

## Reed Profiling Overview

by Brendan Power

Reed profiling is the darkest art of harmonica manufacturing, one of the most important parts of making a harp sound good - or bad! It also has a massive effect on reed life. For these reasons, companies attend to it with a lot of care and guard their secrets jealously.

A reed profile is the shape you see if you cut a reed in half along its length. It starts with the flat reed-base (or rivet pad), where the reed attaches by riveting or welding to the reedplate. It is the thickest part of the reed, and (looking from above) has a square shape wider than the rest of the reed.

After the reed base, the active part of the reed begins. The material it's made from (brass [Hohner and most companies], phosphor bronze [Suzuki] or stainless steel [Seydel]) is carved away in a precise shape to suit the pitch of the reed. It's a very critical process, as getting it wrong has lots of negative consequences: poor tone, short reed life, or lots of unwanted fine-tuning after the reeds are attached to the reedplate.

If you consider that there are 64 reeds on a 16 hole chromatic, in 16 lengths, and each one needs to be shaped just right for its note, you start to realise how intensively detailed this process is.

The same goes for 10 hole

diatonics. If anything, they are even more complex because of the range of keys that the companies make. This is compounded by the new low key harps, such as Hohner's excellent Thunderbird.

Consider this: Hohner has the same reed lengths for a Double Low F Thunderbird harp as it does for a normal C Marine Band or Special 20. That means that each reed length on the 10 holes has a HUGE range of pitches to accommodate, over 1.5 octaves per reed! It's quite an achievement for Hohner to have managed this and kept their legendary tone for all the harps spanning this vast range.

That's all done through extremely precise reed profiling, and there are various ways to achieve it. Hohner and Hering (who Hohner once owned) use a series of bladed discs, each one shaped to make just one reed length. They revolve at high speed at just the right height above a flat brass plate that moves under them, and carve their shape into the brass. They are kept extremely sharp and clean, because any nicks or imperfections get passed on to the reeds.



Suzuki and Tombo use a different system. In their case, the brass strip is fastened around a

perfectly spherical heavy cast wheel. Once it is spinning a stationary blade is lowered into the brass and carves out its profile into the metal strip.

Suzuki and Tombo have very smooth reed surfaces, and they are both known for excellent reed life. Chinese companies use the wheel system but have heavily scored reed surfaces - and, up to recently, were known for inferior reed life.

I asked harmonica tech guru Rick Epping about this and he said: *The (Chinese) knife is actually not stationary, but moves slowly along the width of the profile leaving those marks, which are spiral, like a screw thread. The shape of the profile is determined by a template the knife moves against, in a manner similar to that of a key copying machine.*

I also asked Rick about a method I'd heard of from early days of harmonica history, where reeds were apparently hammered flat from wire. Rick's answer: *An examination I made of this and other 19th Century harmonica reeds leads me to believe that these reeds were more likely not made by hammering wire flat, but by rolling it... After flattening the wire, the sides of the reeds were somehow cut or filed to reduce their width so they would fit into their slots. I know of no one still*

*using this method today but reckon it might be practicable for small workshops producing high quality, high priced instruments. It would be interesting to know whether this method results in a*



*more durable reed than the modern method, where reeds are punched out. I would think that not having to subject the reeds to the stress of being stamped out would go some way in preserving their structural integrity.*

One person who has taken reed-making into new territory using high tech CNC engraving was Brad Harrison of the now-defunct B-Radical harmonica company. Unlike all other methods, which cut across the reed horizontally and therefore introduce microscopic score marks that can lead to stress fractures, his were CNC engraved along the length of the reed. I've examined them under the microscope and they are indeed beautifully made. Brad's process should make the reed a lot stronger.

Since the unfortunate demise of his company, no one else has followed his lead - so the jury is still out on that. However it's certain that new CNC reed profiling methods will increasingly be tried by harmonica companies looking to streamline this complex and critical procedure.

Let's wait and see!