# Don't Try This at Home—Unless You Have an Inside-Out Rod!

***Text by Tapani Salmi, Pertti Kanerva, Juha Jokinen and Pekka Hyvönen***

The discussion, measurement, modelling, calculating and analysis of different tapers for split cane rods is one of the most frequent topics in rodmaking books, journals, rodmakers meetings, on Internet discussion boards and posting lists etc. We makers all certainly have some insight on this topic. There are even scientific, mathematical approaches to the taper modelling and analysis using computer programs like Hexrod, stress/modulus curves, etc. These computer programs give us the possibility to modify an existing rod to a lighter/heavier/shorter/longer one or even try to develop the "ideal" rod to be build.

There are, however, no practical, good ways to modify the already existing six strip rod. If the surface is planed or even sanded too much, we lose the power fibers and the strength of the rod is compromised dramatically. This is caused by the asymmetric location of the fibers, most of which are located near to the surface of the rod. In practice, the change of more than one AFTMA class downwards using the surface planing of the existing rod is certainly a risky task.

There is, however, one possibility to modify an existing six strip rod by building the rod in an inside-out structure. This is achieved by turning each of the six strips 60 degrees before glueing to have the outer surface of the strips and the strong power fibers located inside the rod and to have the "soft" inner structure located on the outside. To make the rod with no gluelines, the outer surface (enamel) has to be sanded or scraped very carefully. According to my experience, the resulting inside-out rod is almost like the traditional outside-out rod composed of strips from the same culm.

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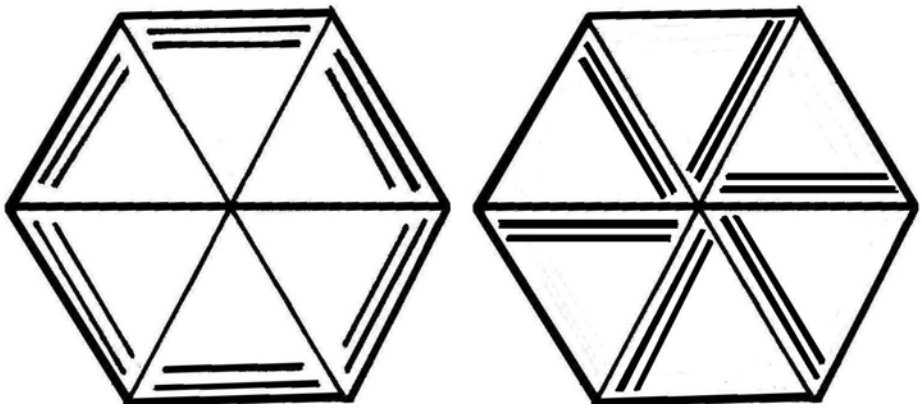

The traditional OUTSIDE-OUT and INSIDE-OUT composition of a six strip cane rod with power fibers indicated as lines.

## Our experiment

The "core group" of the Finnish Bamboo Rodmakers had a Winter Meeting in Ikaalinen, March 10-11th, 2006. The town Ikaalinen does not say very much, but when I tell that it is next to town called Nokia, you may think otherwise. In reality Nokia cell-phones are today manufactured in several places in the world but not in Nokia. However, The big company originates from that town.

We wanted to try something special and decided to make a real practical experiment on the rod taper design and modification and to use an inside-out rod for that purpose.

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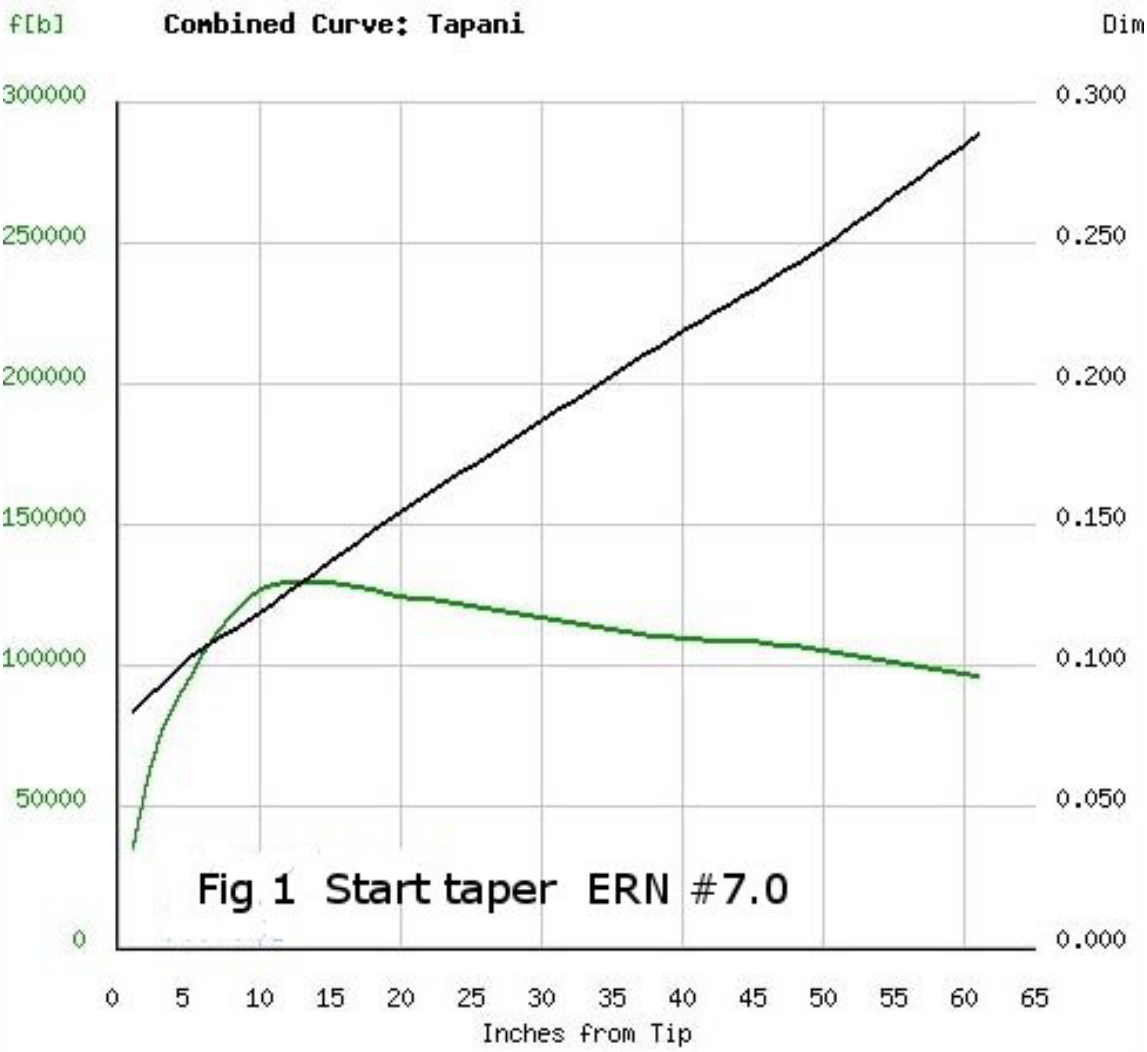


The original taper and stress curve of the rod

I built two rods with the taper and stress curve illustrated in the above figure. The rod is one-piece, 6 strip, 5' configuration. The straight taper actually comes from the tip (and mid) of a #7 Spey Rod. I made one rod as a traditional construction (outside-out) and another with the strips turned 60 degree to achieve the inside-out construction. The rods were almost, but not exactly, equal when finished. Because the outer surface of the inside-out rod is softer, it was a little thinner after scraping and sanding off the epoxy glue.

The rod casts a #6 or 7 weight line and there was no practical subjective differences found when test casting the rods. This had been my experience earlier, too. The feeling was that it was a quite fast #6 rod, but the short rods always have to be quite stiff and fast. The taper was chosen to allow the further modifications. The inside-out rod was varnished with a thin layer and the guides were attached using shrink tube O-rings.

We started by taking the Common Cents (CC) measurements of the rods. This measurement was introduced by William Hanneman in "*RodMaker*" magazine in 2003, you may read more about the

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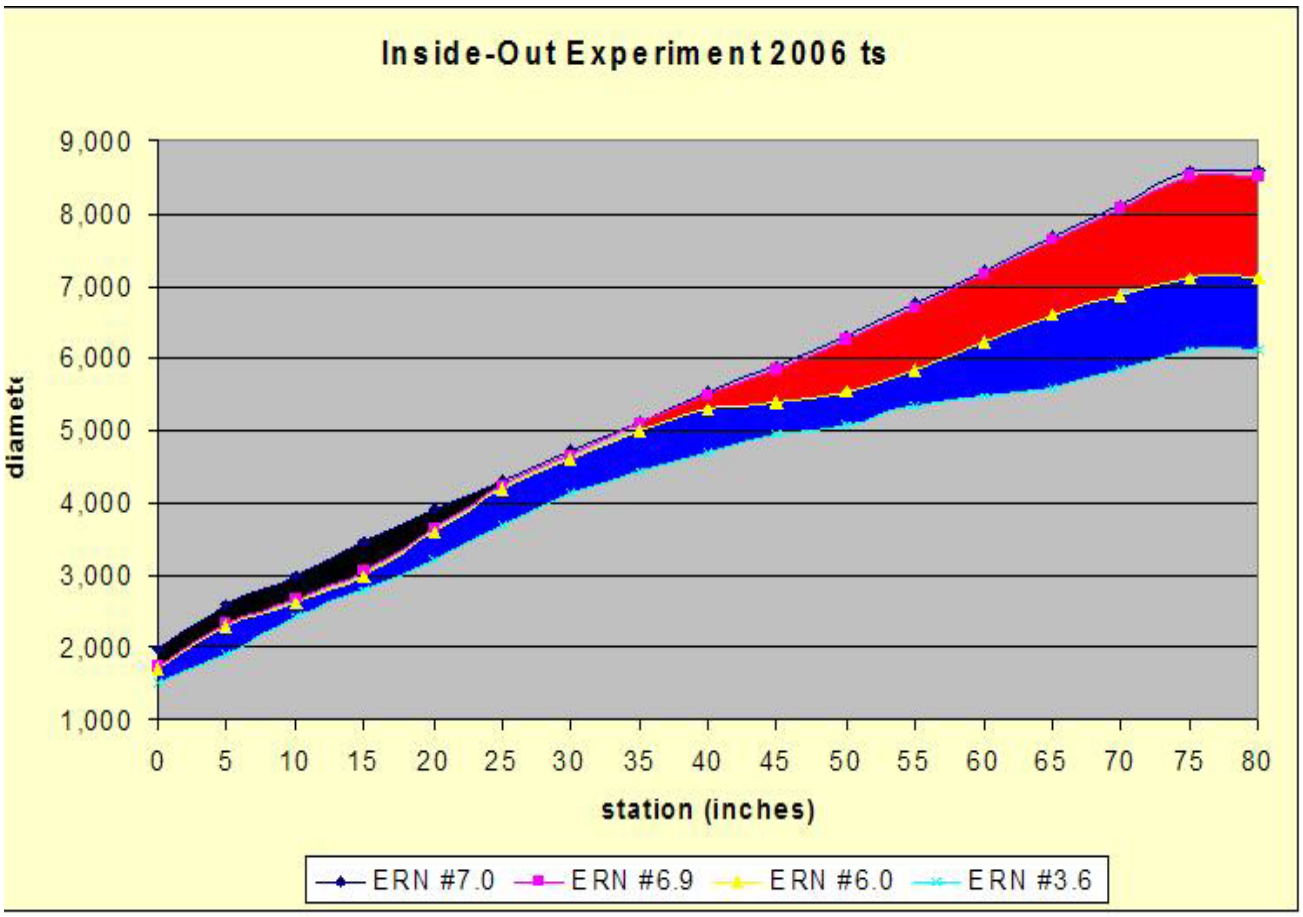
measurement at www.rodbuilding.org. As we are not using US pennies frequently in Finland, I have a conversion table for the Euro coins , see http://personal.inet.fi/private/tapani.salmi/RODTESTENGL.HTML. In short, the bending of the rod is tested using a number of coins fixed to the tip of the rod as weight and the Effective Rod Number (ERN) correlating to the AFTMA class is thus determined.

In the CC test, the traditional test rod had ERN (=AFTMA) value of #7.4. The inside-out test rod was initially two coins less and the ERN was #7.0. We took the guides from the inside-out rod off and started to modify the taper using a plane and scraper. Pertti Kanerva had already made the detailed plan for the modification process.

We first made the tip (first 20") a little thinner by using the scraper to make it a little faster (black area in the figure below). This changed the CC value surprisingly little - it became only less than one coin less and ERN was thus #6.9.

The next modification was much more radical. The rod butt section was planed as indicated by red color in the figure below. Now there was a clear change in the ERN value from #7.0 to #6.0 and there was a parabolic – type of bending and function present when the rod was tested.

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The last modification was really extensive. The whole rod was planed thinner as indicated by the blue color in the figure above. We again used a plane and a scraper to achieve the next taper. Now the difference was very clear, the ERN value in CC test diminished from #6.0 to #3.6. We had started with a #7 rod and had resulted in a #3-4 rod! The bending of the two test rods using a heavy mass fixed on the tip is shown in the photo below. The final rod, however, is well functioning and I am certainly going to use it fishing next summer.

The original #7.4 and modified #3.6 rods in a bending test.

## Summary of our experiments

It is really possible to modify the existing taper, getting a new rod with a different taper and, most important, with different function, if you try to build a rod with an inside-out structure. It was really informative and educating to see how such a small changes in diameter changed the action of the rod substantially.

It is difficult to say if we could produce something "better" compared to the mathematical calculations and modelling of the rods. In our meeting, we were very satisfied with the experiment and results. If you are interested in taper modeling, designing and testing, we would recommend this kind of experiment for you, perhaps as the program in rodbuilders gatherings or in other makers meetings.