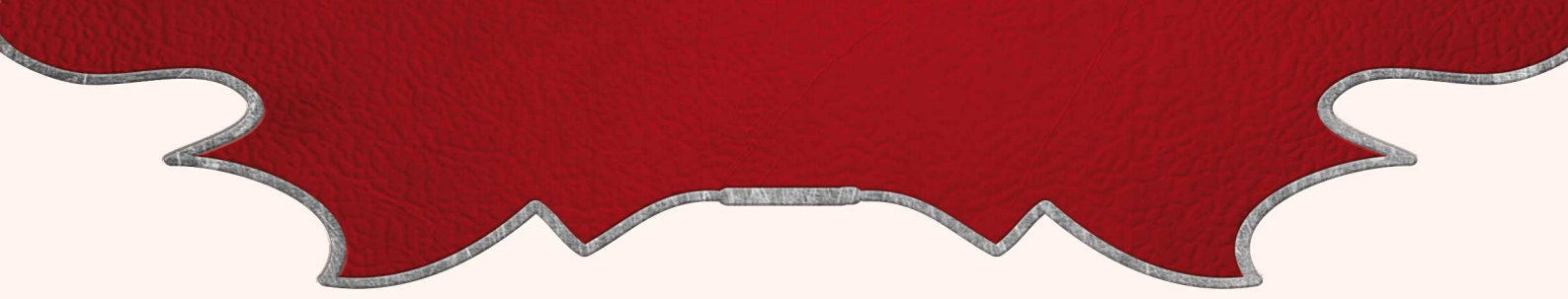
With the bevel successfully cut you are now ready to make the cross guard. This can take many different forms and together with the pommel will make your sword unique. Guards can be made simply by gluing a disc of Plastazote to the base of the sword,

or if you are particularly adventurous a basket hilt could be formed but this takes quite a few hours in itself.



Here we are using a template to cut a simple crossguard from a sheet of 19mm thick foam





We use a bandsaw to cut out the shape as it gives nice parallel sides but with care a sharp knife can be used to do the same job



A soldering iron can be used to make a hole for the core to go through



The crossguard is glued to both the blade and the core and you are now ready to add the handle and pommel

HAFTED WEAPONS & POLEARMS

All hafted weapons be they Axe, Hammer, Mace, Quarterstaff or Spear ave a similar construction technique, here we are going to show you the means of

producing the hafted part of the weapon and then we will tell you how to add different heads.

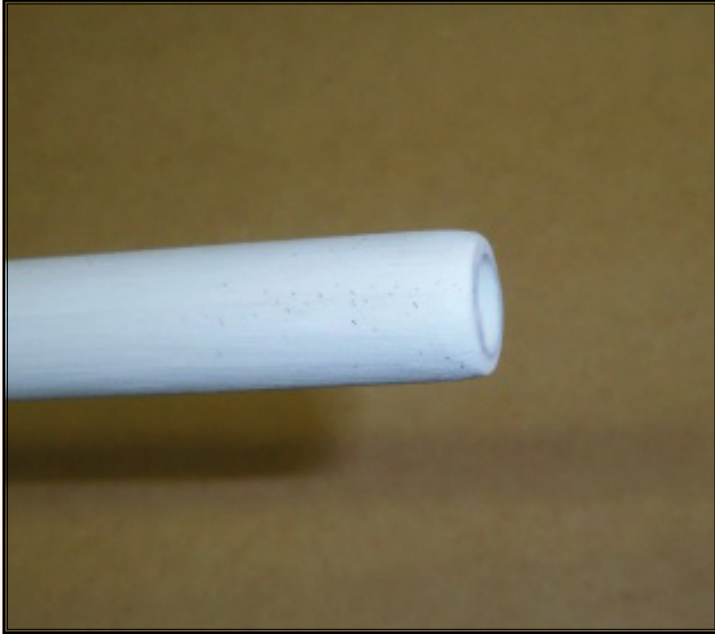
Core size	Common use	Safe useable lengths
10mm Rod	Short hafted weapons	24" to 42" (600mm to 1050mm)
12mm x 8mm bar	One hand hafted weapons	32" to 48" (850mm to 1200mm)
12mm Rod	Two handed hafted weapons	36" to 60" (900mm to 1.5M)
16.2mm Rod	Great weapons	50" to 72" (1.3M to 1.8M)
19mm Tube	Long hafted weapons	Up to 7 feet (2.1M)
25.4mm Tube	Large handles	Up to 8 feet (2.4M)

The first thing is to know what the weapon will look like and how big it is going to be. For instance for the sake of demonstration we decide that we are going to make a symmetrical double headed Battle axe with an overall length (head and handle combined) of 60 inches (1500mm).

For this size of axe we can use either a 19mm tube or a 25.4mm tube. Cut the fibreglass core 2"(50mm) shorter

than the finished haft length required but we must also calculate the overhang of the axe heads. For a large battle axe the heads will usually protrude some distance above the end of the shaft for example our axe head will be 3" (75mm) beyond the end of the shaft leaving 57" (1425mm) of shaft, taking the last 1" (25mm) of the shaft to be padding then we will need a core of 56" (1400mm) using a sharp hacksaw we must cut this length of 19mm





The cut edge will be left very sharp and capable of cutting through plastazote foam. To improve the core safety we round the ends of the core with a suitable abrasive say about 80 grade emery cloth, this will remove any sharp edges and help to prevent the core cutting its way out of the weapon during use. Rub down the whole length of the core with the abrasive to remove any glossy finish and improve adhesion to the foam, When using to 12mm x 8mm bar the square corners of the bar should also be rounded slightly.



Once rubbed down all dust must be removed from the core and it should then be wiped down with Acetone, this will help with adhesion to the foam by removing any remaining dust and grease from the fiberglass rod and allowing the contact adhesive to properly wet the core. The acetone is a solvent for the polyester resin used in the core construction and thus it will etch the surface leaving a slightly porous surface which will also improve glue adhesion and improve the longevity if the finished weapon.

Acetone is volatile and highly flammable. Wear protective gloves when cleaning the rods. Acetone will remove the natural greases from your skin and will sting if allowed to enter a cut or scratch. The smooth resin factory finish on the core will not readily accept adhesives. If the core remains untreated then the weapon life will be greatly reduced.

CORE WRAPPING, GLUEING and REINFORCING

Once the core is abraded and degreased it is ready for the next step, 'podding'.

When using tube as a core then the ends of the tube should be plugged with some foam off cuts. Cut a small wedge of foam with its larger end slightly larger than the internal diameter of the tube.

Place a generous coating of hot glue around the inside of one end of the tube

and immediately twist the foam wedge and 'screw' it into place. When the hot glue is cooled trim the end of the plug to be flush with the end of the tube, repeat with the other end and now apply the pods.





A small piece of foam of the same diameter as the core should be hot glued to one rounded end of the core and the end wrapped tightly in cloth tape, this forms a protective "pod" which will prevent any injury should the core ever part company with the foam. Cut a small piece of foam similar in size to the profile of the core and about 2" (50mm) long.



Use the hot glue gun to apply a small amount of glue to the end of this 'pod' and keep the glue gun in contact with the foam until the end of the pod is soft and coated with hot glue then working very quickly before the glue cools apply the pod to the end of the core and hold it tightly in place until the glue cools.



Now take a short length, approximately 4" (100mm) of 1" (25mm) cloth tape and lay it glue side up on the work bench. Place the pod end of the core on the end of the tape at a slight diagonal angle and pressing down with the flat of your hand roll the core over the tape until the end of the fiberglass and the foam pod are tightly wrapped in cloth. Repeat for the other end of the core.



The podded core is now ready to use.

The Hot melt glue should be carefully chosen for this process. At our workshop we use specialized high temperature melt plastic glue. This glue will remain slightly flexible even when cold. This prevents the glue joint from breaking when cold or subjected to extreme duress.

The next stage of making any hafted weapon is wrapping the core. The safety standard we are working to declares that 12mm of padding is required on striking surfaces, this is achieved by giving the haft two wraps of 6mm foam. We use two 6mm wraps as a single

Cut a piece of 6mm thick Plastazote LD45 slightly longer than the podded core, ie. slightly over 60" (1500mm) and wide enough to wrap around the core with an inch or so to spare.

Cut a 45 degree bevel along one long side of the foam, this allows for a neat finish to the wrap. If the edges were left square then when we wrap the foam around the core there would be a resultant air gap as the foam overlaps itself. With the glued beveled edge to complete the wrap then the foam lays neatly over itself looking somewhat like a number '6' in cross section.

wrap of 12mm foam would be very difficult to achieve and using two wraps also allows us to alternate the glue joints ensuring that there is no defined weakness in the padding.

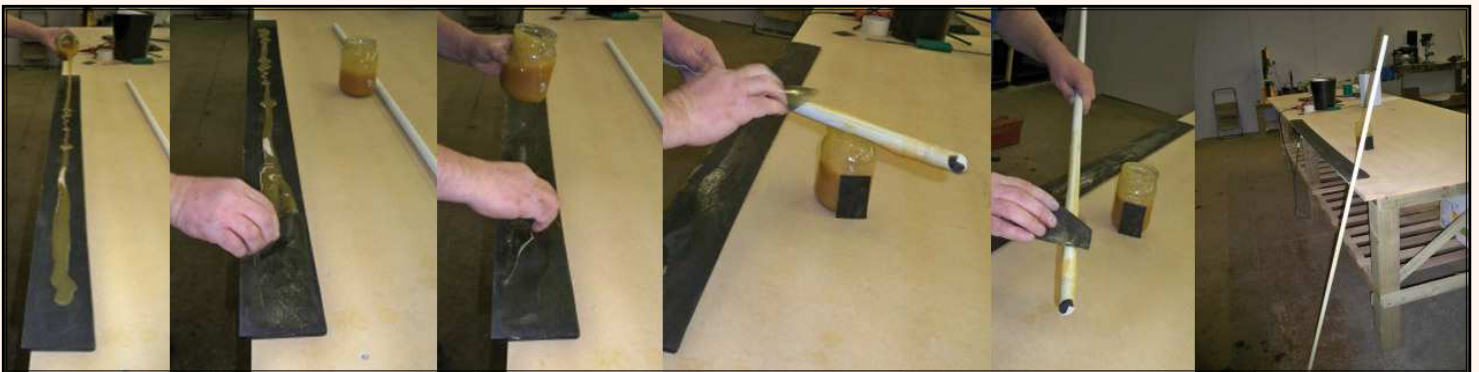




Plastazote foam is a closed cell foam, this means that it allows for no liquid uptake, if immersed in water it will float and any water will run off the surface when it is removed, this closed cell structure also gives us some problems when applying glue, the adhesive will work better if it has an absorbent surface to work on so we must create a rough surface to improve the adhesion and thus increase the longevity of the weapon. Rub down the beveled edge and the wide side (the side that does not show the beveled edge) of this piece of foam with 80 grade abrasive, this breaks open the cell structure of the otherwise sealed surface of the foam and improves adhesion.

Contact adhesives must be applied to both surfaces of the joint. The glue must be applied in a liberal coat and moved all over the surface using a smooth edged spreader, once the glue has had time to react with the foam surface then any excess should be removed and deposited back into your glue container, until a thin, even glossy coat is left behind on each surface. After a few minutes the foam will curl slightly as the solvent reacts with the surface, as the glue dries over the next few minutes the curling will relax and the foam will

return flat at the same time the glue surface will dull slightly. At this time test the glue surface with the back of your hand, if the foam sticks to your clean hand then the glue is still too wet, if the surface feels slightly tacky but does not stick to your hand then it is ready to be joined. Place the two surfaces together. Once joined together the two surface will require some pressure for the glue to adhere properly. If pressure is not applied then the two surfaces can be separated quite easily.



Glue the beveled edge and the abraded side of the foam wrap, first glue the beveled edge of the foam then place the foam flat on the workbench with the glued bevel hanging glue side down over the edge it will then be easier to glue the flat side of the foam. Now glue the prepared core with a thin film of contact adhesive and

leave until touch dry it may be easier to use a small off cut of foam to apply the glue to the round core rather than a hard flat glue spreader, the contact adhesive should be cured and ready to stick together in about 15 minutes.

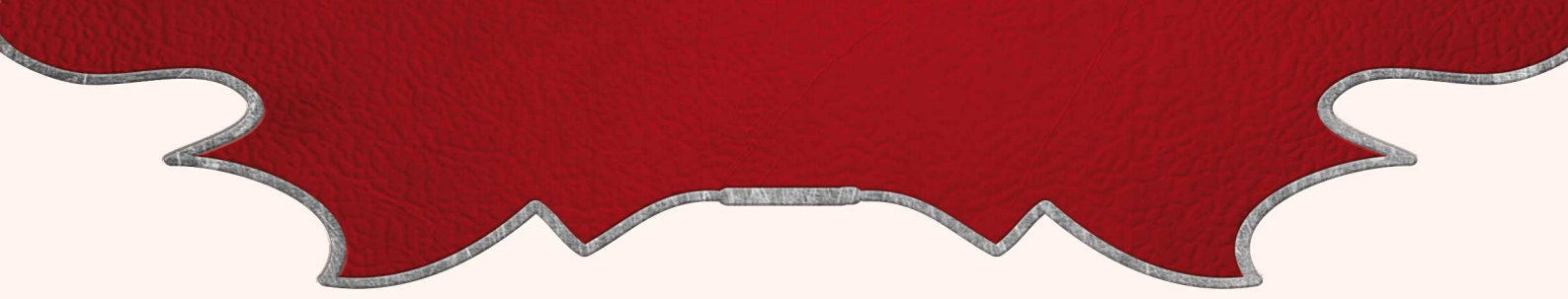
in about 15 minutes. When touch dry stick both pieces together starting with the beveled edge of the foam laying it neatly down the length of the core and hanging slightly over each end



then gently wrap the glued foam around the core ensuring that it lays neat and tight to the fiberglass with

no wrinkles or air gaps between foam and fibreglass

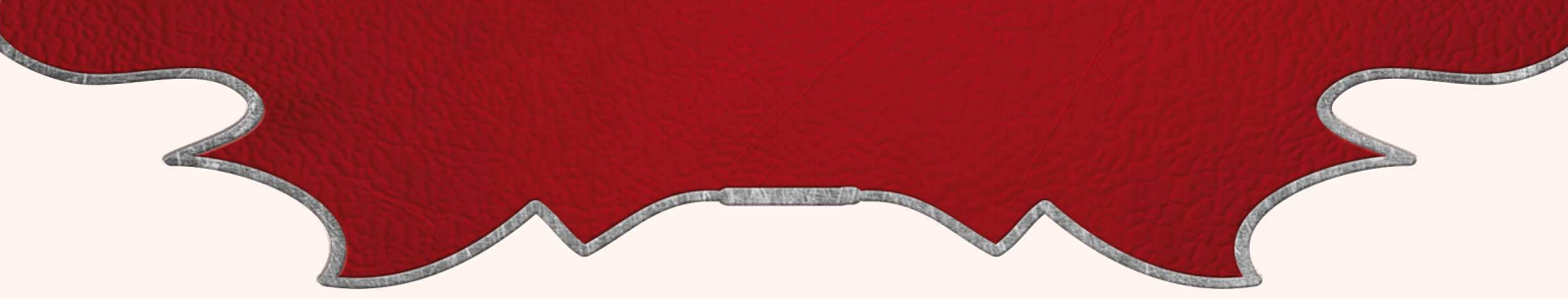




Place the wrapped core on a clean dry surface leave to dry overnight.

For the best results after each completed glue process the weapon blank should be left overnight on a flat surface to allow for the excess solvent to evaporate. During the normal contact glue drying some 90% of the excess solvent will evaporate during the 10 – 20 minute cure time, the remaining 10% will take much longer to evaporate, bearing in mind that the plastazote foam is of a closed cell structure it will have no way of evaporating after the surfaces have

been stuck together which can have devastating results in the future, a sudden increase in temperature or a drop in pressure can result in the excitation of the small amount of solvent trapped within the weapon, this excitation could cause the solvent to expand and rip apart the weapon from the inside. Thus may sound far fetched but I have seen it happen with quite dramatic results!



The next day, when the glue on the wrapped shaft is well dried using a sharp blade trim the spare foam from the shaft, keeping the blade resting flat on the shaft and

perpendicular to the spare end of the wrap. This should leave a neatly wrapped shaft with a slight triangular raised section along the join.



Take a very sharp blade and carefully trim the top off the raised section. Using the coarse 80 grade abrasive gently sand the edge down to round off the shaft. Always sand in one direction, resist the urge to use a reciprocating 'scrubbing' motion as this will result

in a very uneven rough surface. Keep the sanding motion down and slightly around the shaft in the same direction as the foam wrap. Do not sand against the wrap direction as this will lift the edge of the foam and leave an uneven surface.



At this point you are ready to attach an axe, hammer or mace head before continuing work on the haft



Now prepare the second wrap. Take another piece of 6mm foam wide enough to wrap around the shaft (this will be wider than the first wrap and the shaft is now 12mm larger in diameter)

Cut one piece at 3" to 4" (75mm to 100mm) long, this will wrap the end of the shaft above the head. And then cut a piece slightly longer than the remaining shaft below the head. Abrade the beveled edge and the back of the wraps and glue the edges and back of the wraps and the axe shaft and leave to cure.

When the glue is touch dry repeat the wrapping process as before but ensure that the beginning of the second wrap layer starts on the opposite side of the shaft from the first layer (180 degrees around the shaft) this will make a much stronger joint and a longer lasting weapon. Keep the second wrapped layer tight against the axe head, to do this compress the foam as you begin the wrap to make sure that there will be little or no gap between the second wrap and the axe head.

When the glue has completely dried the spare foam can again be trimmed away to leave a smooth round shaft.

Axe Heads

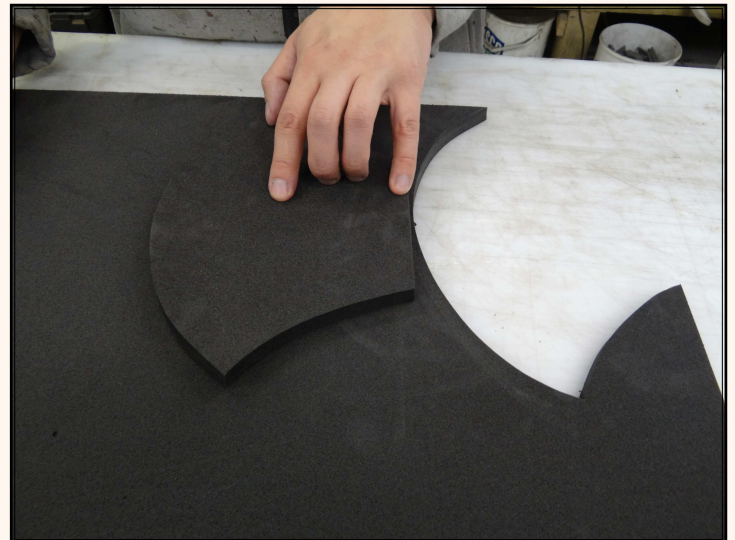
Whilst the wrapped core is drying the heads of the axe can be prepared.

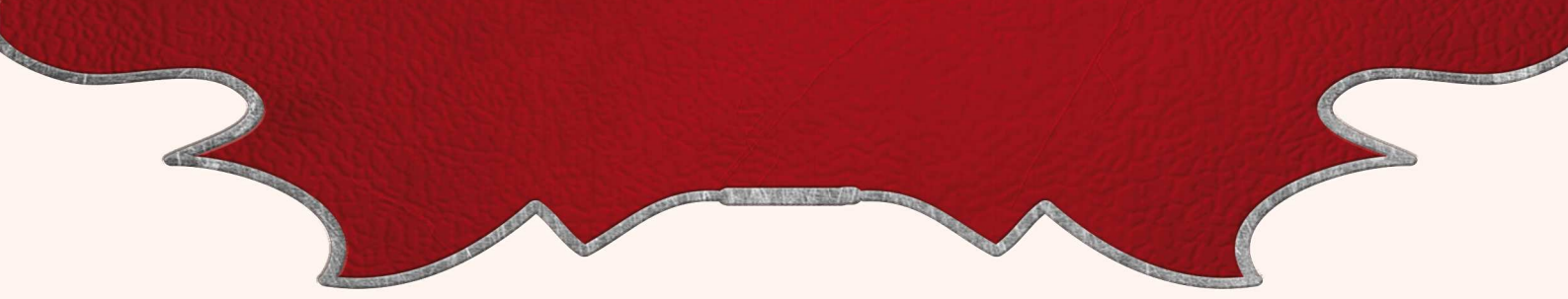
There are several methods of making and attaching axe heads but we will deal with the most basic method. Here we will show how to make a double headed axe

Using 18mm thick Plastazote LD45 mark out and cut two axe heads, a finished axe will look much bigger than the individual heads, lay the wrapped shaft on a the sheet of Plastazote (if making several use a large sheet of card or paper as a template) and draw the finished outline of the double headed axe marking the thickness of the shaft.



Once you are happy with the overall shape and size of the axe cut out a template for a single head and use this to cut two identical heads from the 18mm foam.





Using a sharp scalpel cut a 'v' groove in the edge of each blade where they will meet the shaft, this enables a better glue joint.



When you are happy with the surface finish of the wrapped core you are ready to attach the heads. Apply a generous amount of hot glue into the groove of one of the pre cut axe heads, use the tip of the glue gun to ensure that the foam and glue are very hot and soft then apply the head to the shaft. Ensure that the head is attached to the fiberglass section of the shaft and not overlapping the foam pod. Keep the axe blade flat and level on the shaft and hold firmly in place until the glue is set.



Once the glue is cooled and the head is firmly attached then the second head can be attached. The second head is more difficult to position as it must be level with the first blade but also it must lie exactly opposite the first blade 180 degrees around the shaft, it will be very difficult to hold the second head in position and aligned in both planes as well as keeping it flat but with some practice and a lot of patience this can be achieved.

Once the two heads are hot glued into place and you are happy with their positioning rub down the surfaces with 80 Grit paper to get a good surface to bond to then the whole of the head and the areas of the joins should be covered with a generous layer of contact adhesive, remove excess glue and return it to the glue pot but allow it to pool in the joins against the shaft. Place the axe on a flat surface and allow the glue to dry overnight.

When the glue has completely dried overnight the process is repeated on the other side of the axe head again allowing the glue to fill any voids in the axe head and shaft. Place on a flat surface and leave to dry overnight..

The next day spread a generous layer of glue over the area where the heads are attached to the shaft extending to a few inches (50mm) either side of the shaft. Place a strip of 2" (50mm) cloth tape along the shaft from the top to the bottom of the heads and coat with a generous layer of glue. Allow the glue to soak through the cloth tape for a few minutes and then using a straight spreader, 'squeegee' the glue out of the tape and leave the glue soaked tape to dry. This will reinforce the hot glue joint and help to make the axe heads stronger and longer lasting. Leave flat to dry overnight and the repeat the process for the other side of the head.

For a single headed axe wrap the tape around the shaft and onto the other side of the axe head





When both sides of the axe heads have been glued and reinforced then take a piece of 6mm LD45 and cut two shapes similar in shape to the double axe head but slightly narrower leaving an inch or so of the blade edge exposed. Scuff one side of each of the pieces and glue one of them with contact adhesive and glue one matching side of the axe heads.



When the glue is cured on both sides carefully place the 6mm cut piece onto the axe head and press down into place. Place the axe flat on the floor and with clean shoes apply pressure all over the axe head.



Repeat the process for the other side of the head. If the axe heads are very large or have large beards they may need a further cloth reinforcing along the bottom edges of the blades, if this is the case then using 1" tape (25mm) glue and tape from the underside of the axe beards onto the shaft and leave to dry.

Now return to wrapping the core with the second layer of foam

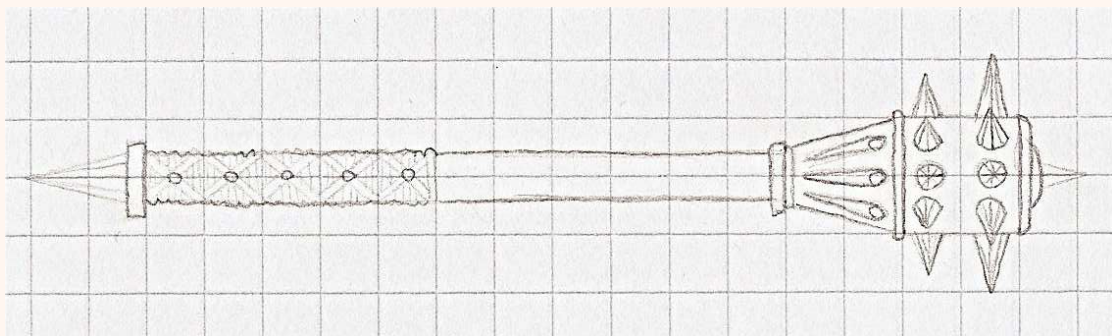
Mace Heads

Creating a flanged mace head is very similar to creating a double headed axe head

First we cut out 6 identical flanges for the mace head, depending on the size of head you might want to use plastazote of a smaller thickness than the 19mm we use for axes 12mm is a good size for smaller maces



Just as we did for the double headed axe start by hot gluing two of the flanges onto the shaft opposite each other on the flat





With the first two flages glued into place it becomes much easier to add the remaining flages



For LARP weapons we would always recomending reinforcing the joints with fabric tape just like the axe, rather than overlaying with 6mm Plastazote foam you may find it better to use 3mm



Now return to wrapping the core with the second layer of foam.

Hammer Heads

Whilst the wrapped core is drying the head of the hammer can be prepared. For the large striking surface of a war hammer closed cell foams would be too hard. A softer open cell Polyurethane (PU) foam, often referred to as furniture foam, would be more suitable.

For a large example we will use a simple square section head. A piece of foam approximately 4" (100mm) square and 10" (250mm) long is cut from a sheet. This can then be carved to the desired shape. For home projects a large amount of PU foam can be retrieved

Find the centre of one side of the soft foam hammer head. A hole must be cut through the head slightly smaller than the wrapped diameter of the shaft.

The easy way to cut a hole through foam is with a piece of old pipe. I always save any old off cuts of steel or copper pipe that I find lying around. I have two short pieces of copper pipe that are just the right size for hammer shafts. Use a file or emery to sharpen the inside edge of one end of the pipe

Place the foam hammer head flat on the bench and using your new hole cutting tool with a twisting action cut a hole neatly through from the centre of one side of the head straight through to the centre of the opposite side.

from discarded furniture. An old sofa will often provide enough foam to make twenty or thirty such hammers!

For a smaller hammer head we add a softer PU foam to the striking surface of an LD 45 foam base

Cutting PU foams is made much easier with the use of a domestic electric carving knife. These are readily available in most department stores or supermarkets at a very reasonable price, they are an indispensable tool in the prop makers kit.





When you are happy with the surface finish of the shaft slide the precut hammer head onto the shaft slightly below the end of the shaft. If you are happy with the proportions of the hammer then the head can be glued into place. Slide the head further down the shaft and then coat the shaft with a liberal amount of contact adhesive and slide the head back up into position. Remove any spare glue from the shaft and replace it in your glue pot. The head should be near to one end of the shaft but should be mounted over the fiberglass core, do not be tempted to have any amount of the 'podded' end of the shaft within the hammer head, the results will be catastrophic and the head will tear away from the shaft.



Spear Heads

Our preferred method of spear making is to form the head separately from the shaft and so we will create the spear head first; following the instructions for bladed weapons but cut the fibreglass core 8”(200mm) longer than the finished spear head length

Using a 10mm core with a 19mm tube is a perfect combination as the core is a perfect fit into the tube, with a 25mm tube a 10mm core needs a 19mm tube sleeve around it and a little work to get it to fit

Producing spears is a little different than the other polearms in that we produce the head first and then wrap the shaft twice rather than attach the head after the first wrapping goes onto the shaft.

With the blade finished the spear head and shaft can be married together;

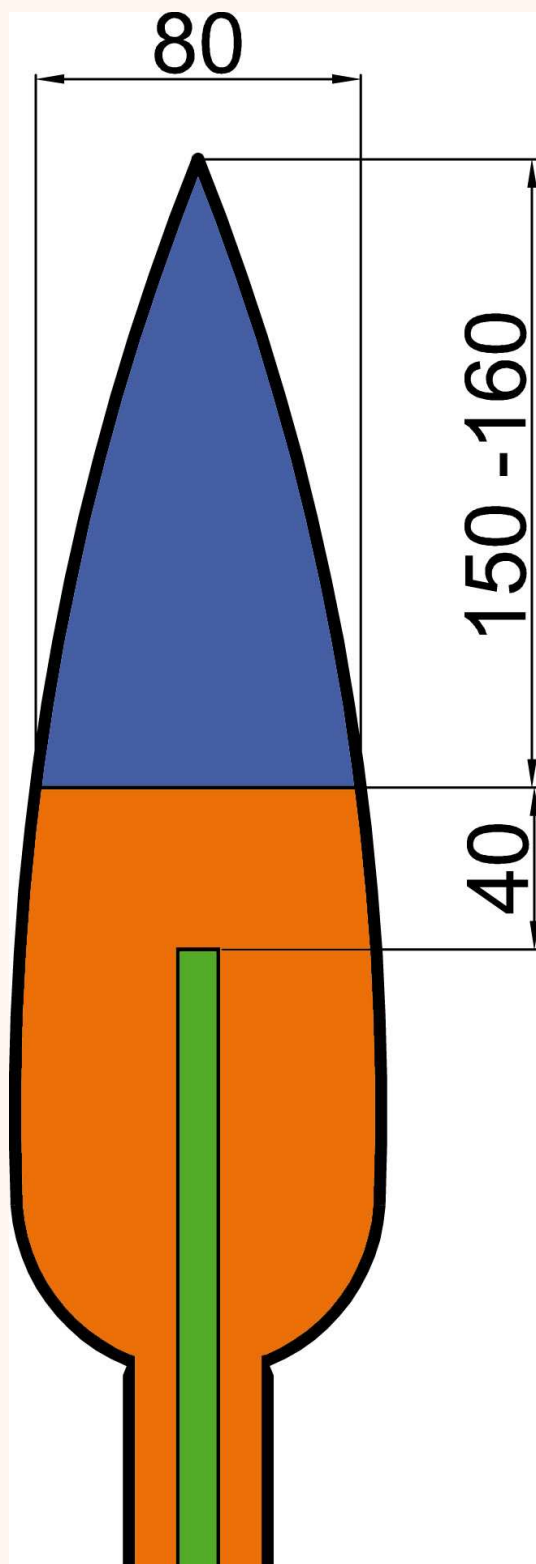
Lay the spear head alongside the unpodded end of the shaft and mark the 19mm shaft where the 12mm core ends. This will ensure that we know where the tang of the head will end when it is inserted into the shaft. Now hot glue the tang (the core protruding from the spear head) remembering to work quickly as the glue will cool very quickly, push the tang into the open end of the 19mm shaft in one quick motion until the bottom of the spear head fits tightly against the top of the 19mm tube and use a scrap of foam to remove any excess hot glue

that oozes from the top of the shaft.

Once the head is glued in position the shaft and tang should also be pinned in place to bolster the glue joint. Drill through and fit three small panel pins through both the tube and the spear head tang at right angles to each other to secure it in place. Using a 2mm drill bit place the first hole approximately 2” (50mm) from the base of the head and then a further 4” (100mm) down the handle drill a second hole at right angles to the first and then drill the third hole an inch (25mm) above the mark indicating the end of the tang ensuring that the holes are central along the length of the shaft to ensure that the pins pass through the centre of the head core. Placing the tip of the glue gun against the holes, fill the pin holes with hot glue and place a panel pin into the hole and tap it into place using a small pin hammer.

At this point you create the hafted part of the weapon

Thrust Safe Tips



Thrust safe weapons are more complicated to produce than ordinary LARP weapons. Much like Hammers they use a soft foam for the contact area to all but eliminate the risk of injury for the person being stabbed as the soft foam collapses and absorbs the force of the impact.

We start in much the same way as we would if creating a normal bladed weapon, with just a couple of changes, firstly when we bat up the body of the blade we make it 150 to 160mm (6 to 6 3/8th inches) shorter than the finished desired length, this will be added using the softer foam (shown as blue in the adjacent diagram) and secondly when we place the podded up core within the bat it must be placed dead centre and the slot to hold the core should start 40mm back from the front of the bat to provide additional resistance to the core passing through the foam into the person being struck. If we assume that a 10mm core is being used the thickness of the Bat will be around 22mm (7/8th inches), the junction between the harder Plastazote LD45 foam used for the rest of the weapon and the softer open cell polyurethane foam (typically used for furniture cushions) should be a minimum of 80 mm (3.25 inches) wide, as shown in the diagram. This soft foam is attached to the tip before the shaping and bevelling of the blade occurs.

There is just one remaining difference, when the latex and the protective clear coat has been applied to the weapon you need to make a small 2mm diameter (3/16th inches) hole through the latex and clear coat into the soft foam just in front of the glued joint, this will let the air out as the front section of foam collapses, if you don't do this the latex may well balloon up as the tip collapses and come away from the foam due to the increased air pressure.

HANDLES

The handle can be made either from wrapping foam around the core or preferably (If using a core of less than 16mm diameter) by adding a piece of fiberglass tube to the end of the core. If the tube is the chosen method you must ensure that the tube is a tight fit over the 10mm core, a tube with the same bore as the core can be used or the core can be “bulked” out with even strips of Gaffa tape until the tube is a tight fit.

Now glue the tube in place using hot glue or contact adhesive. If there is a slight gap between the core and the handle tube then hot glue will fill this gap but the joining of the two must be done very quickly as the hot glue will cool very quickly against the two fiberglass surfaces. If the tube and the core are a very tight fit then it would be best to use a contact adhesive but apply the glue in a generous layer to the sword core and then slip it into the handle. Remove the excess glue and apply a little hot glue to the end of the handle to hold it in place whilst the contact adhesive dries. (This will take a few days to fully dry) Once the handle tube is glued in position (which ever method you use) the handle should also be pinned in place to bolster the glue joint. Drill through and fit two small panel pins through both the tube and the original core at right angles to each other to secure it in place. Using a 2mm drill bit place the first hole approximately 2” (50mm) from the blade end of the handle and then a further 3” (75mm) down the handle drill a second hole at right angles to the first ensuring that the holes are central along the length of the handle to ensure that the pins pass through the center of the sword core. Placing the tip of the glue gun against the holes, fill the pin holes with hot glue and place a panel pin into the hole and tap it into place using a small pin hammer.





If the hot glue sets before the handle is fully on you can use a hot air paint stripper to attempt to soften the glue and allow you to move the tube.



Now repeat the rubbing down and podding process on the handle, this is the same as the pod and cloth wrap used for a sword tip but this time the piece of foam must be the same diameter as the handle.

Once a layer of cloth tape has been wrapped around the pod then a wrap of Plastazote can be added; Cut a piece of 6mm thick plastazote slightly longer than the handle and wide enough to wrap around the handle with an inch (25mm) to spare. Cut a 45 degree bevel along one long side of the wrap, this will ensure that the handle wrap will fit tightly against the fiberglass with no air gap. Using the 80 grade abrasive rub down the beveled edge of the wrap and the 'wide' side, that is the side away from the bevel. Apply contact adhesive to the abraded bevel edge and reverse side of the sheet and to the fiberglass handle. When the adhesive is cured stick the wrap against the handle, starting with the beveled edge (facing upwards!) place the edge along the handle tightly against the bottom of the blade and running down to the pommel end. Now slowly wrap the foam around the handle ensuring that it lies smoothly around the handle with no trapped air between the foam and

the fiberglass. As the foam reaches the beveled edge it can be pressed tightly against the upwards facing bevel. Once dry the spare overlap of foam can be trimmed off. Using a sharp blade cut the spare foam away keeping the blade perpendicular to the spare edge. This will leave a neatly wrapped handle with a spare triangular edge that can then be trimmed away. Use the coarse abrasive to gently sand the handle to an even cylinder, keep it moving with the direction of the foam wrap and not against the glue joint.

THE POMMEL

Once the handle is even then a further wrap can be applied around the end of the handle to form a basic pommel on the sword. Ensure that any pommel wrap covers both the foam pod and an equal length of the fiberglass tube. The pod should be trimmed to 1" (25mm) and the pommel wrap should be 2" (50mm). Further foam embellishments can be added to make a very decorative pommel if required. As with the guard, the pommel can be formed in many different ways including the very simple method of gluing a soft foam ball over the pod.



THE LEATHER HANDGRIP



The weapon is now ready to have its handle finished, a piece of suitably coloured leather or cloth glued to the fibreglass tube will add the finishing touch. If you want to be a bit more technical then a second wrap of contrasting leather with holes punched for laces can be wrapped and then laced with thong for a medieval look. Our normal chosen method at Skian Mhor of handling is to glue a piece of leather around the handle area and then to bind the leather in with a spiral wrap of synthetic sinew.

Alternatively you could wrap the handle with a strip of leather as shown below, this is typically used for more primitive styled weapons, start by working out how long a strip you need to wrap the handgrip. then trim the end of the strip at an angle before coating the back

of the strip and the foam handgrip area with contact cement, allow to go touch dry then tightly wrap the leather around the handle. Trim at the top to get a nice finish.



DETAILING

Detailing is the process where we add character to the weapon we have created

Plastazote detail can also be added to weapon heads and shafts details such as square plates, anvil silhouettes etc. Gradually decreasing sizes of plates can be built up on either side of the head. and strips or spirals added to shafts and pommels



Another simple detail that can be added to weapons detailing is the rivet. These can be simply created with the hot glue gun. Small blobs of glue applied to the surface of the rings will look like rivets when latexed and painted.





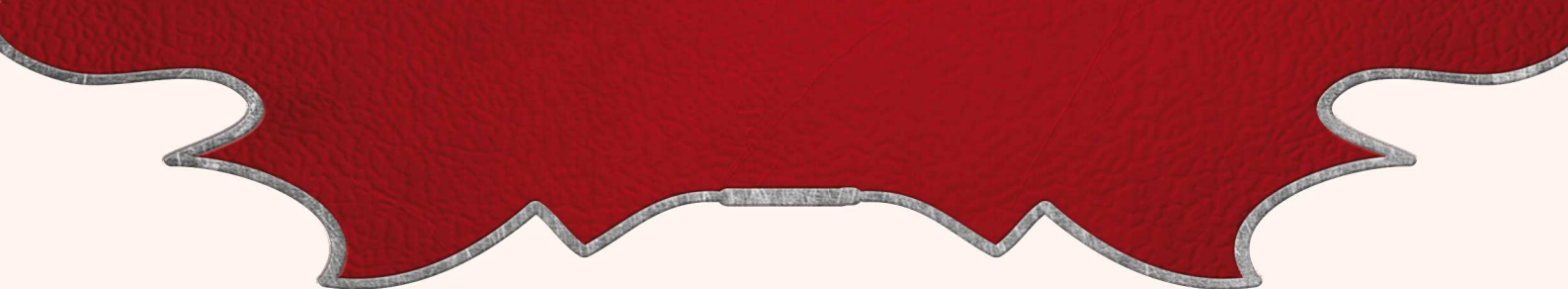
Teeth and claws can be carved from small pieces of plastazote and applied to the weapon, but when doing so pick locations that are unlikely to be used to hit someone, this reduces the chance of such decoration being ripped off in combat.



The wooden shaft of a polearm or the head of a mallet can be left smooth and eventually painted as wood or it can be textured. Sometimes we break up the smooth surface of the shaft with a wood bark effect created with a rotary tool such as a Dremel.

Using a tapered stone in the mini drill a series of slightly random lines can be engraved running up and down the shaft.

A different interpretation of wood can be created by taking very thin slivers of foam from the surface with a very sharp blade, this will represent a stripped or 'adzed' appearance but care must be taken to remove only a very thin layer and not to cut into the foam or the shaft



will no longer have its required 12mm of padding. To allow for this an extra layer could be added to the shaft when it is wrapped or maybe 8mm foam could be used for the wraps instead of the 6mm allowing an extra 4mm of thickness that can be carved away to form the carved bark.

Carving into the foam is not just limited to wood grain effects, cutting a groove down the length of the blade with a sharp scalpel or engraving runes or other symbols into the blade, shaft or guard using a minidrill, dremel or soldering iron, Cutting small nicks out of the blade can give a well worn antique look to the weapon.

The Details you add are only limited by your imagination just remember to always leave sufficient foam in place to ensure the minimum 12mm on striking surfaces and 6mm on non striking.



LATEXING & PAINTING



Now that the weapon design is finished the coating of rubber can be applied, we choose to use a black latex for coating;

Liquid latex is a natural organic tree sap that has been treated with sulphur to vulcanize it, (vulcanizing turns the raw sap, which resembles lumpy cottage cheese, into a smooth chain structure which gives it its characteristic elasticity) medium density dipping latex consists of latex solids suspended in water with about 6% ammonia added to keep the solids in suspension. The latex resembles a creamy white milk, when the water is evaporated away it will leave a thin almost clear rubber layer. Being an organic material suspended in water means that it can be coloured using water based dyes and paints.

Once dry the latex is forms a smooth porous layer which reaches its full modulus after a week or two at which point it can be stretched up to seven times its original size before tearing, however it can be destroyed by contact with solvents or copper and it suffers when left exposed to strong Ultra Violet light.



Pre-mixed water colours and household emulsion paints work very well. Many other paints may be suitable but a small sample should be tested first as some paints will react with the latex to varying degrees. Some paints will simply rot the latex and some will turn the latex into an unusable blob.

Metallic paints in particular tend to react with latex, (copper based including bronze and brass are particularly bad as are those with any sort of iron content) but there are plenty of metallic paints that do not react.

We use Black Latex for a number of reasons, the black dye thickens the latex slightly, the black also attracts the heat and tends to dry slightly faster, a black surface is easier to paint finished colours onto and finally with the base latex being white when wet and clear when dry, the dyed latex is grey when wet and black when dry. This is a useful indicator to tell at a glance when your latex coats are dry.

Make sure that the area you are latexing in is well ventilated as there will be a strong smell of ammonia. Do not be tempted to use chemical latex thickeners for coating weapons. The commercially available thickeners are designed for making latex adhere to ceramics when making moulds. If used for coating weapons they will reduce the elasticity of the latex and can cause the weapons surface to split and crack.

The first job is to attach a small loop or hook to the handle of the sword to allow it to be hung up whilst drying, this can be made simply by taping an off cut of foam to the handle or by wrapping a short length of stout wire around the handle.





Now we apply a coat of adhesive (contact adhesive thinned with toluene is suitable) it is sprayed on, or brushed onto the weapon with a paintbrush. A thin even coat is applied to the whole weapon leaving enough of the handle to hold whilst working. This priming layer of glue is vital to keep the latex attached to the sword. Latex is often used to make moulds as it is easily removed from most surfaces, the weapon is made from closed cell foam which resists anything sticking to it, the combined properties of the two materials gives the weapon maker a serious problem in trying to stick something that doesn't stick to anything to something that nothing sticks to! The only solution is to use a layer of glue between the two; the contact adhesive will stick to the foam and it contains a latex component which the latex layer will now stick to.

The sword is hung up for a few minutes until the solvent has evaporated from the surface but the glue is still a little tacky, now the first of a series of coats of Latex can be applied.



Using a clean paintbrush or a spray gun carefully coat the foam surfaces with black Latex making sure that all exposed foam is covered but be careful not to put so much on that fine detail is lost or that latex runs down the weapon.

Lots of thin coats are the secret to achieving a smooth realistic finish. After each thin coat has been applied hang the sword up to dry in a warm dry place, again each coat should dry in about half an hour. (This drying time can be shortened using a domestic hair dryer or a fan to move the air around the chosen drying room) Typically you require about 10 brushed coats of black Latex. When this has been achieved and you are pleased with the overall look of the sword then 4 or 5 coats of metallic pigmented Latex should be applied.

A reasonable metallic latex can be achieved by mixing clear latex with water based acrylic paints, experimentation will be required to achieve the best results and the metallic latex will require a more concentrated mix than the black latex. Possibly a 50% mix will be needed for the final metallic coat.

When these are completely dry then the final detailing can be applied to the sword, any fine detail such as rivets or gemstones can be painted with a special mixture of flexible paints, we create these paints with a mixture of enamel paints and Isoflex special primer, mix them in equal parts but only mix a very small amount as it will dry within 20 minutes. It is also possible to paint the detail with a coloured latex, this is not quite as effective for painting very fine detail but is completely suitable for general colouring. The sword is now ready for airbrushing.



The edges of detail and any areas that would be worn or in shadow can be sprayed with a very fine layer of black enamel, using an airbrush, to give a lifelike appearance. 'Lowlight' is the technique of painting black lines on to raised edges to make the surface recede and appear thinner, the black airbrushing is also used to 'fog' the joins between two painted colours, this removes the painted edges and again adds the illusion of realism to the weapon. The human eye does not like solid colours, all colours in nature are made from many shades so the adding of shades and shadows makes us believe that the item is 'real'





Once this layer has dried for 24 hours then a final coat of flexible lacquer (Isoflex special primer) is applied to the sword to give a protective glossy finish. This lacquer is applied in two or three very thin coats taking 8 hours each to dry. The Isoflex is a nearly clear flexible primer which acts as a lacquer over the latex. It is only slightly porous and when dry it is impervious to most solvents. It flexes with the latex and so tends not to chip and crack from the flexible surface unlike most other lacquers. The Isoflex Special primer is supplied in 750ml tins which will be sufficient to generously coat twenty five or more average weapons. A major problem is that it doesn't store well and once the tin is broached the Isoflex will begin to thicken and within a week or so it will set solid. We punch two small holes in the tin and decant a small amount at a time into a disposable container plugging the holes as soon as we have sufficient decanted. Brushes must be cleaned immediately in strong solvent such as Acetone else they become solid.



Isoflex leaves a tacky surface when it is dry and any two freshly Isoflexed weapons will stick together so ensure that newly finished weapons are kept well apart until they can be treated with silicone.

We finish everything off with a coat of Silicon emulsion 35%, our favoured protective finish. Supplied as a thin white liquid it can be sprayed on, or a cloth wetted with silicone can be wiped over the weapon. The porous nature of the Isoflex will allow the emulsion to soak into the surface finish and leave a water repellent layer. There are a wide variety of Silicone Emulsions you want to use the one specified as a water repellent agent.

COSPLAY Vs LARP

There are very few differences in construction techniques between Cosplay weapons and LARP weapons, cosplay weapons are not generally meant to hit people with so bladed weapons especially can be made slightly thinner and thus look more realistic, cores can be no more than 2mm smaller in diameter for a bladed weapon and the foam should be a minimum of 8mm thick on a contact edge and 3mm thick on a no contact surface (however you may want to stick with the LARP specifications as this will allow you carve details into the foam) Stick with the LARP sizes when it comes to axes, hammers and other polearms or your weapon may flex too much.

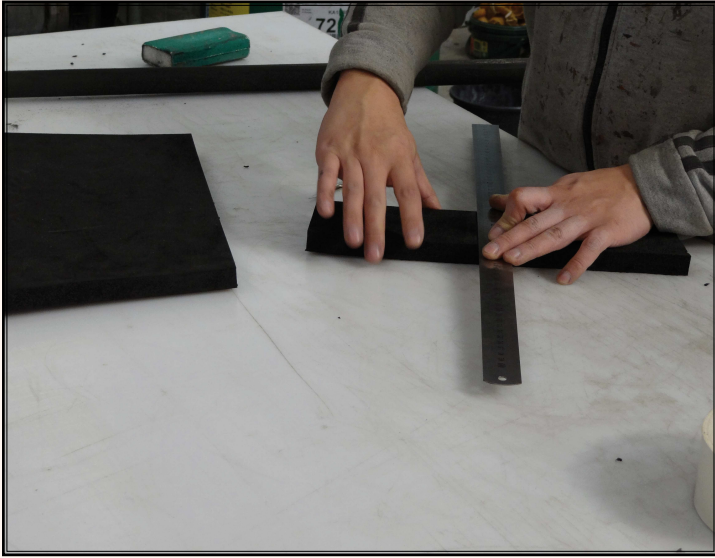
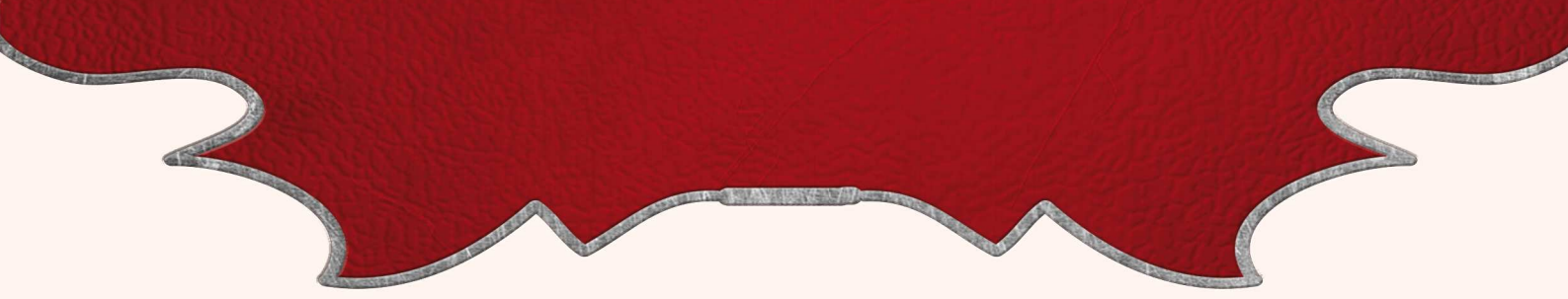
Here we are going to show you the difference in construction using the Harley Quinn giant hammer as an example, this is based off a design one produced originally by Nerfenstein his Facebook page is <https://www.facebook.com/Nerfenstein>

We started out deciding on the head size of the hammer, an appropriately sized bucket was used as a template to cut out the two ends of the hammer from two layers of soft furniture foam, If this was a heavy duty larp weapon for regular combat we would make the head solid foam but for cosplay we want to keep the weight down whilst still allowing a bit of fun.



Next we wrapped some Plastazote LD45 around the ends to form the hollow head, this on its own would be a bit weak.





So we added a little bit of internal bracing from more LD45 Foam



The handle was made in exactly the same way as we make LARP weapon hafts and the bracing added.



Then we glued the hammer head to the shaft and started to detail the weapon.

First we applied the wood grain effect to the hammer faces using a dremel

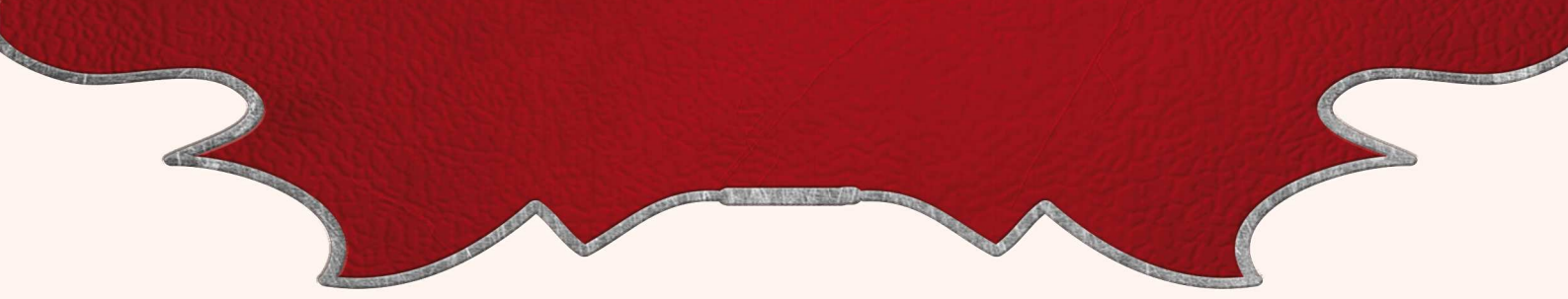


We then started using the dremel to form the bark on the hammer head



We finished off the head with a couple of foam bands that will look like metal when we finish painting.





With the basic coats of latex on we start to paint the hammer in various shades of browns



Working with an airbrush we apply highlighting and shading to the paints to make it look more realistic.

We then coated the hammer with Isoflex to protect it from the weather before wrapping the handgrip with leather.



Finally we gave it a coat of silicon emulsion to seal it and it was ready to ship to a happy prize winner on the other side of the world !



SUPPLIERS

Foam

We always recommend Zote Foams

Zotefoams plc,
675 Mitcham Road,
Croydon, Surrey
CR9 3AL
England

They have a network of worldwide distributors with factories in the UK, USA and Asia

<http://www.zotefoams.com/pages/EN/distributors.asp>

will let you find the nearest distributor

however we have picked out a few around the world for you already:

Australia

Pilon Plastics Pty Ltd
1-5 Parraweena Road
Taren Point, NSW 2229 (Sydney)
Australia

www.pilon.com

Canada

Jacobs & Thompson Group
89 Kenhar Drive,
Toronto,
ON M9L 2R3

www.foamparts.com

Denmark

Bramming Plast-Industri A/S
Vardevej 9
DK-6740 Bramming
Denmark

www.bpi.dk

France

GVG Sport Industrie S A
BP 15 Zone Industrielle
76580
Le Trait

www.gvg-industrie.com

Germany

W. Köpp Zellkautschuk GmbH & Co.
Postfach 370123
52035 AACHEN
Germany

www.koepp.de

Italy

Gruppo Sogimi – Aercel S.p.A.
LVia G Giordani, 2
40054 Budrio (BO)
Bologna
Emilia Romagna
Italy

www.sogimi.com

USA

American Converters, Inc. (AMCON)
5360 Main St. NE
Minneapolis,
MN 55421

www.amconfoam.com

Cores

Here in the UK we use

RBJ Reinforced Plastics Ltd
Unit 1 Woodcock Hill Industrial Estate
Harefield Road
Rickmansworth
Hertfordshire
WD3 1PQ

<http://rbjplastics.com/standard-profiles.html>

We buy Glass Fibre Solid Rod, Unidirectional Glass Fibre Tube, Glass Fibre Bar and Carbon Fibre Rod from them and we would recommend them if you are ordering large quantities if you are based anywhere in Europe.

Exel Composites have a similar range of products and if you want large quantities and are based in Australia they may well be the people to contact

Exel Composites Australia
991, Mountain Highway
Boronia
Victoria 3155
MELBOURNE
AUSTRALIA

<http://www.exelcomposites.com/en-us/english/home.aspx>

Exel have a number of branches in Europe as well which may be more convenient to order from than RBJ Plastics, but we would still recommend RBJ first.

In the USA we suggest contacting one of the following for large quantities

Liberty Pultrusions – East
1575 Lebanon School Road
West Mifflin, PA 15122-3464

<http://www.libertypultrusions.com/>

they seem to stock very similar sizes of Glass Fibre Rod and Bar but their 19mm tube has a significantly thinner wall thickness than the one we use

Alternatively
Glasforms, Inc.
1226 Lincoln Ave.
San Jose, CA 95125
U.S.A.

<http://www.glasforms.com/index.html>

they have a smaller range but may be able to help

For smaller quantities you may be able to order from LARP weapons manufacturers or from kite supply stores, Glass Fibre Pultruded rods are often used in kite construction

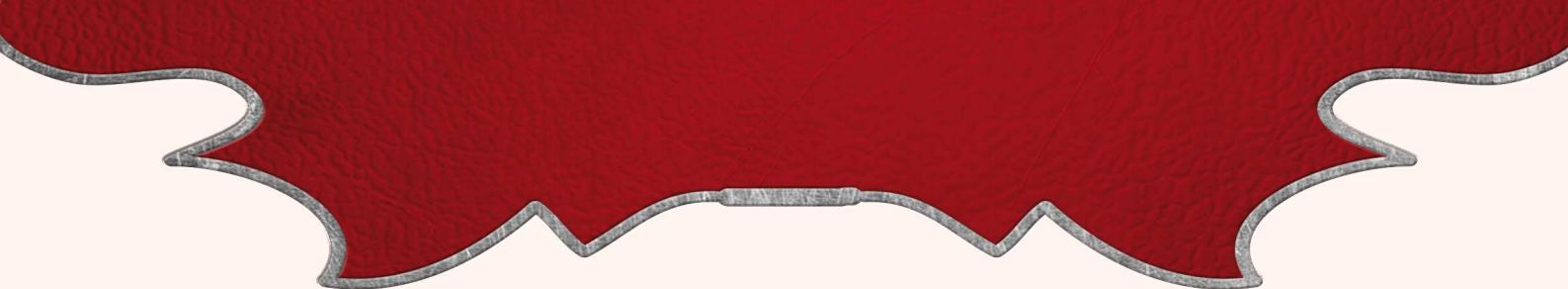
In the USA try

TAP Plastics (with multiple stores in CA, WA and OR)

<http://www.tapplastics.com/>

Have a selection of Fiberglass and Carbon Fibre Rod, Bar and Tube

http://www.tapplastics.com/product/plastics/plastic_rods_tubes_shapes



Goodwinds LLC
1829 Railroad Avenue
Mount Vernon, WA 98273
United States

<https://goodwinds.com/>

Clear sealant

In the UK and in some European countries we prefer Isoflex
You want the clear special primer and nothing else
In the UK this can usually be found in larger B&Q stores in the roofing section

In Italy

Fucina del Drago
Via Vacuna, 92
Roma
00157

<http://www.fucinadeldrago.it/component/virtuemart/materiali/materiali-per-armi-larp>

In Germany

Wacławczyk & MEHLIG
Max-Planck-Straße 2
06796 Sandersdorf-Brehna
OT Stadt Brehna

www.wm-malermarkt.de

Elsewhere you may not be able to find Isoflex, but you should be able to locate

Clear Waterproof Elastomeric Sealer

This is typically used as a roof or brick sealant and will have similar properties to Isoflex, the most important being that is very flexible and clear.

In the USA there is a very similar product called Through the Roof

We have also heard good things about Liquitex Varnishes which are available worldwide through good art supply stores

Glues

We use several suppliers and buy vast quantities of contact cement, from industrial suppliers, however contact cement is widely available, in Europe Bostik make Evo-stik Impact available from many DIY stores and Evo-stik 528 Contact adhesive available from many builders merchants, note that in recent years they have made changes to the Impact adhesive, some tins are now labled as “Solvent Free” this version does not stick the plastazote foams and should be avoided.

<http://www.bostik.co.uk/diy/category/Repair-Adhesives/2>

In the USA Barge Original All Purpose Cement is the one to look for, again available in better DIY stores, Buildim material suppliers and some Leatherworking suppliers

<http://www.bargeadhesive.com/products.html>

Elsewhere look for a contact adhesive with similar properties.

These glues are particularly nasty, wherever possible we advise you to use them outside or in a very well ventilated space, if you cannot do so you should purchase a good quality filter mask to protect you from the vapour