TRIANGLE CANE ROD BUILDING

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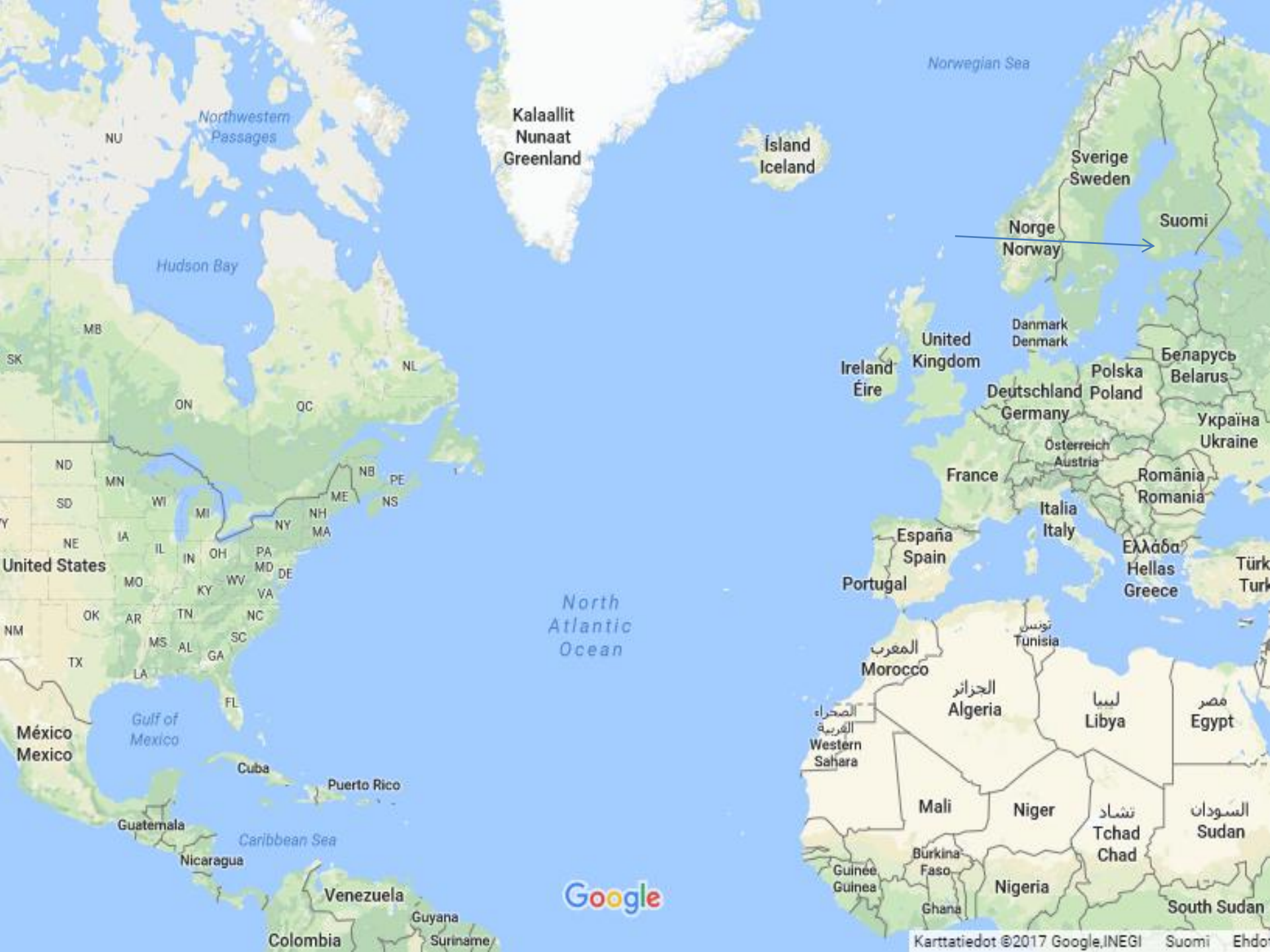
Catskill Rod Makers Gathering
2017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Cuba
Puerto Rico
Guatemala
Caribbean Sea
Nicaragua
Venezuela
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Colombia
Suriname
North Atlantic Ocean
Danmark Denmark
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Ireland Éire
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مصر Egypt
الصحراء الغربية Western Sahara
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تشاد Tchad Chad
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TRIANGLE (TRI) ROD BUILDING SUMMARY:

- some physical properties of TRI are superior compared to six, five or four sided rods

- It is possible to make long and light single and two hand TRI rods with pleasant fishing properties.

- Some fishing techs benefit of long rods: nymphs, streamer, boat, coach etc

- advantages of extreme hollow-building are easily obtained using standard hand tools

- thick sections for two hand rods are obtained using normal cane thickness

TRIANGLE (TRI) ROD BUILDING SUMMARY:

Disadvantages:

- the unusual/strange outlook!

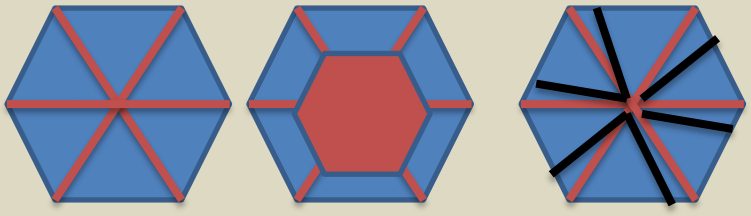
- no tapers available

- problems with planing/milling, handle, ferrule/joint, line guide geometry – examples and solutions presented in this presentation

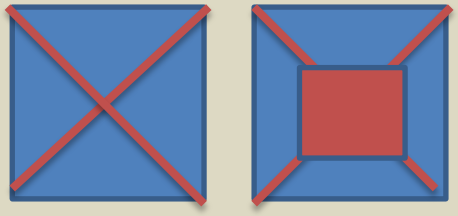
Tapani Salmi

- **Amateur rod maker since year 2000 , no commercial interests**
- http://personal.inet.fi/private/tapani.salmi/

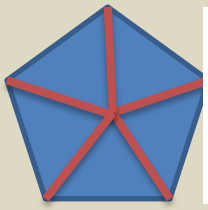
My previous experience 2000-2007

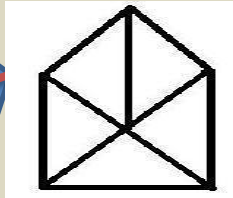


Hex
Hex hollow
Hex inside-out

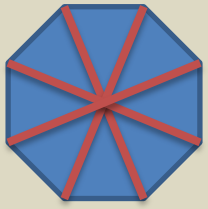


Quad
Quad hollow



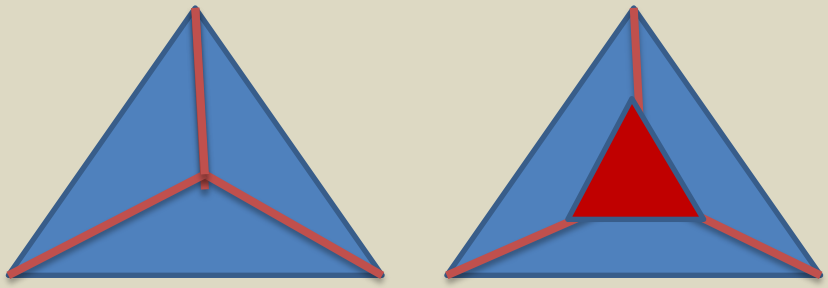


Penta,
QuadPenta

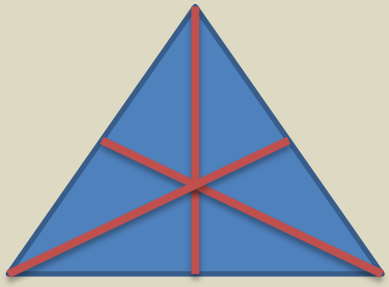


Octa inside-out

…and then something totally different…



1. Triangle (TRI)
Three strips
Three strips hollow

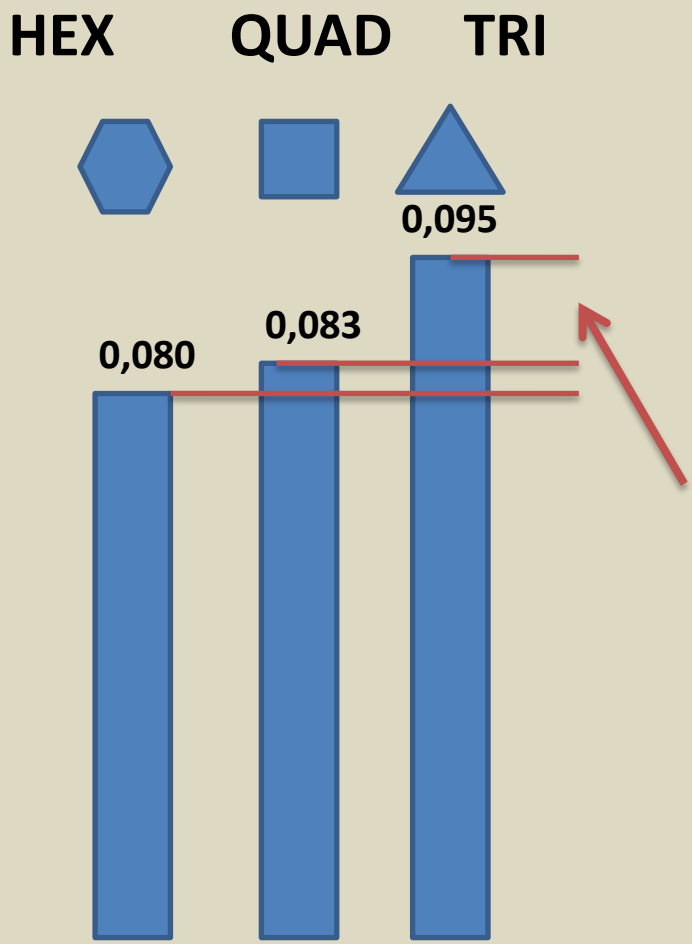


2. Triangle TRISTAR
Six strips inside-out, solid structure



Trip to Egypt 2007: Papyrus reed in river Nile is triangle in cross section – I decided to try triangle building

WHY TO MAKE TRIANGLE TAPERS?
Physical properties!



Moment of Inertia MOI,

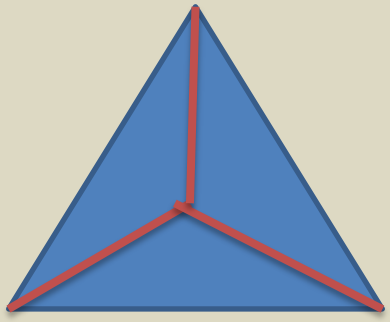
”stiffness/elasticity of the rod” , when cross section Area (mass) =1.0

NOTE: difference between HEX and TRI is FOUR TIMES BIGGER than HEX and QUAD

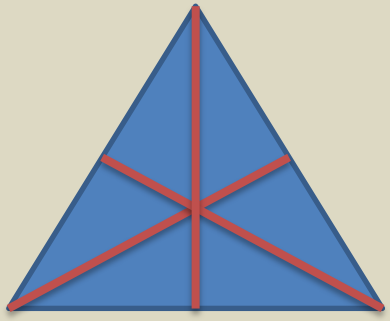
”the nature if full of brilliant mathematicians”

HOW TO CONSTRUCT THE TRIANGLE ROD?

1. TRIANGLE ROD WITH THREE STRIPS

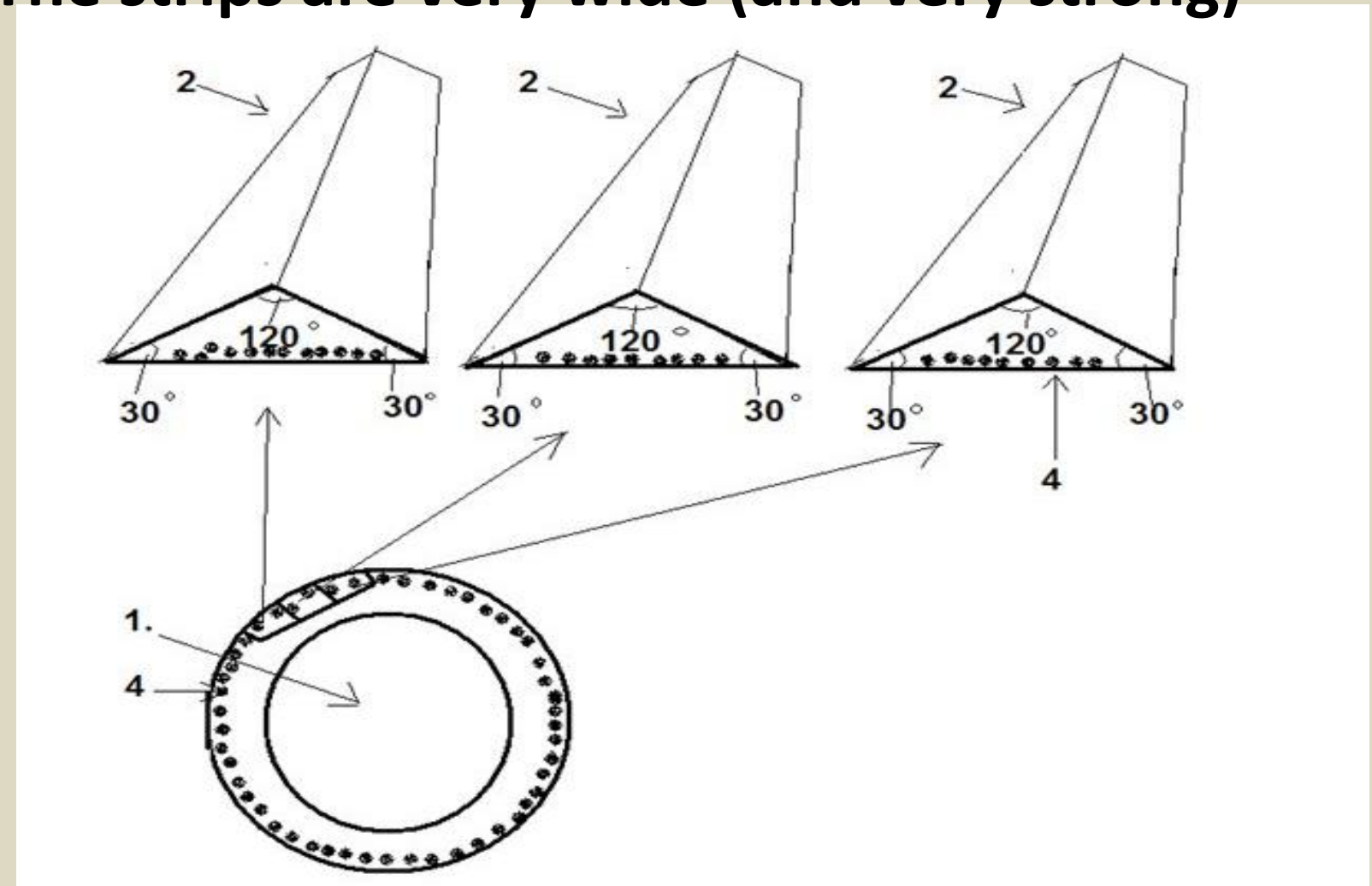


2. TRIANGLE ROD WITH SIX INSIDE-OUT STRIPS: TRISTAR structure



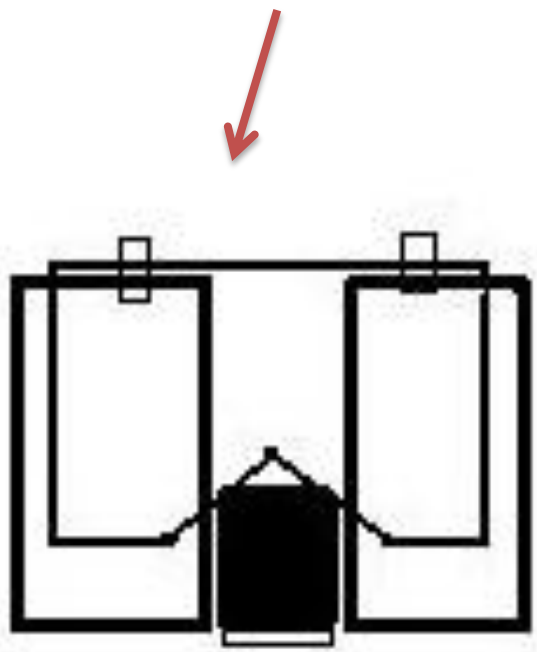
1. TRIANGLE ROD WITH THREE STRIPS

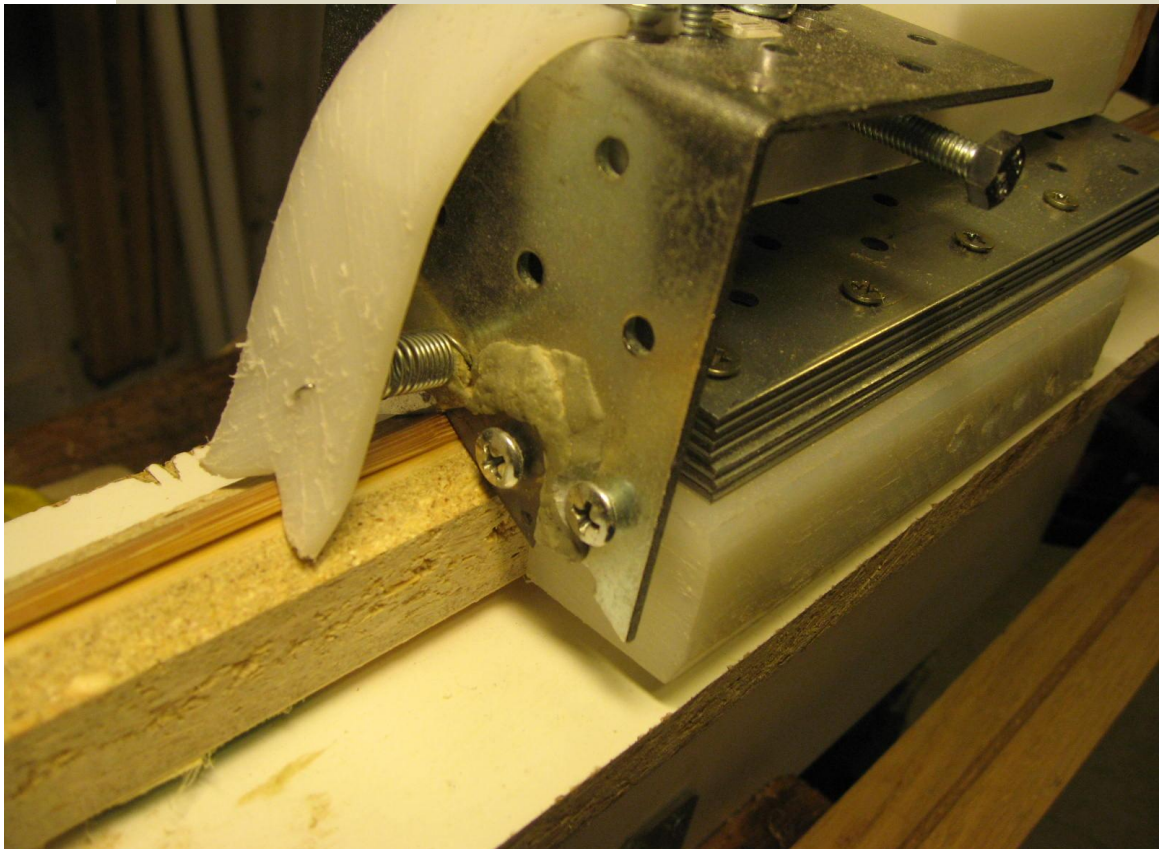
- The angles are 30°, 120°and 30°
- The strips are very wide (and very strong)



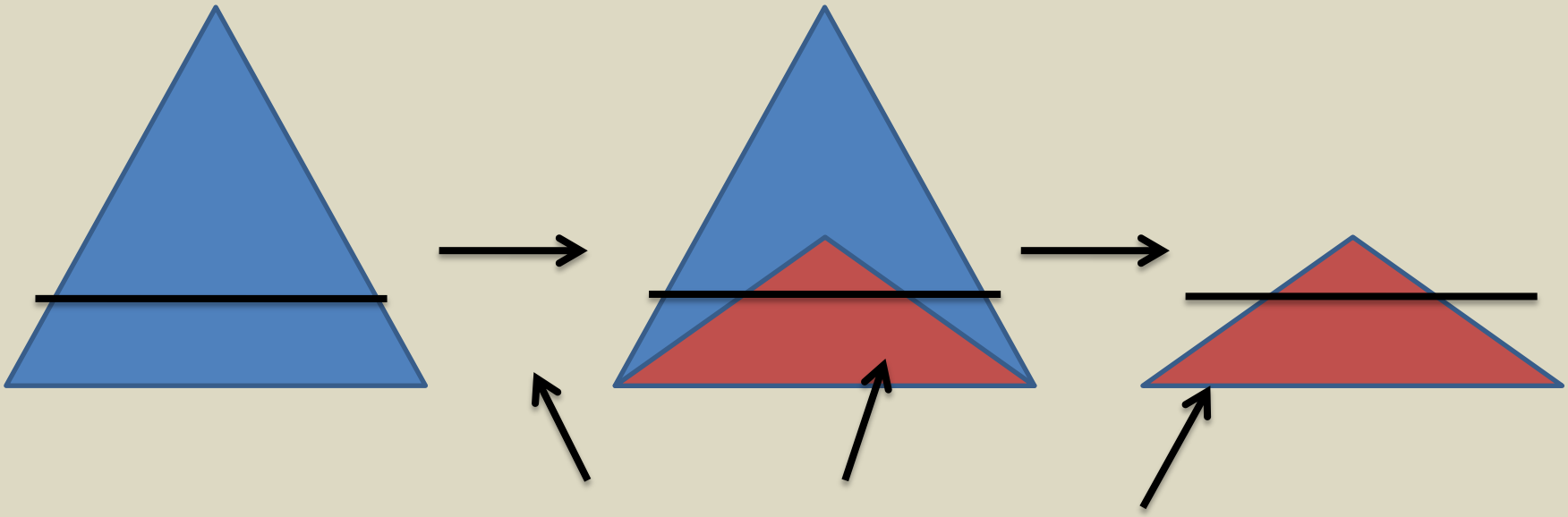
How to make 30-120-30 strips?

- not too easy using hand tools, wide strips
- soaked strips!
- simple hand mill, Morgan hand mill





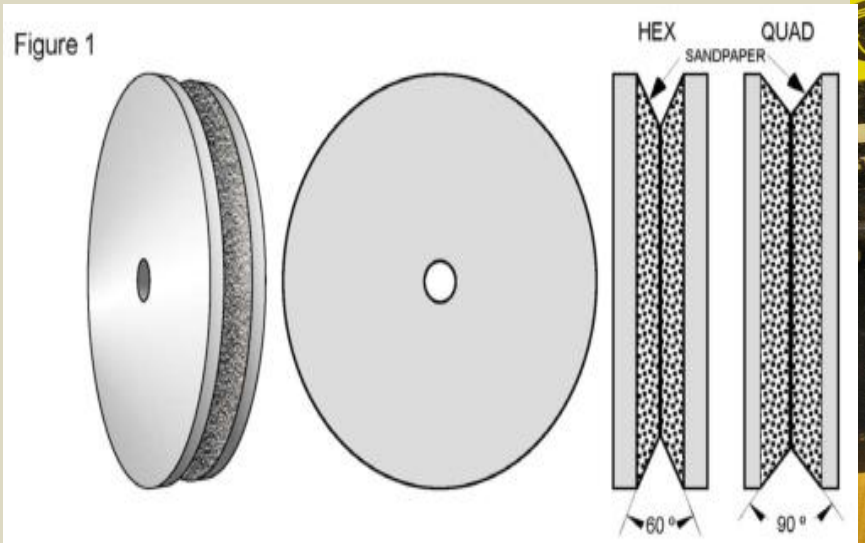
My method: 60-60-60 strips of proper size are converted into 30-120-30 strips



Power fibres

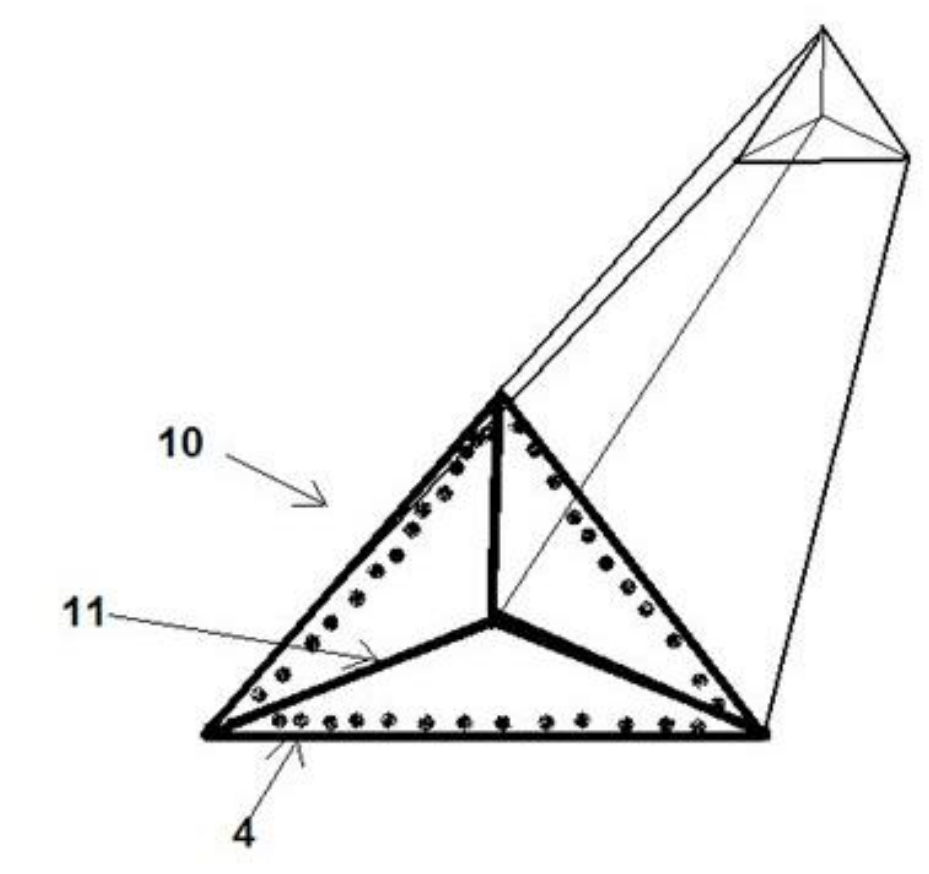
How to make 30-120-30 strips?

- 60-60-60 strips of proper size are converted into 30-120-30 strips
-
- **Baginski beveler** with 120° angle

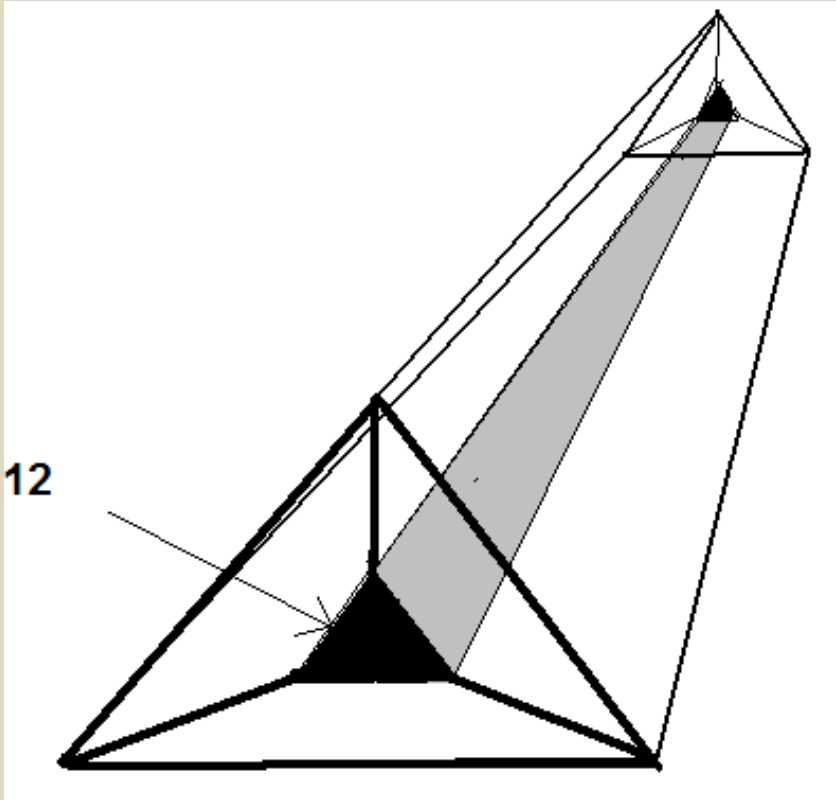


TRIANGLE THREE STRIP CONSTRUCTION

Solid



Hollow

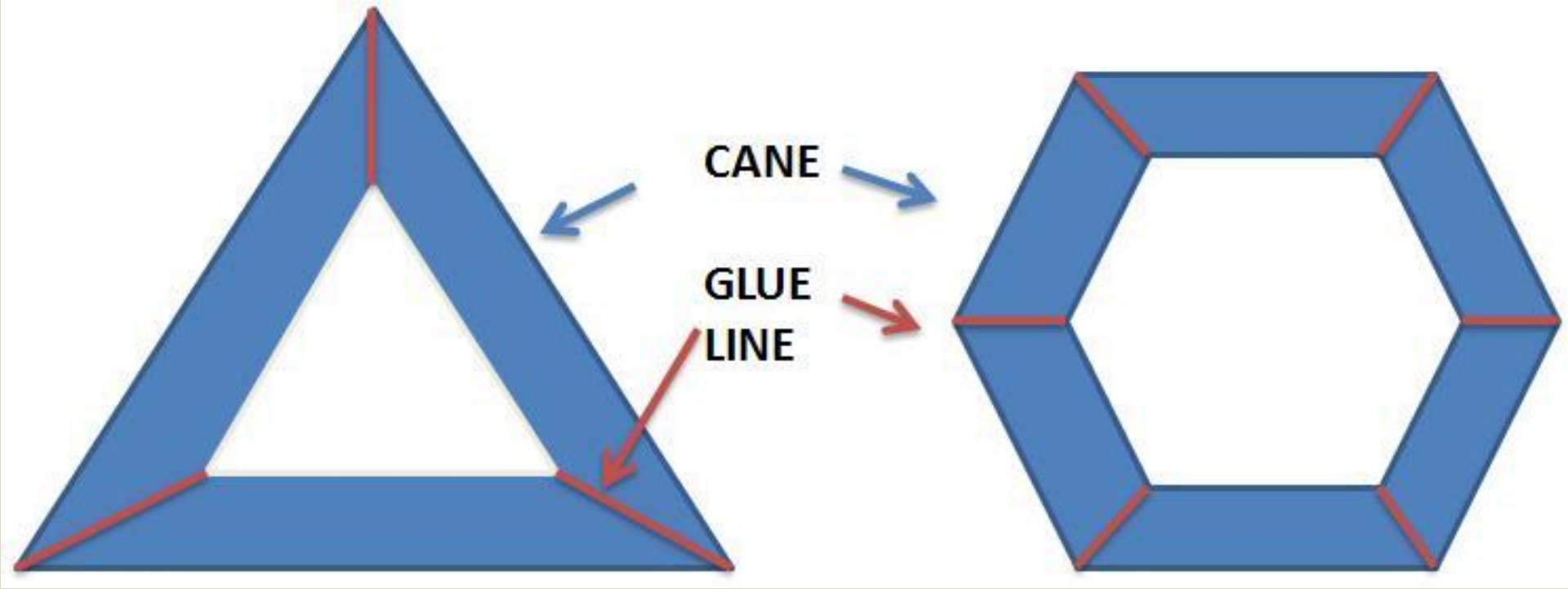


TRIANGLE hollow building

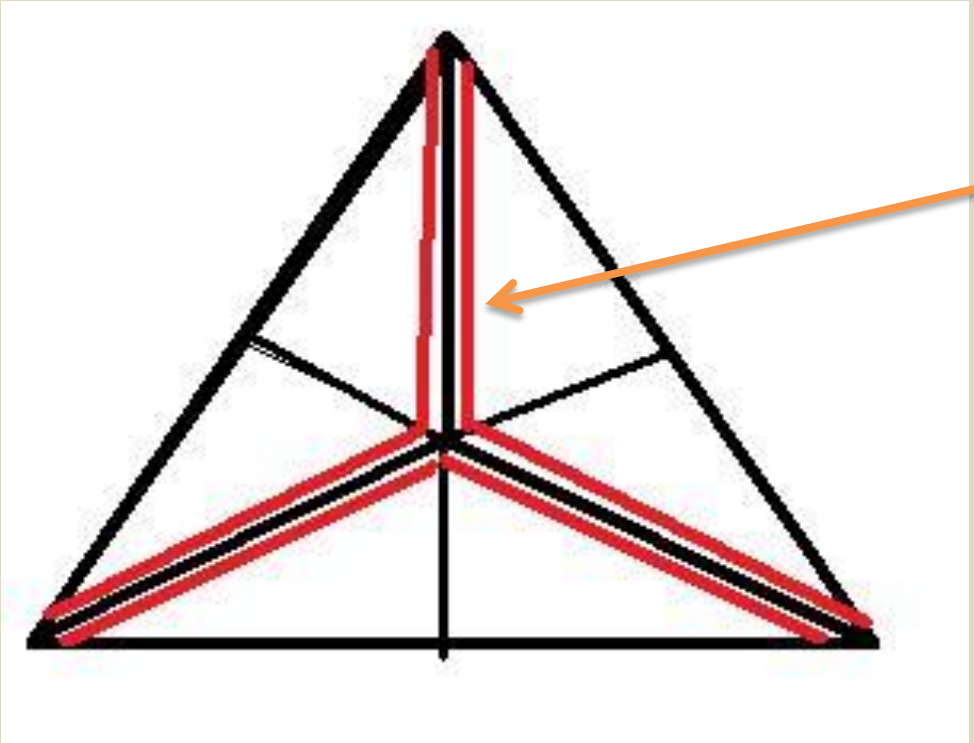
Advantages:

Possible to do big rods using only power fibres

The glue lines (red) are 40% wider in TRI than in HEX - stronger structure



2. TRIANGLE rod with six inside-out strips: TRISTAR structure



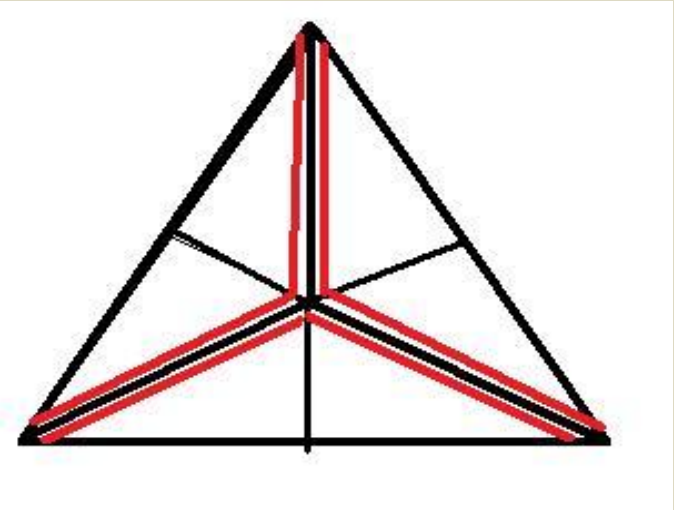
POWER FIBRES

2. TRIANGLE rod with six inside-out strips:

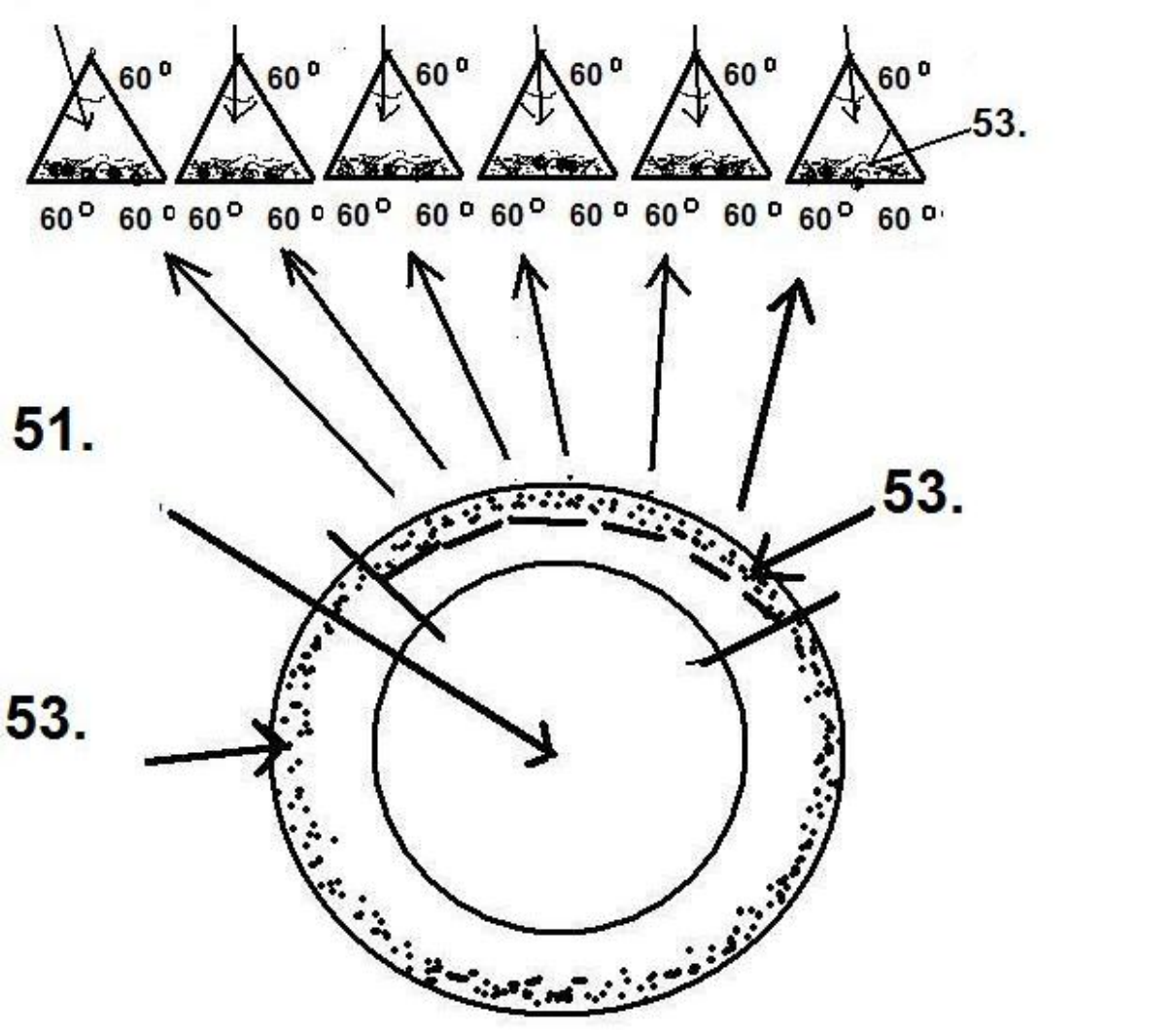
TRISTAR structure

You may do it using your standard hand tools!

No special hand mill, beveler etc.

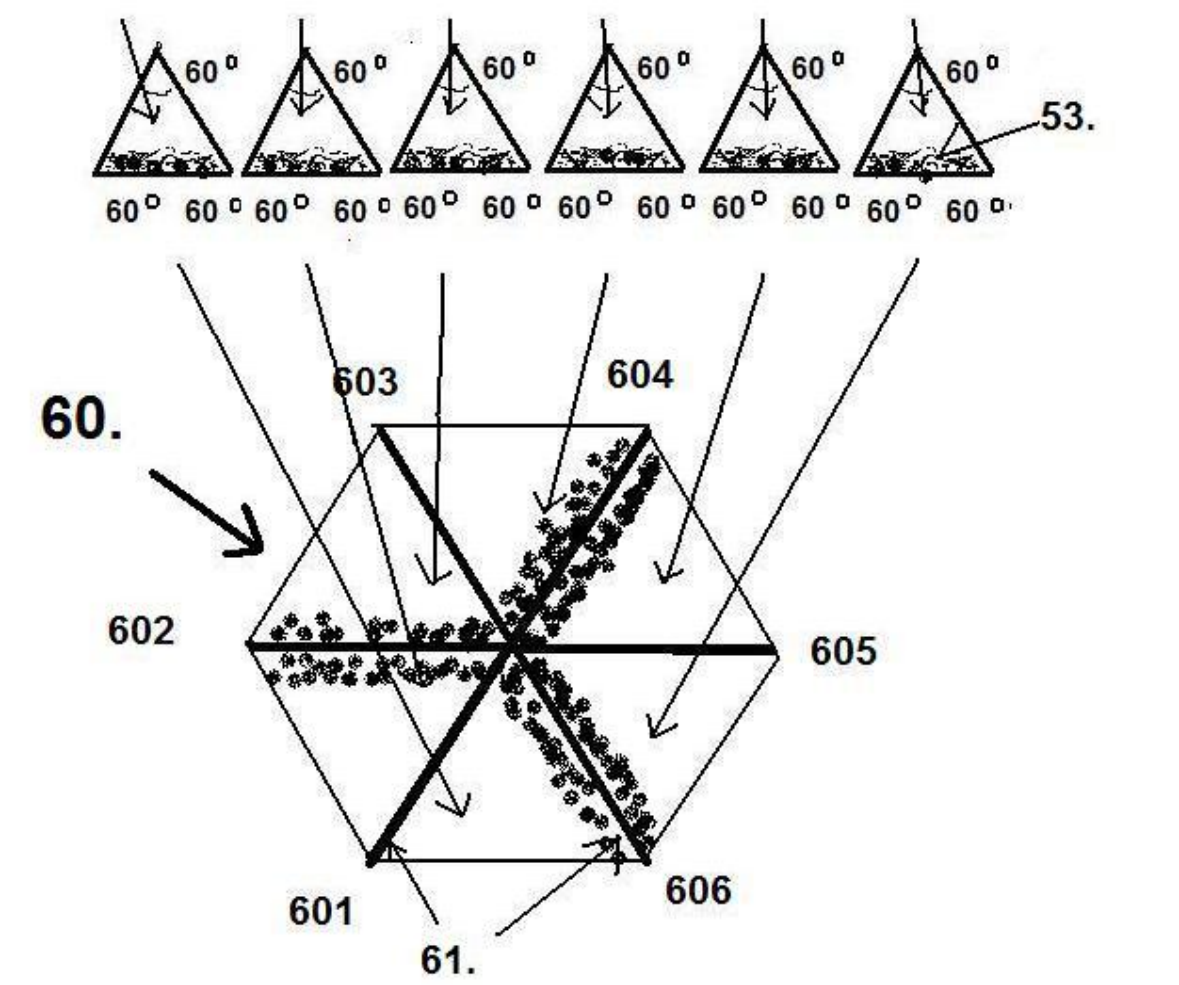


TRIANGLE rod with six strips TRISTAR structure:
- Start with 6 normal HEX strips



TRIANGLE rod with six strips TRISTAR structure:

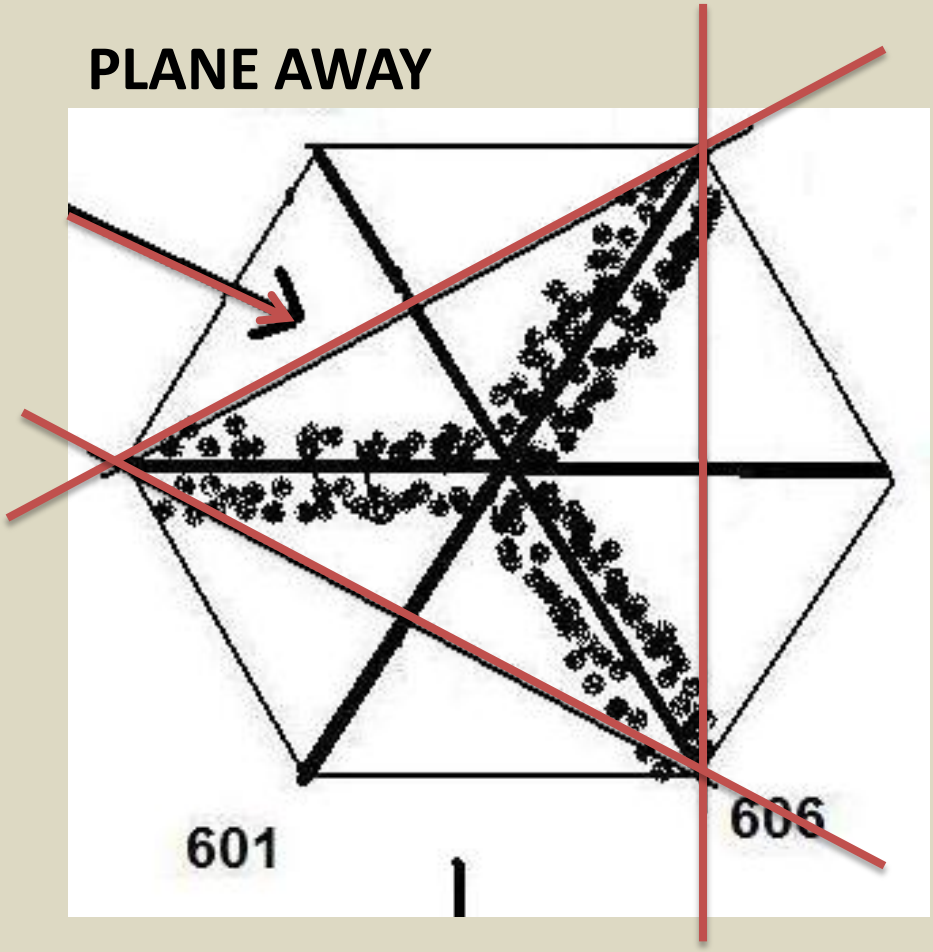
- Glue HEX strips inside out with power fibres against to each other



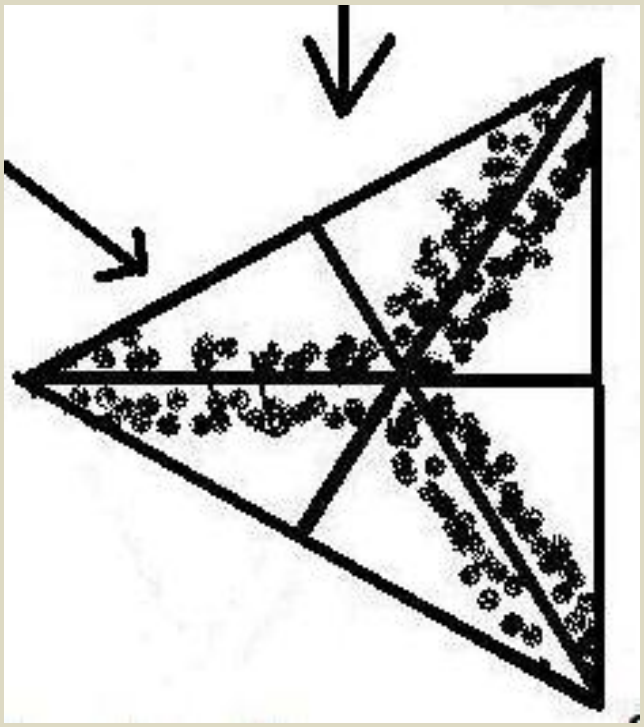
TRIANGLE rod with six strips TRISTAR structure:

- plane soft part (pith) of the outside away to get final triangle shape

PLANE AWAY

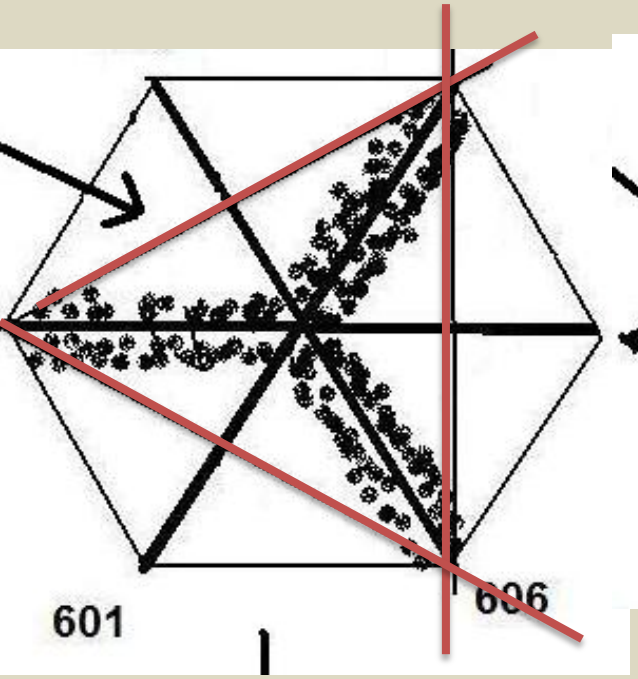


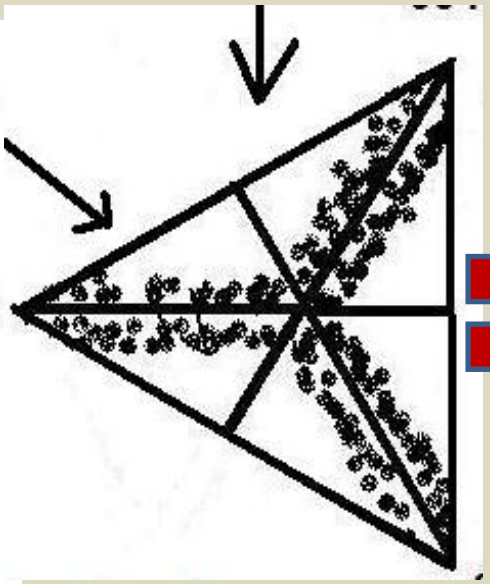
FINAL SHAPE

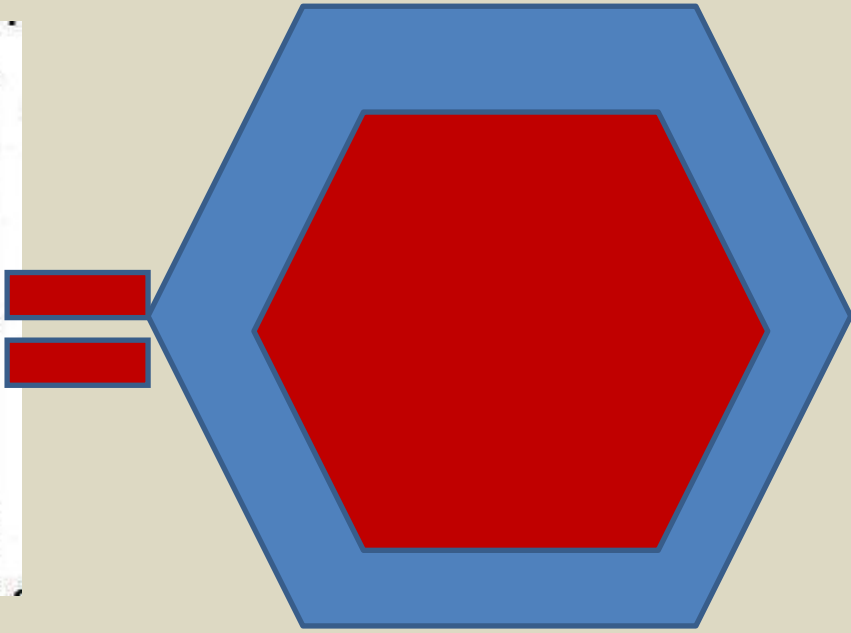


TRIANGLE rod with six strips TRISTAR structure:

- plane soft part of the outside away to get triangle shape
- The mass is dimished by 50%. This is equal to 70% hollow building because power fibres are not lost!

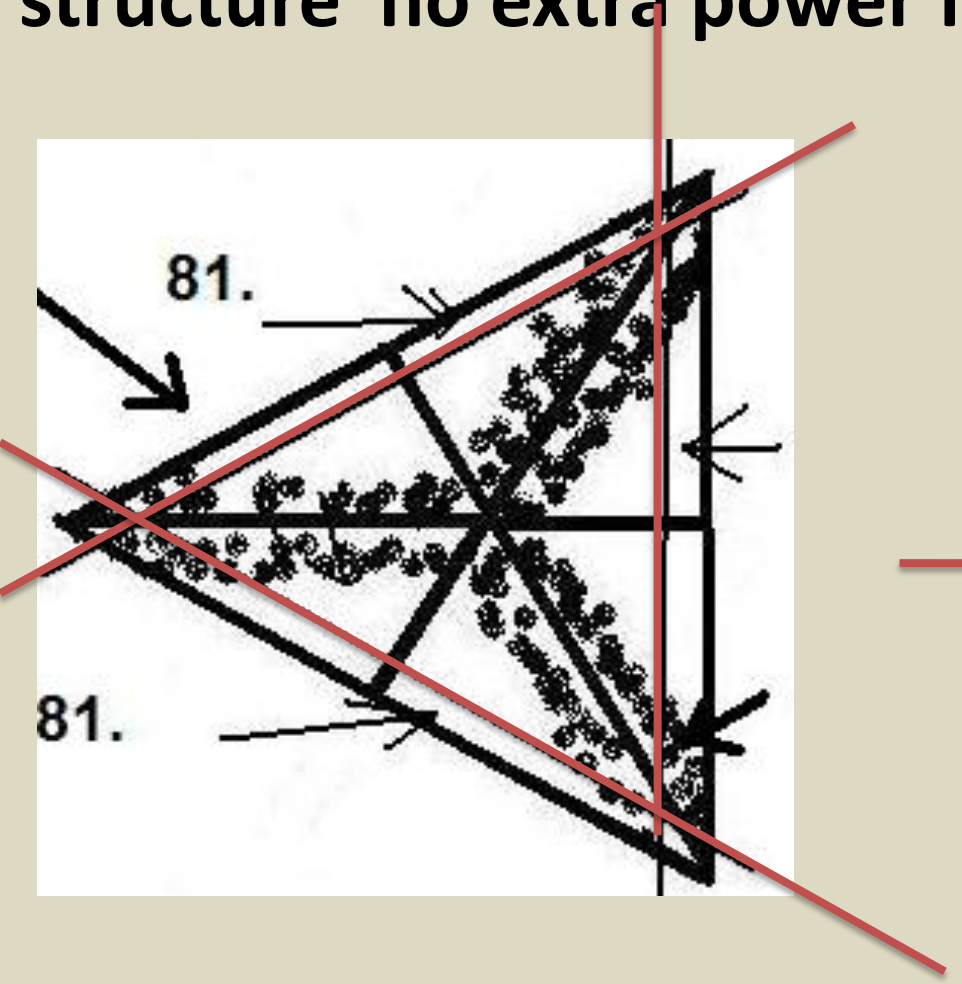




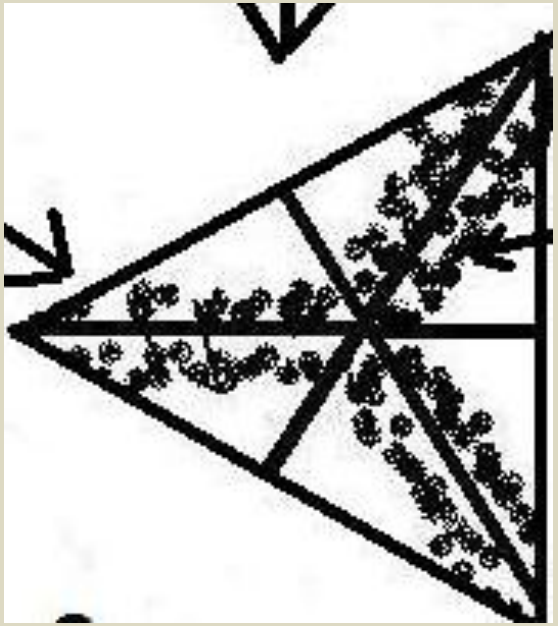


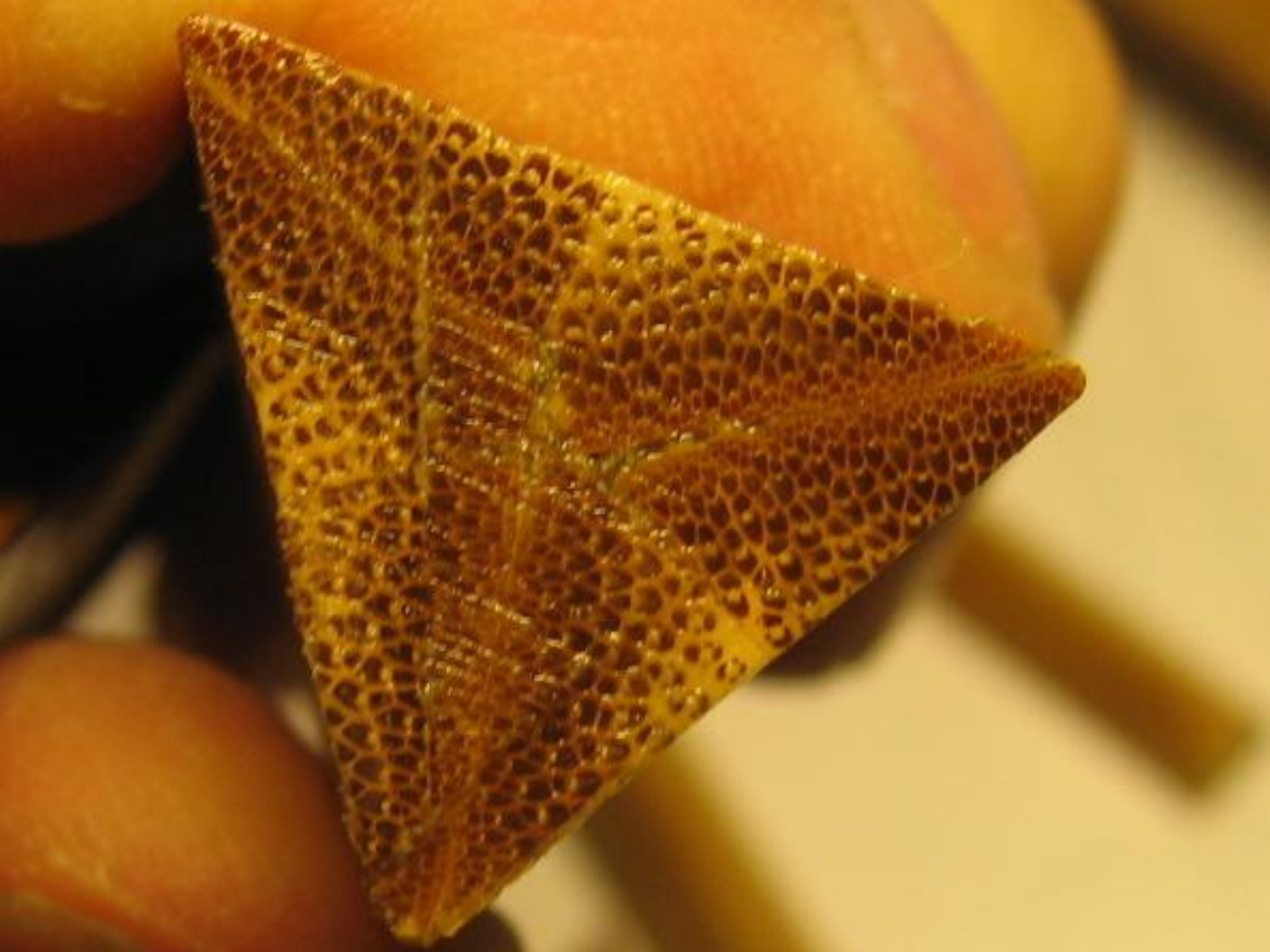
TRIANGLE rod with six strips TRISTAR structure:

You may modificate the taper afterwards:
plane the taper thinner - because of the inside-out structure no extra power fibres are lost



New taper





TRIANGLE ROD PROBLEMS

1. No tapers available
2. No ferrules, joints
3. No handle
4. No line guides
5. Wide strips preparation

TRIANGLE ROD PROBLEMS

1. No tapers

- The geometry is simple (*1,40) BUT
- TRIANGLE rod with same mass is about #2-3 AFTM class stronger than the original taper
- Mass/area multiplication by 0,9?
- Simple Excel calculations
- Tapers by TRIAL – AND – ERROR!

TRIANGLE ROD PROBLEMS

1. No tapers

- Straight tapers so far
- Tapers by TRIAL – AND – ERROR!
- Easy to obtain fast rods as the total rod mass is smaller

TRIANGLE ROD PROBLEMS

2. Ferrules, joints

Metal ferrules – not too easy!

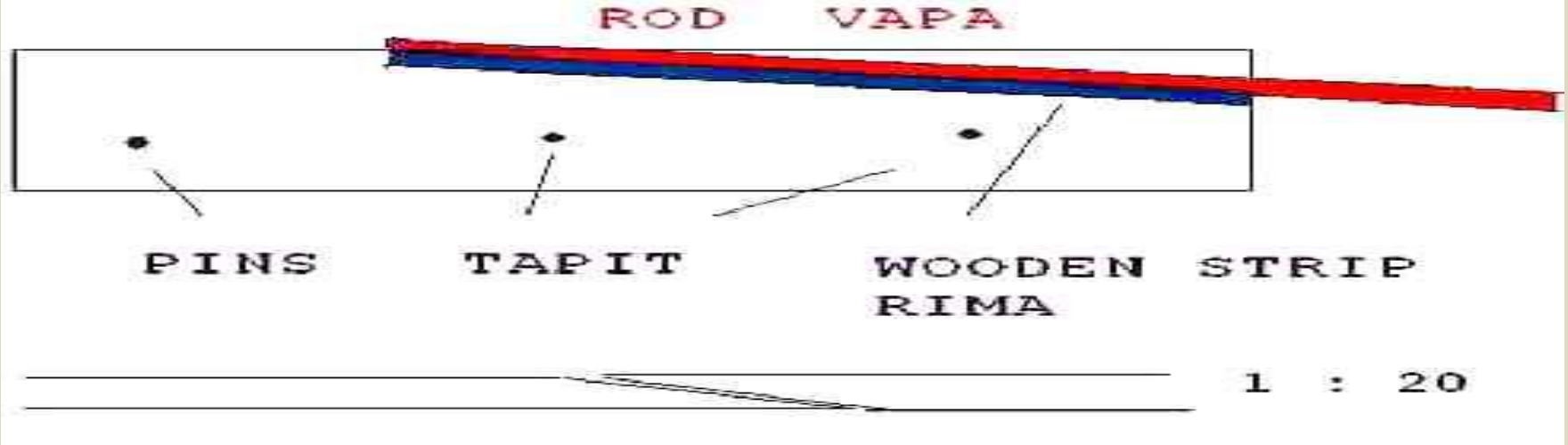
Scarf / spliced ferrule is OK for single hand rods.

Bamboo ferrule is OK for single hand rods.

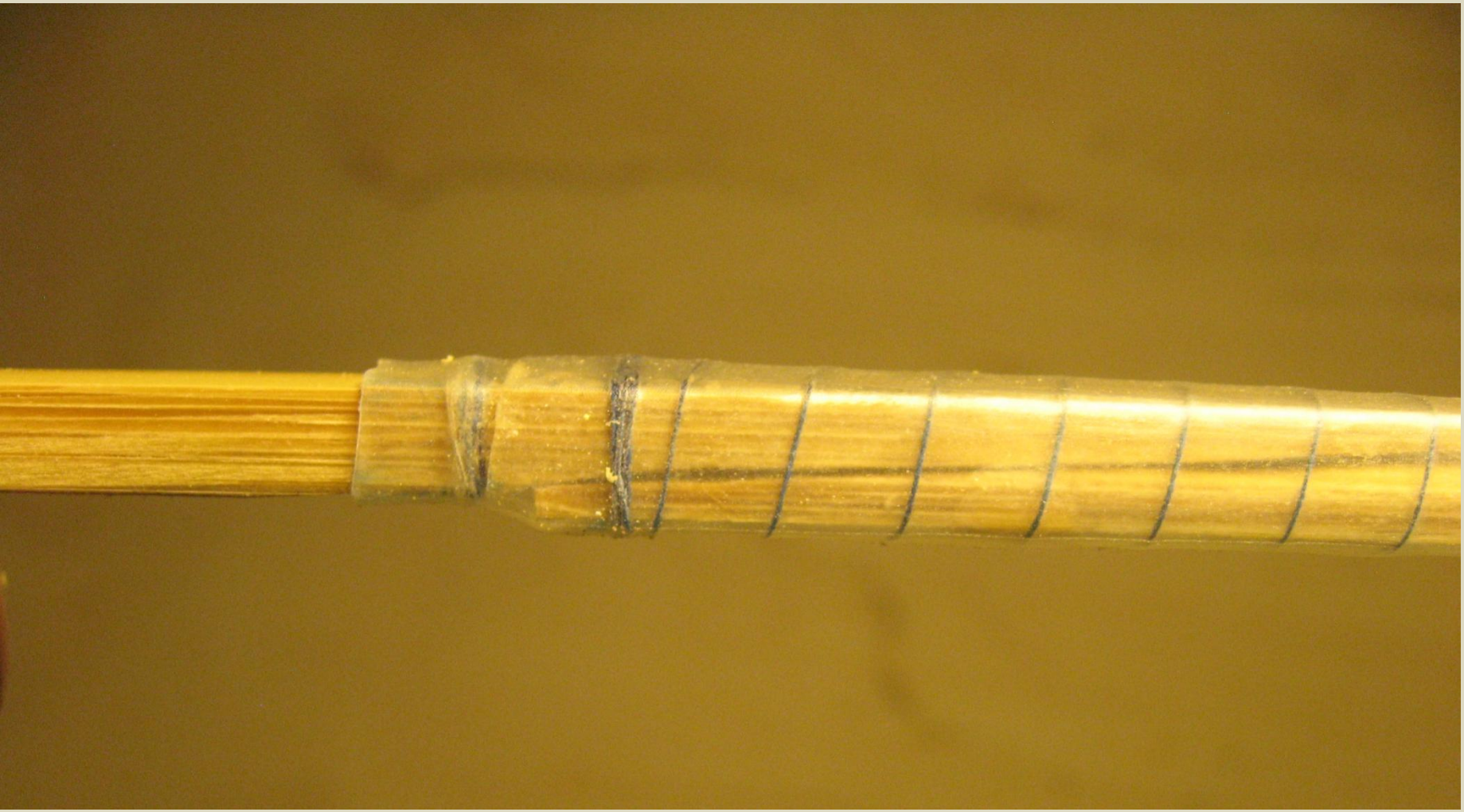
The problems has been in two-hand salmon rods – the stress at first joint is very high causing breaks -> <u>bayonet joint</u>

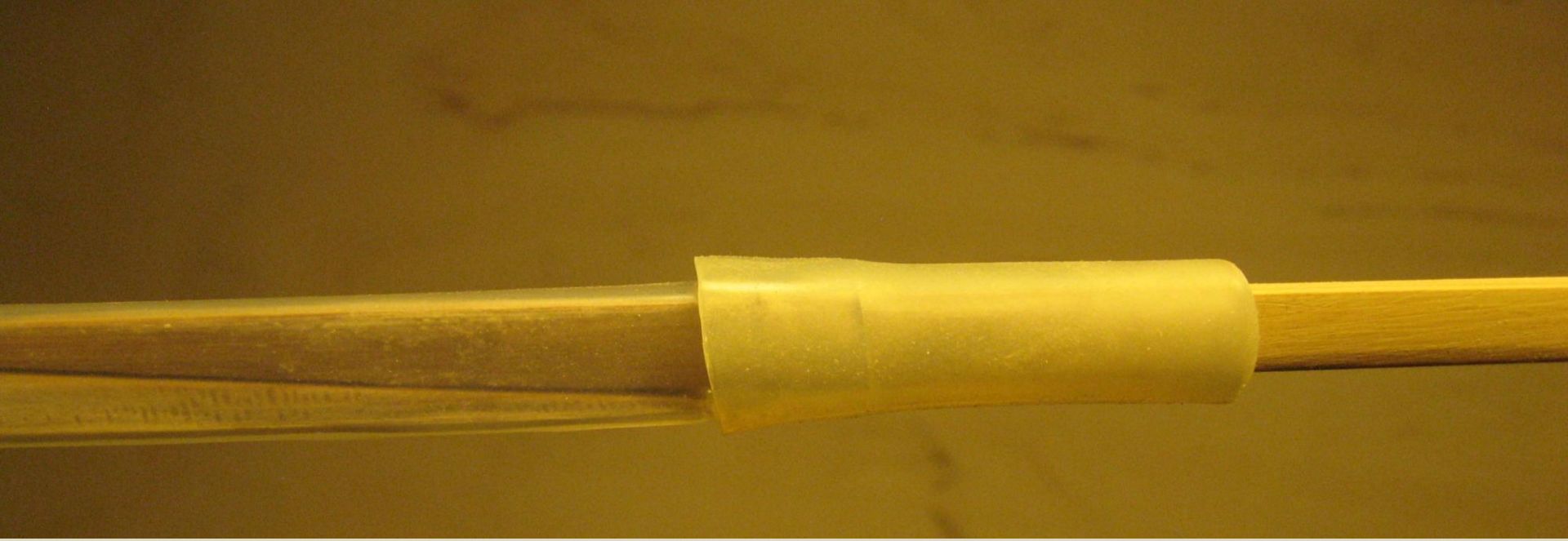
Bamboo ferrule is OK for single hand rods

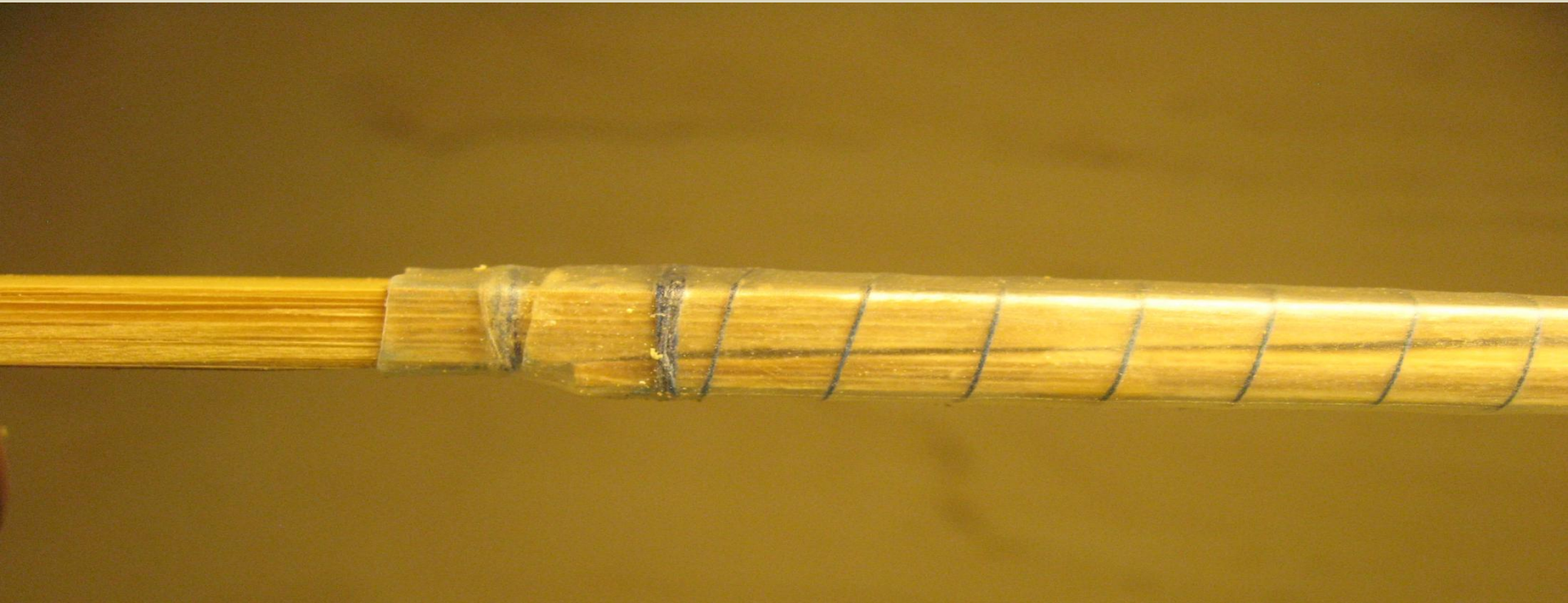
Scarf / spliced ferrule is OK for single hand rods

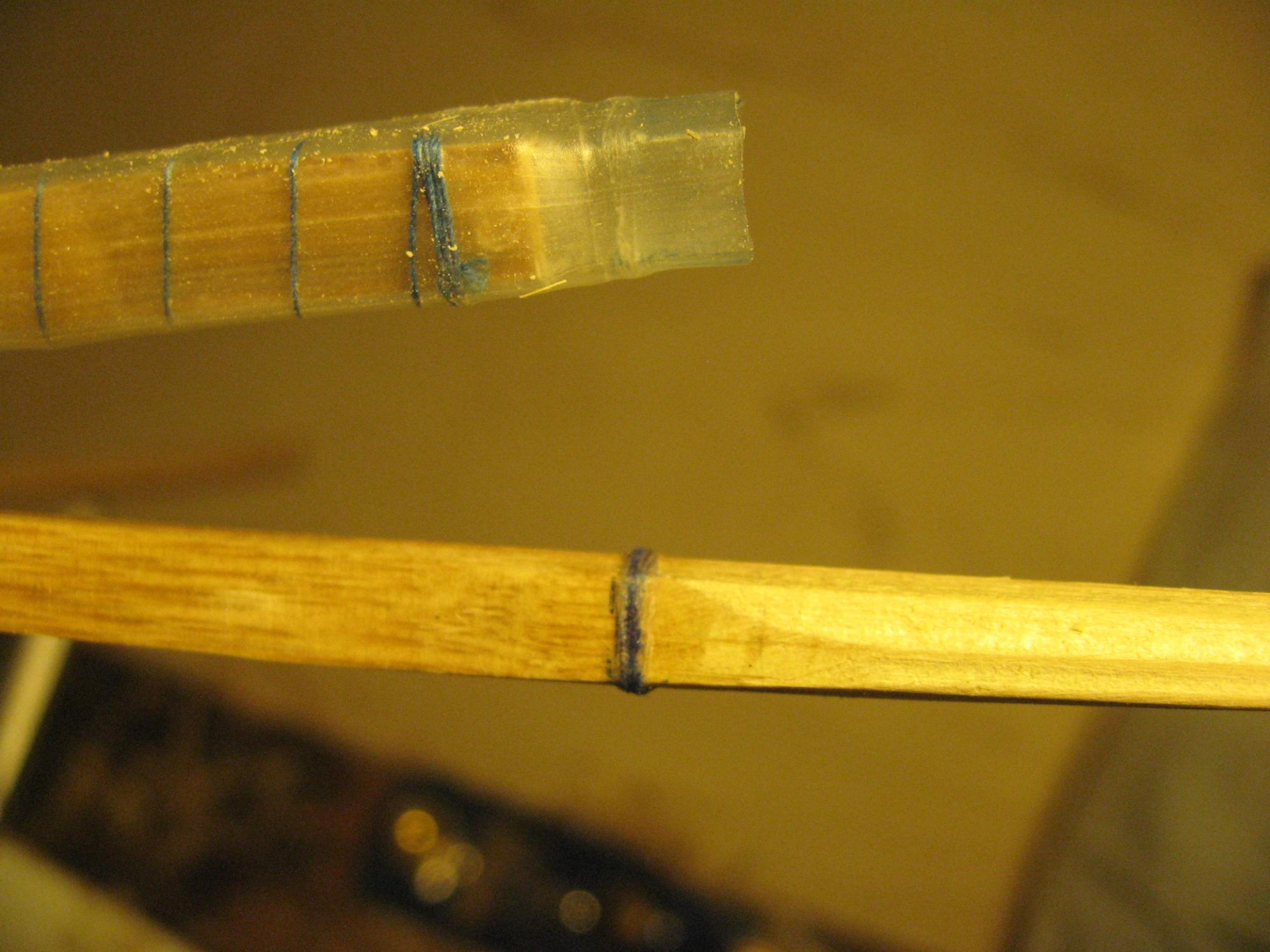


SHRINK TUBE SCARF / SPLICED FERRULE





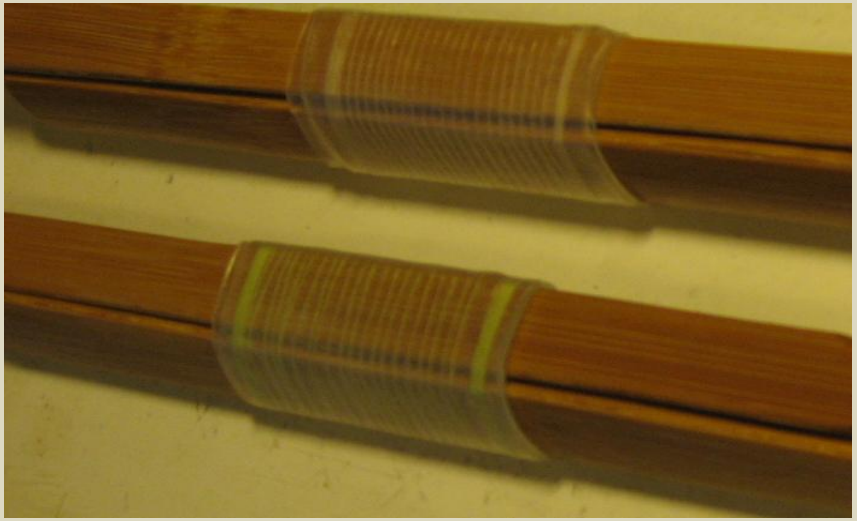




SHRINK TUBE SCARF / SPLICED FERRULE

SHRINK TUBE SCARF / SPLICED FERRULE

SHRINK TUBE INSERT PLUS TAPE

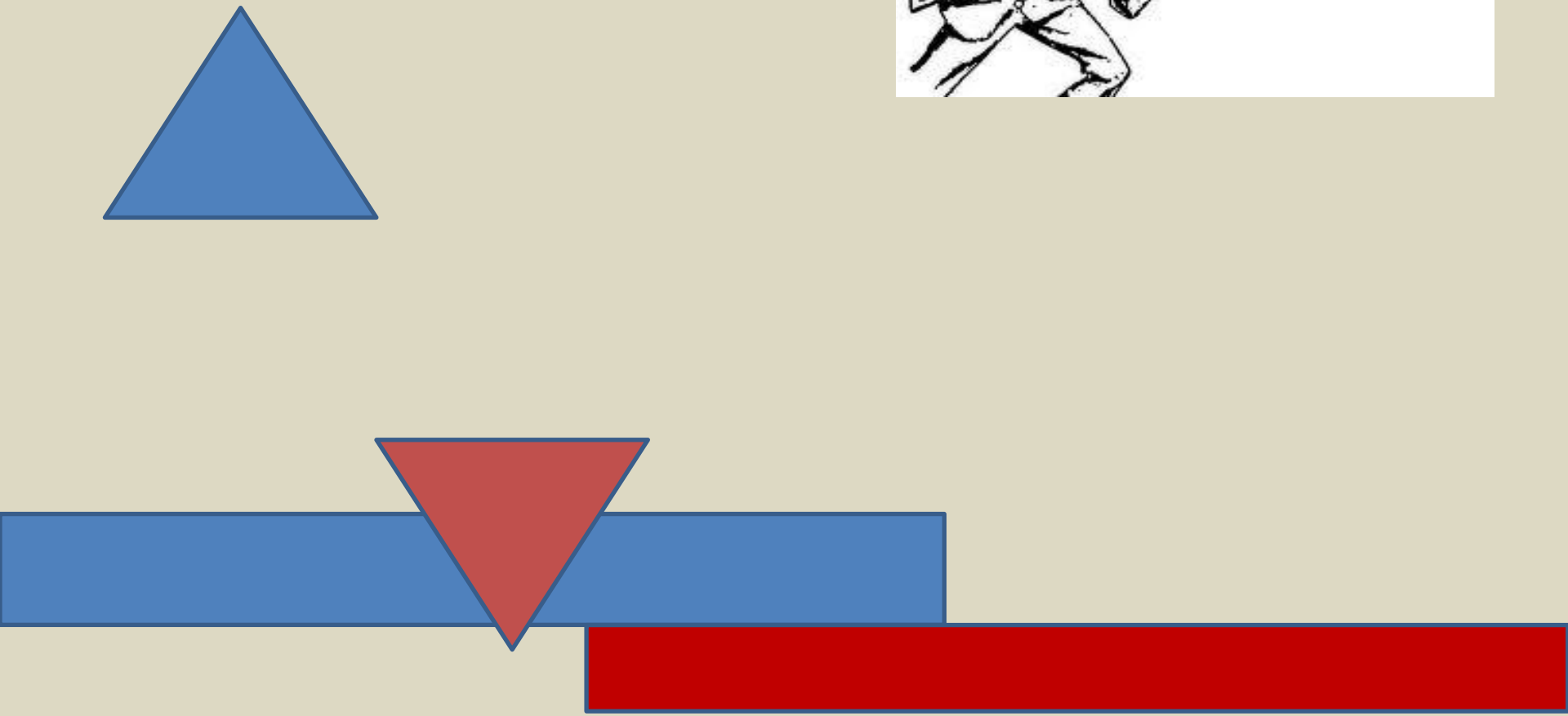


TRIANGLE ROD PROBLEMS: JOINTS/ FERRULES

The problems has been in two-hand salmon rods – the stress at first joint is very high causing breaks -> bayonet joint

Simply the triangles are fixed base - to - base

Bayonet joint for two hand rods:



Simply the triangles are fixed base - to - base

BAYONET JOINT IS EXTREMELY STRONG (AND UGLY)

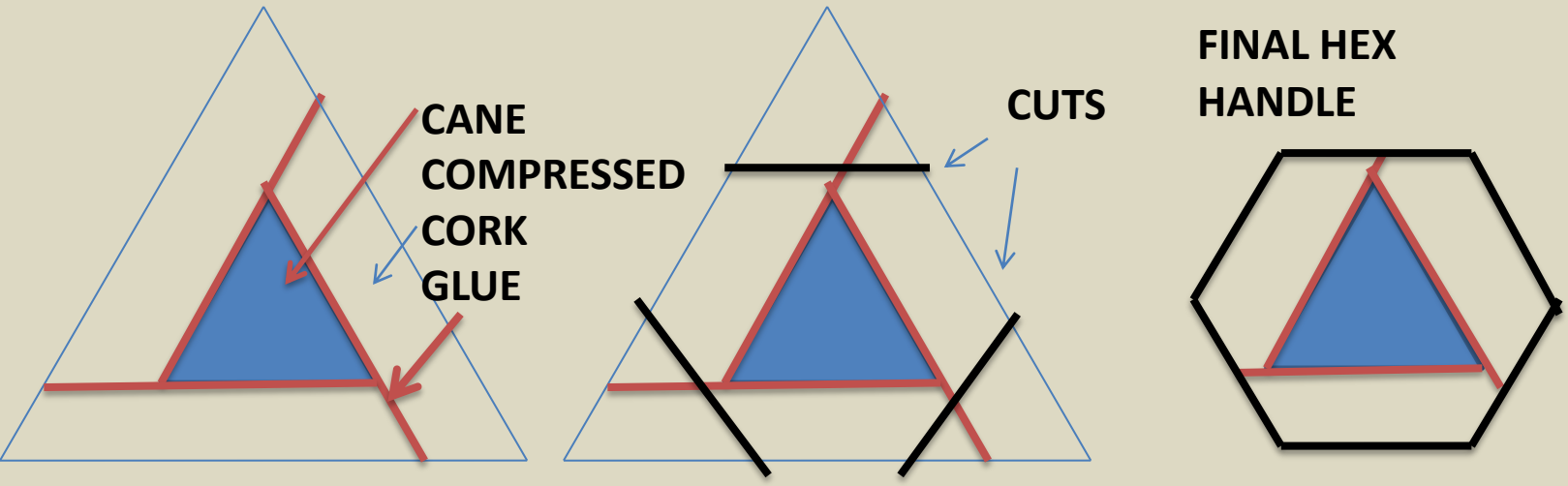
BAYONET JOINT IS EXTREMELY STRONG (AND UGLY)

Note shrink tube insert in the midle of the joint to help taping.

Metal wire support for the oblique stress

TRIANGLE ROD PROBLEMS

3. GRIP / HANDLE: HEX handle into TRI rod



TRIANGLE ROD PROBLEMS

Handle using compressed cork plate

TRIANGLE ROD PROBLEMS

Handle - PU glue

TRIANGLE ROD PROBLEMS

Handle – compressed cork with thin PU varnish surface

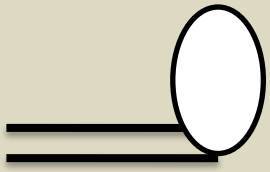
TRIANGLE ROD PROBLEMS

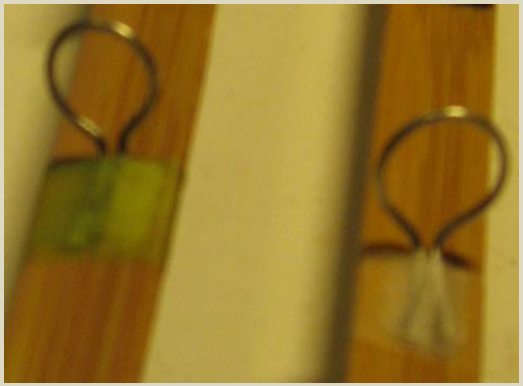
4. Line guide problems:

TRI rod is stronger if you cast the ”sharp” angle forward –> the quide feet has to be modified.

Bayonet joint turns the triangle ->guides are different in shape in diff sections.

SOLUTION : DO IT YOURSELF - DIY!





TRIANGLE ROD PROBLEMS

5. Wide strips preparation

Wide strip straightening, planing, preparation is difficult –

Solution: soaking and wet planing

- **Makes nodes easier to preparate**
- **Small curves are possible to leave**
- **Planing is much easier**

SOAKING AND ALL-WET PLANING

Experiment:

- **10 strips**
- **40 measurement points**

- **Soaking for 4 days -> mean swelling of 3,5%**

SOAKING AND ALL-WET PLANING

In practice:

- **Soak for 2-4 days**
- **add 3% to taper dimensions, plane to dimensions.**
- **heat treat and glue!**
- **”planing of butter”, no frequent sharpening of blades**
- **almost no problems with soft nodes**
- **accuracy: sufficient for an amateur maker?**

HOLLOW BUILDING

- **Hollowing is an advantage especially in long rods**
- **Fluting, scalloping for firm solid bridges**

TRIANGLE hollow building

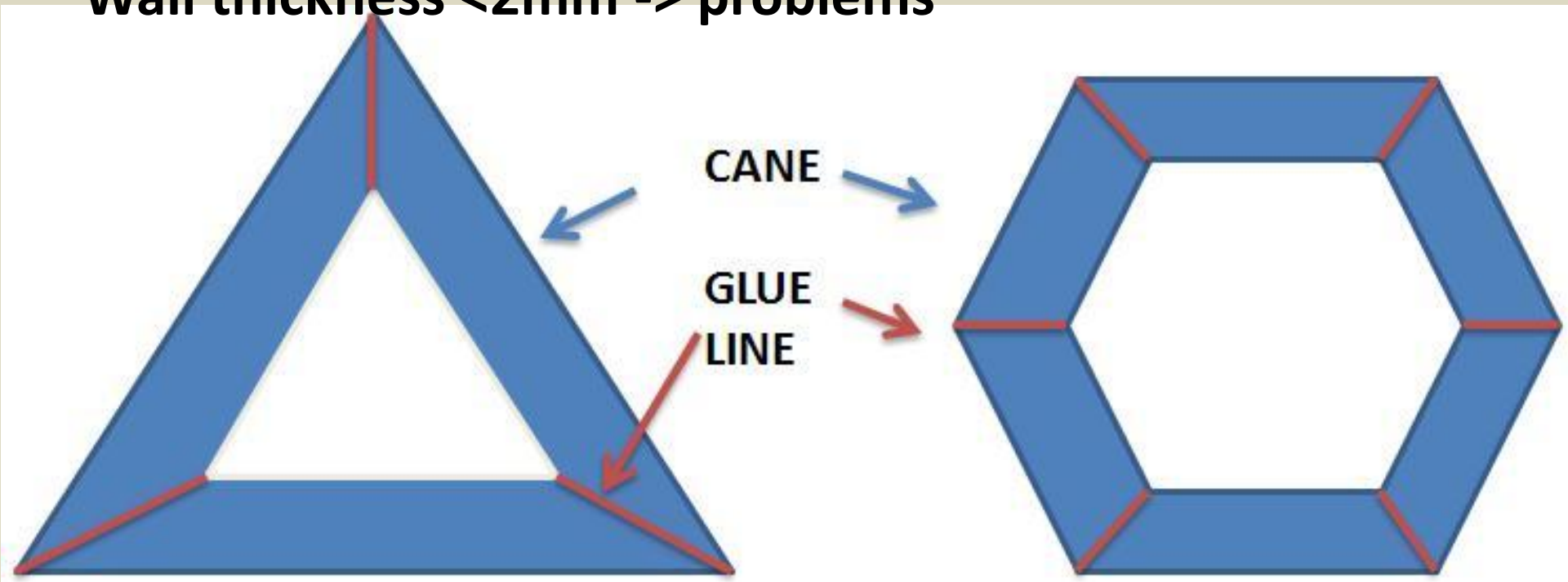
Advantages: Possible to do big rods using only power fibres

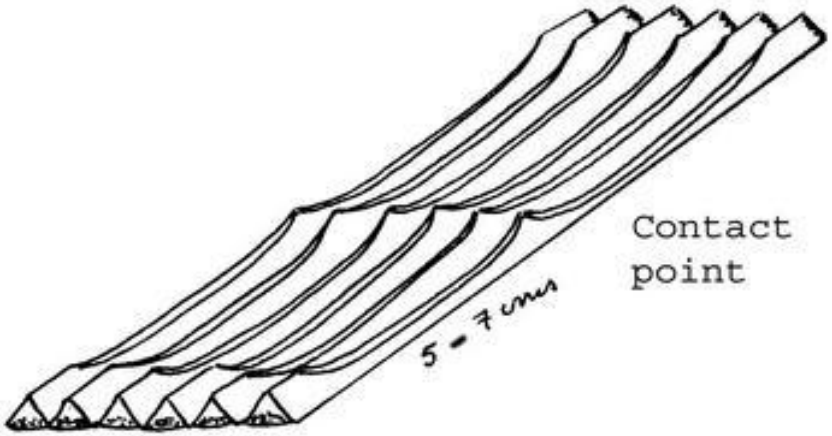
The glue lines (red) are 40% wider in TRI than in HEX - stronger structure.

No of glue lines 3 vs 6. Amount of glue 4/6.

Triangle structure is more stable.

Wall thickness <2mm -> problems




Contact
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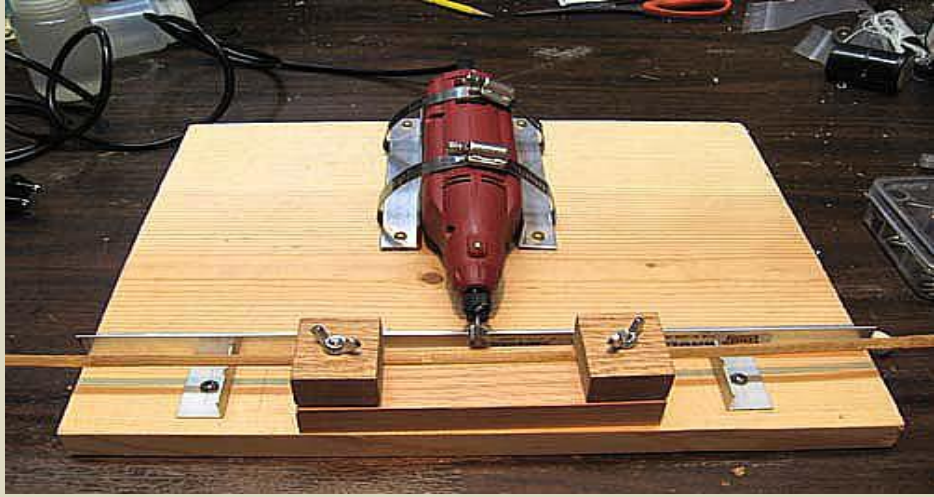
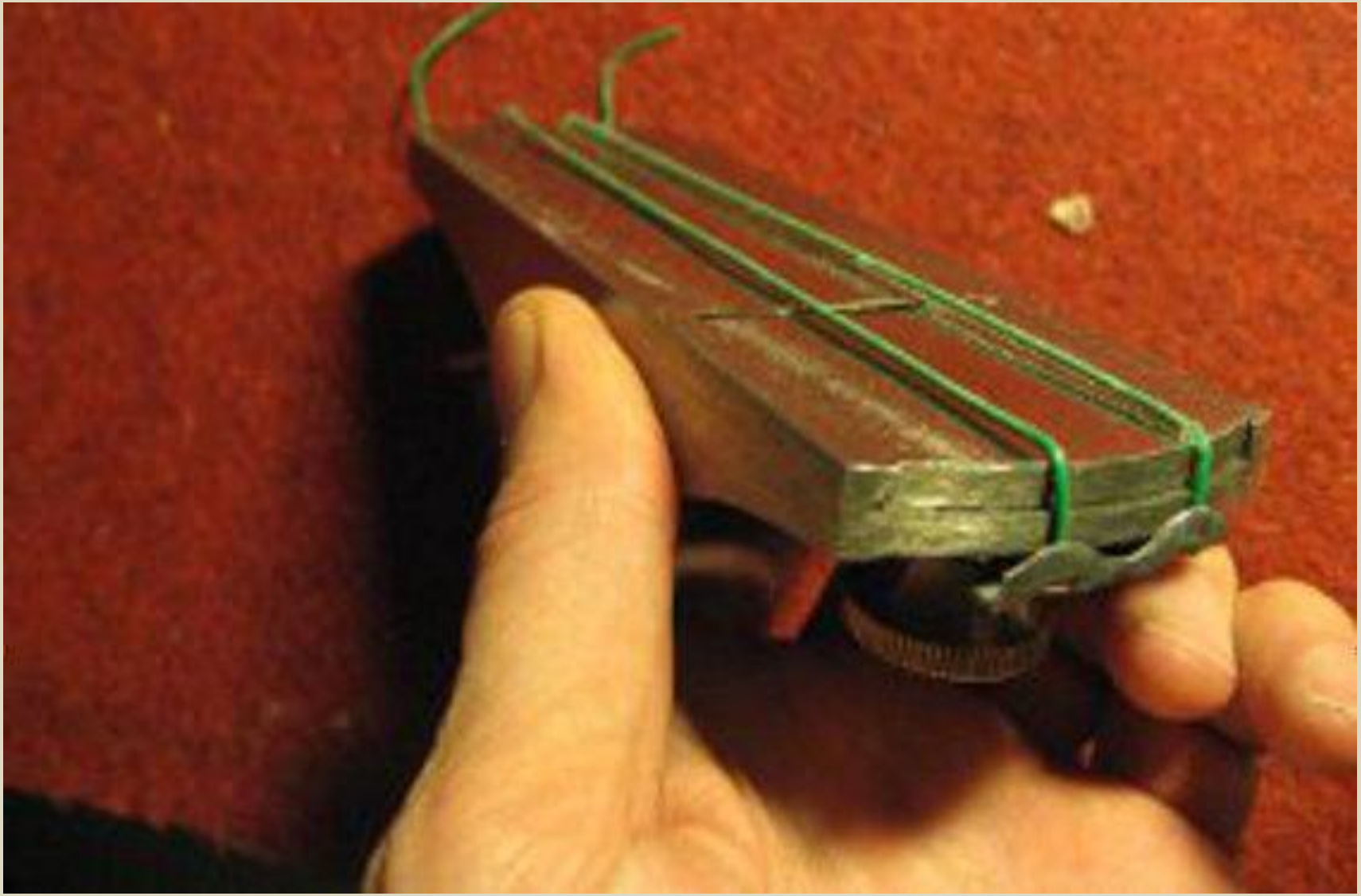
5 - 7 cms



ROLF BAGINSKI’s METHOD for extreme hollowing

Internal bridges are built using PU glue + cotton wool balls + water

ROLF BAGINSKI's METHOD for extreme hollowing



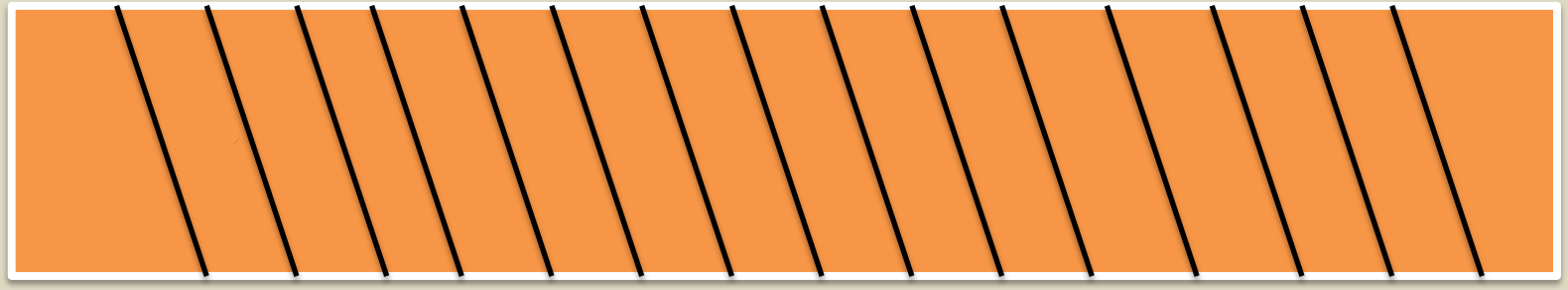
ROLF BAGINSKI's METHOD for extreme hollowing

HOLLOW BUILDING – AN EASY METHOD

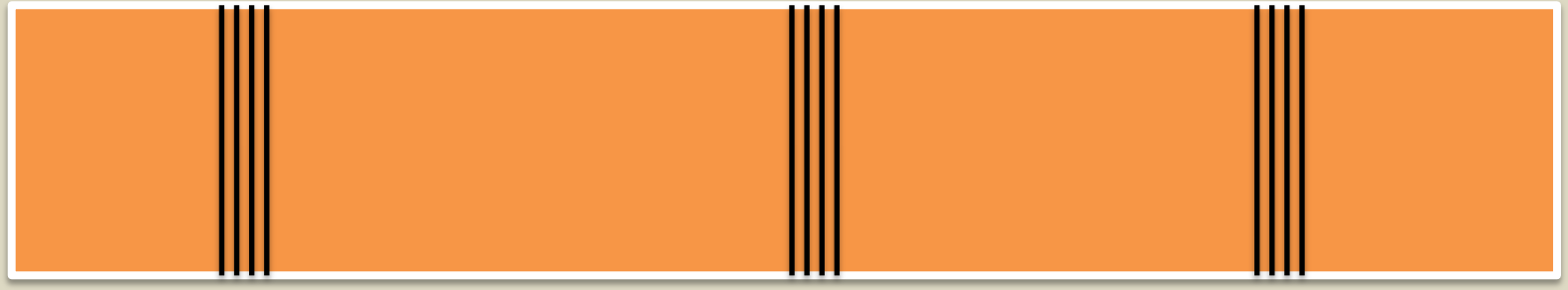
- Hollowing of triangle taper: wide glue lines, amount of power fibres is high
- Longitudinal MOI of cane is high
- Circular MOI/ stress: internal bridges vs external brigdes


SPIRALX
INFINITY TAPE - COUNTER-CLOCKWIS
MUSCLECARBON
INFINITY TAPE - CLOCKWISE

SPIRAL WRAP



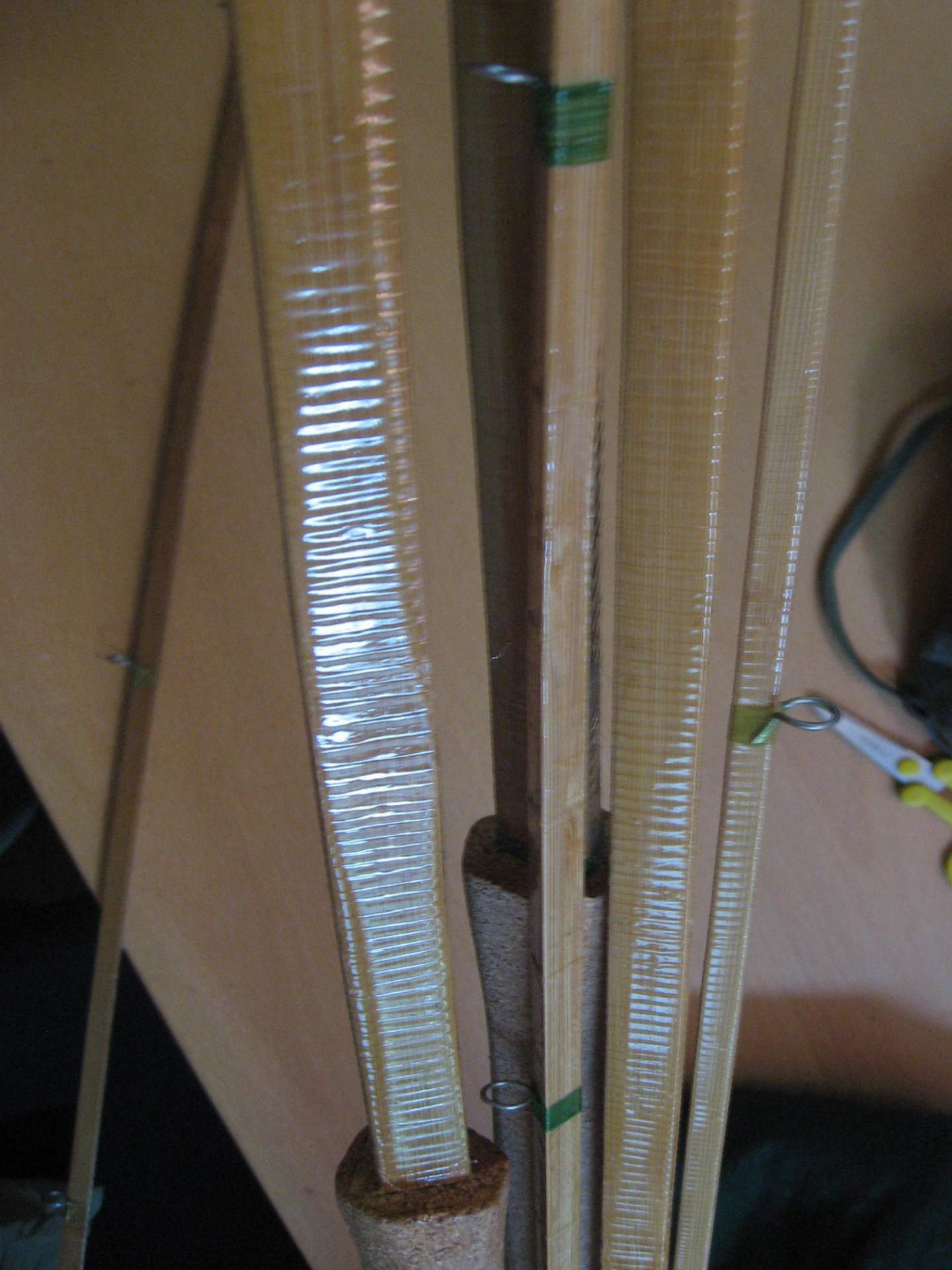
INTERMEDIATE WRAPS



HOLLOW BUILDING – AN EASY METHOD

- Hollowing of triangle taper: wide glue lines, amount of power fibres is high
- Longitudinal MOI of cane is high
- Circular MOI/ stress: internal bridges vs external brigdes

- External bridges: intermediate wraps – OK!
- Continuous circular wrap – easy and fast
- Very thin monofilament or silk.
- Varnish, epoxy, PU




THANK YOU!

12,5’ #9-10 two hand salmon rod , three strip TRI, hollow, bayonet joints, weight 392 g, underhand cast using 35 gram sinking-tip 9,5 m shooting line