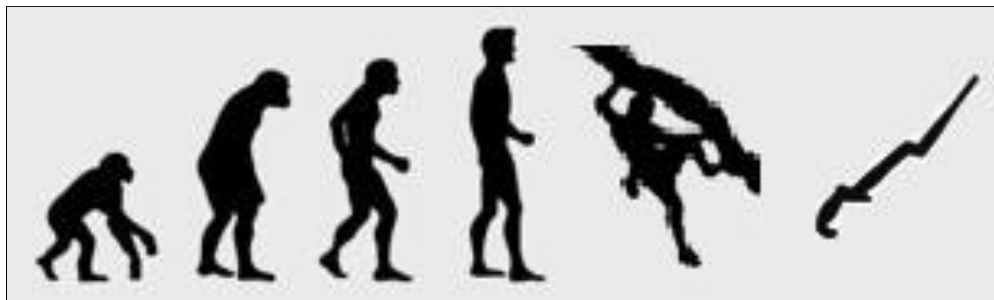


The evolution of the Schmool



In the beginning...

Anyone who trad climbs or boulders will know that after a winter stuck on indoor climbing walls, outdoor performance is often diminished. A combination of lack of climbing, loss of strength, endurance, and diminished technique all contributes to this. The same is true for Winter climbing and if anything, is exacerbated by the unpredictability of the UK weather, not to mention the severity and seriousness of the actual activity. In short, to get the most out of the limited winter season, you need to be strong and *on form* well in advance.

It is from this necessity that dry tooling evolved – climbers would attempt to mimic the conditions and experiences of winter climbing on rock crags, hooking, torquing and balancing their ice axes on the imperfections of the rock. And in much the same way as trad climbers opt to climb on indoor walls (because of weather and convenience); dry toolers also opted to 'tool' indoors.

The evils of tooling...

There a few fundamental problems with *tooling* indoors, on artificial walls. Firstly, ice axes are a pretty serious piece of kit! They are inherently dangerous – the prospect of someone wildly slinging around an axe, or even dropping one, almost entirely precludes their use in/on indoor walls (ok, some open minded climbing wall managers do allow tooling but always in cordoned off areas using helmets, visors and leashes which can be a bit of a pain).

Secondly, the pick on the end of the axe is not very friendly, especially to plywood walls and resin holds. The pick seriously damages both the wall and the hold {insert image} and wall managers usually have to set specific route, using protective back boards and holds that aren't being used anymore. These two facts have legitimately meant that indoor dry tooling

has not been accepted and established mainstream, unlike say lead climbing. And this is the point where the concept of the schmool first began...

Damaging problems, inspiring ideas...

October 2008, one of the future Schmool designers is dry tooling late on a Wednesday evening, in a barn near Middlesbrough. The guys he is training with are all seasoned winter climbers and have built an indoor wall within this barn for there own training.

A moving problem...

Before we can start thinking about the aesthetics and ergonomics of the actual shaft design, we have to consider the sling mechanics. The actual end-solution that we see now, seems so logical and simple, but at the time of inception, this was a serious quandary. To clarify this, we need to consider what the 'sling' needs to do: it has to be strong but flexible, hardwearing but not damaging to holds, dynamic & flexible but still ridged.

Material	Strong	Flexible	Ridged	Robust	Hold Friendly	Practical
Cordelette	√	√	X	X	√	√
Swaged Cable	√	X	√	√	X	√
Cordelette / Swaged	√	X	√	√	X	X
Dynema Sling	√	√	X	√	√	√
Reinforced Dynema	√	√	√	X	√	X
Canvas conveyer belt	X	√	√	X	√	√
Cross-weaved rubber	√	√	√	√	√	√

As described previously, their ice axes are making short work of both the wall and the holds. The first step towards a specialised dry tool was when these guys tie some 10mm static rope through the karabiner hole at the top of the ice axe, loop these over two high holds and proceed to do sets of ice axe pull-ups. And sometimes that is all it takes – the glimmer of an idea.

A month later and the two schmool designers are working on an idea to retro-fit ice axes with a sling attachment to allow dry tooling – even great ideas sometimes go off track! The concept is sound but the commercial practicalities aren't. This idea quickly develops into the concept of a specific, specialised tool design solely for dry tooling.

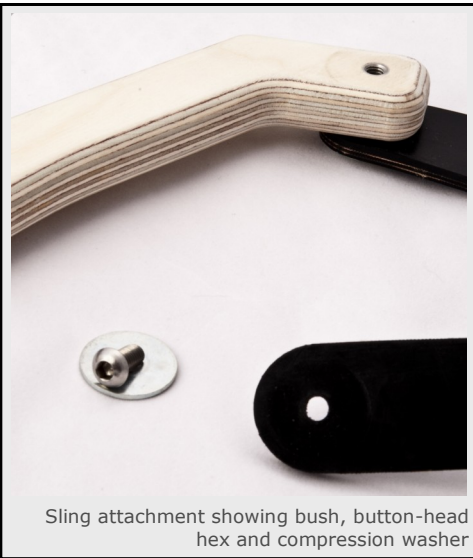
This is a fundamental design problem – any time that you have to join something solid to something that is essentially soft, elastic & dynamic, you have a problem.

Our starting point was 8mm Cordelette, inserted through a hole and tied with a double fisherman. As expected, the results are good – strong, no hold damage but not rigid and so it's impossible to position on holds. From here we experiment with a variety of different materials (see table) and a pattern in performance emerges. If the material is rigid enough, it's not strong enough; if it's strong enough, it's too damaging to the hand holds; if it doesn't damage holds, it's not rigid enough. A vicious circle if ever there was one! We start experimenting with wild ideas and concepts, threading Dynema slings with rubber re-enforcements to give rigidity.



Machining metal 'butterfly' clips to hold the sling on the tool. Those solutions that worked were not commercially or practically viable.

The final solution, the toothed, cross-weaved, rubber sling was stumbled upon almost by accident. A piece of this material was given to us as a sample when we purchased the canvas conveyor belt sheet. Neither of us thought for a second that it would be strong enough and there were some doubtful looks when it was first tested on a real 15 m climbing wall route. However, within minutes we saw the instant merits of this – super strong, robust and ridged, maximum friction and purchase. The method of attachment was equally as simple and elegant – compress the rubber sling, over a large surface area, against the shaft of the tool.

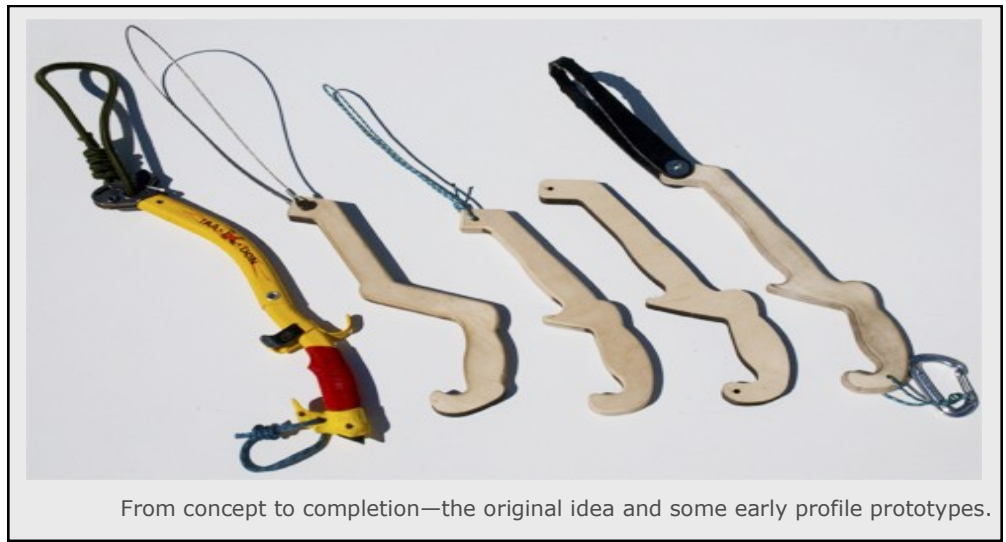


Sling attachment showing bush, button-head hex and compression washer

Within the confinement of the compression the rubber is still able to expand and contract thus preventing it from splitting. During prototyping this was done with washers and a nut & bolt – on the D10 production model this is achieved with button-head hex bolts and a custom made 304 stainless steel bush insert.

When is an axe not an axe?

There are two standard model shapes for an ice axe – a straight shaft (traditional alpine style) or curved shaft (technical axes). A logical starting point for designing a dry tool would be to mimic these profiles. It quickly becomes apparent that these profiles are excellent for their intended purpose



From concept to completion—the original idea and some early profile prototypes.

i.e. ice climbing, essentially pivoting and pulling on a single point, but useless when trying to maintain a constant downward pull on a sling. Careful calculation of forces seems to be the key – the complex shape of the tool allows constant downward pressure at the correct angle, allowing for intricate and delicate moves to be made. Several profiles later we have a working prototype. What is constant within all these designs is the double handed grip with a base-plate for support. Hours of dry tooling has taught us that this base-plate is critical, not only does it stop tired and sweaty hands from slipping off, but it also allows you to rest / relax your grip by hanging just on the base of your hand.

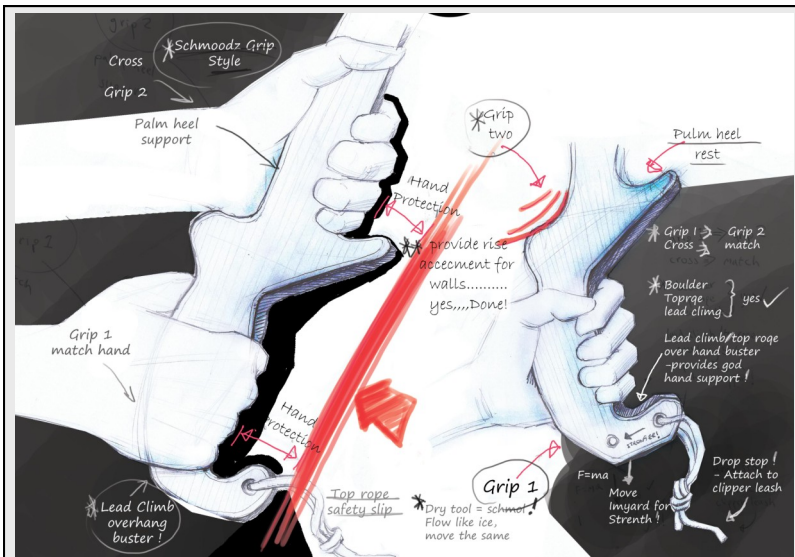
Mother Nature isn't often wrong...

The choice of material for the shaft is another area that was kind of stumbled upon. Prototyping can be an expensive process. Stereolithography is a rapid prototyping technology where a computer design can be used to generate an actual physical object built out of layer of photo-polymer resin. This technology is often used to generate a physical object that the designer can hold but it is expensive and does not enable the prototype to be actually tested i.e. it has no intrinsic strength.

We opt for a more practical approach that produces a viable working tool that could be tested both in terms of its ergonomics and its strength & performance. Each prototype design is modelled in a 3D CAD package, which is then used to drive a CNC laser cutter. This effectively burns the profile out of marine ply wood – quick, easy, efficient. However, it quickly becomes apparent that these ply wood prototype profiles are vastly stronger than anticipated and there seems little point in trying to better 'mother nature' with metal forging or composite casting.

The proof is in the pudding...

The last part of the product evolution and concept is getting it out there. We know we have an awesome design and that there is a definite market for dry tools but it soon becomes apparent that non-winter exponents could benefit from this fun and strenuous activity. The original product inventor tests the tools with his college climbing team and they all love it – maybe there is some scope for something more than a winter training aid. The brand name, Schmoolz, is intended to try and move away from just dry tooling, and bring this exciting new concept to the mainstream. We hope you find this as exciting as we do—if so then let us know if our idea was worth it!



Early concept sketches showing the development of the dual grip.

