SEGMENTED MOB MEETING NOTES
MELVILLE CLUBROOMS
Thursday 5 October, 2023

Present – Syd Harvey, Ian Hamilton, Noel Moyes, Aiton Sheppard, Jon Brain, Tania Emmerson, Mike Phillips and Silvio Moriconi.

Apologies – Ray Dallin and John Townsend.

WELCOME

Aiton only arrived at 1010 by which time Syd had done his welcome and general waffle ensued.

BUTTERFLY VESSEL PROJECT

Tania has made up the rings for her one which is a work in progress.

SOCCER BALL PROJECT

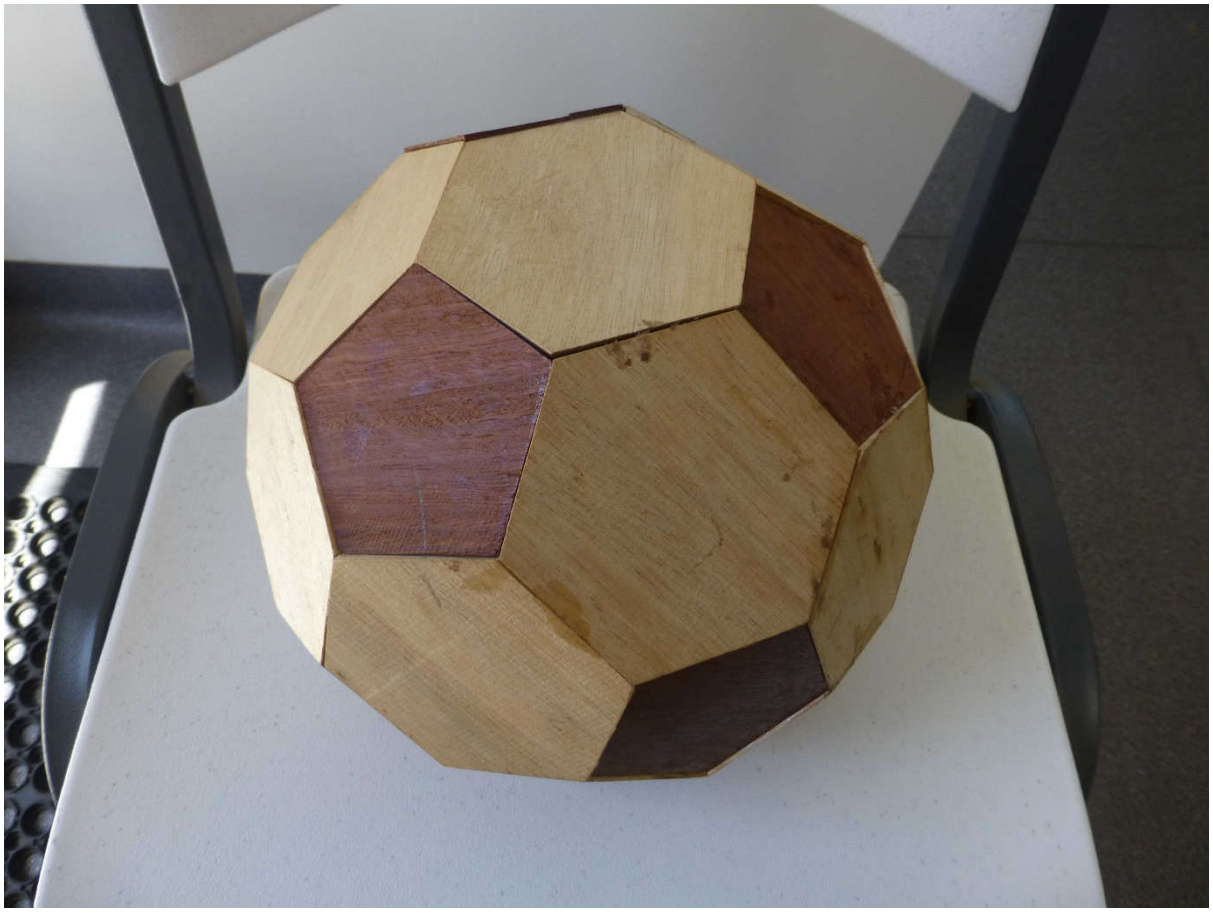
Noel and Silvio have commenced theirs. The photo is below. Noel had trouble with cutting his pieces and believes the templates are not accurate – he will have to fill in and hide the gaps which are evident in the photo.

Syd is also in the process of making his soccer ball which is illustrated in the photo overleaf. Syd used his disc sander at an angle of 20.8 degrees to sand accurately to the template lines.

The YouTube video to watch is Andrew R Conti Snr, “Soccerball Bead Ball”. A table saw jig may be found at ‘Hexagon Cutting Jig 2.0 | Cut a Hexagon any Size | Adjustable Table Saw Jig for Cutting Hexagons – YouTube’.

DUMMY SHELL PROJECT

Dummy shells 9.75”X31” shells for Rottnest Island is a project that can be made up from scrap timber. Note for future discussion.



WEBSITE

https://drive.google.com/drive/folders/1ZXKXiCAKthAjxLWn1NCrY9UhL1xim9Cz

Ian Ludford also has our page set up on the WAWA web page the link to which is https://www.woodturnerswa.org.au/segmenters/

On-line John di Sefano Segment Helper www.johndistefano.com.au

SUGGESTED PROJECTS

1. More hands on demonstrations.
2. Learning to make feature rings. (Basic through to advanced.)
3. Training video suggestions on website or YouTube.
4. Jig designs and specifications to use when preparing, cutting, assembling, or turning your project.
5. A team project from start to finish at meetings with all members being involved. This will then be sold for Seggie fund raising. Tania's artistic challenge may result in a suitable item for this.

AROUND THE TABLE

SYD – advised that Ross has purchased the new sander from Carbatec. After the meeting we went out to assemble it.

AITON – went to Carbide Tools, Wangara, where he had band saw blades sharpened and found BioSteel 8/10/12 tpi bandsaw blades, similar to those used by Trev.
Aiton will also be an apology for the Sunday 15 October meeting.

2023 MEETING DATES
OCTOBER –Sunday 15, and Thursday 26.
NOVEMBER – Sunday 5, Thursday 16 and Sunday 26.
DECEMBER – Sunday 3. Noel is arranging the annual wind-up, to be held at “The Seventh Avenue” pub in Midland. Butterfly Vessel project to be completed and brought along for show & tell and most popular vote.

Turning a Soccer Ball

by Sam Shakouri

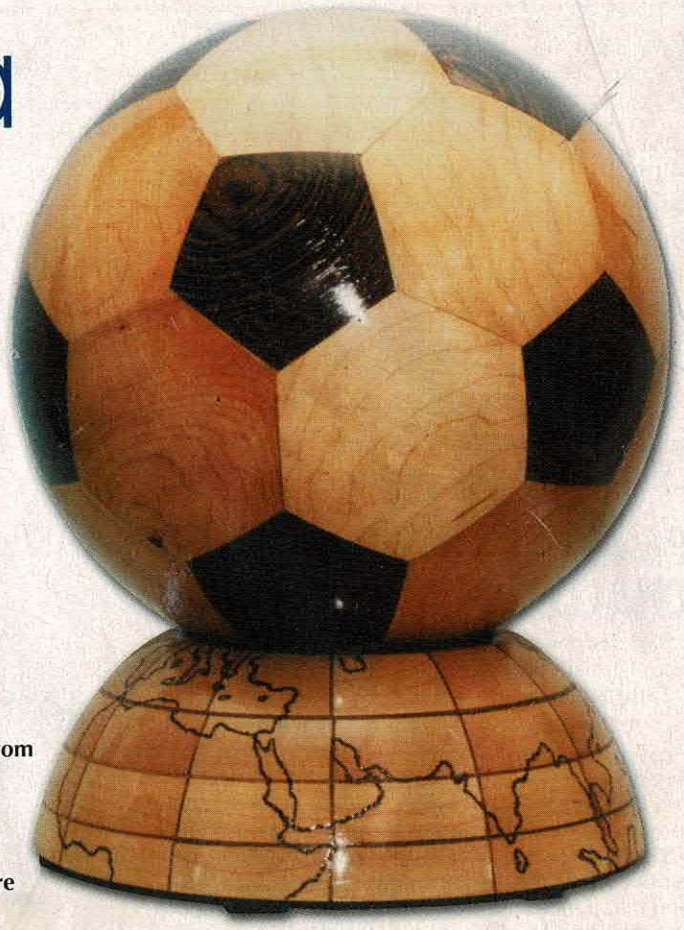


Photo.1: This ball from Rock Maple and African Wenge sits atop a base that represents the northern hemisphere

My interest in segmented turning and my love of soccer were combined when I turned my first soccer ball. Since then I have made others and they have always attracted people's attention.

The Real Ball

Before turning a soccer ball from wood, it is necessary to consider the design of a real soccer ball.

The balls come in different sizes. The drawings provided here will produce a ball with a diameter of approximately 240mm, ie. a No.5 ball which is the size used by adult and teenage players.

Each ball consists of 20 hexagons and 12 pentagons.

The Turned Ball

Choose a light coloured timber for your hexagons and a dark one for your pentagons. For the hexagons I've used woods such as Tasmanian Oak, Maple and Rock Maple; for the pentagons I've used Jarrah and African Wenge. The darker timber is likely to be more expensive, but you do use less of it to make the ball.

Forming the Blank

Using the template provided in Fig.1a, mark out the 20 hexagons on 18-19mm thick stock. If you wish you can photocopy the template and glue it to the timber, as the paper will be removed during the turning process.

Cut out the hexagons 2-3mm oversize. The cutting can be done on a bandsaw, scrollsaw or with a jigsaw.

Set up your disc sander with the worktable tilted 20.8° down from the horizontal (Fig.2). This will give an angle of 110.8° (90° + 20.8°) between the sanding surface and the worktable. It is not essential to get this angle to within a tenth of a degree, but the more accurate you are the tighter the joins will be in the finished ball.

It took me a while to realise how I could work out the required angles. The solution came when I constructed a full-sized ball from card pentagons and hexagons. At each join I measured the external angle. The required chamfer was then half the internal angle, ie. (360° - external angle) x 0.5.

Carefully sand each edge of the hexagon back to the marked line. This will ensure the segment is of the correct size and has the required chamfer on all edges.

Mark the centre of the outer (larger) face of each hexagon and glue a 15mm long piece of 10mm dia. dowel at this point. These will secure the rubber bands used during assembly.

It is important to locate all of the dowels at the centre of their respective hexagons. If they are placed off-centre, the 'pull' exerted by the bands will be uneven and tend to distort the shape of the ball during glue-up.

I used a good quality PVA to glue the dowels in place. You can use other adhesives, but don't use one which is so strong that it tears away some of the wood underneath when you later remove the dowels with a chisel.

Assemble the ball without glue to check the effectiveness of the rubber bands. If necessary use others of a different length or elasticity to achieve the desired result. Don't mix the bands. They should be of the same length and ideally from the same packet to ensure that they provide a uniform tension between the dowels.

Glue the ball together. I used a good quality PVA for this but again there are other alternatives you may prefer. Use calipers or other measuring device to check the ball is approximately of uniform diameter (any slight discrepancies will be removed during turning).

When the adhesive is fully cured, remove the bands and then dislodge the dowels with a tap from a sharp chisel.

Adding the Pentagons

Prepare the 18mm thick pentagons in exactly the same way as the hexagons, using the template in Fig.1b and setting the worktable on the disc sander to 18.4° below the horizontal (ie. 108.4° from the sanding plate). However, do ***not*** sand to the line when forming the chamfer on the edges. Leave at least 2mm on all sides.

Insert the pentagon in the opening in the ball and note how proud it stands of the mating edges. Return it to the disc sander, remove a small amount of material from all edges and check the fit in the

Photo.2: A combination of dowel stubs and elastic bands permit the ball to be assembled in one step

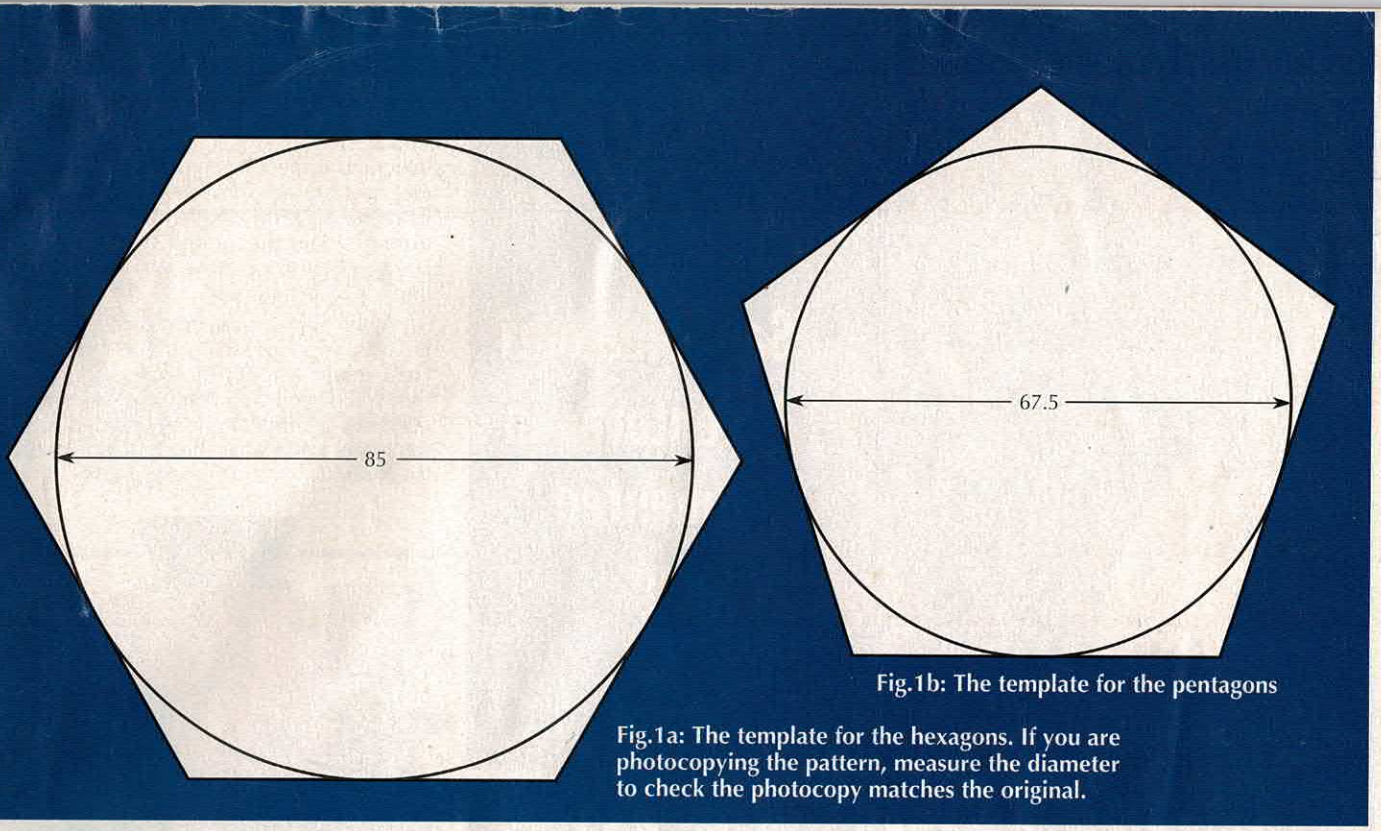


Fig.1b: The template for the pentagons

Fig.1a: The template for the hexagons. If you are photocopying the pattern, measure the diameter to check the photocopy matches the original.

ball again. Repeat this process until the pentagon is a perfect fit in its location.

Whereas the glue-up of the ball allows for any slight inaccuracy in the hexagons, the rigid globe structure is unforgiving when you are placing the pentagons. This is the reason they have to be chamfered oversize and then sized by trial and error for the final fit.

Glue each pentagon in place. A simple strip of masking tape is enough to keep the block in place while the glue sets. Since each pentagon is sized to fit a specific hole, it is advisable to glue them in place as each one is finished.

Turning the Ball

Cut two more hexagons (Fig.1), this time from 18-19mm thick scrap stock. These are cut to size, not oversize.

Glue these pieces to opposing hexagons on the ball and mount the blank between centres on the lathe. I use a drive centre in the headstock and a dead centre in the tailstock.

Prepare a plywood template with a semi-circular cut-out with a 120mm radius. This is used to check your turning to ensure that you don't remove too much and that the finished ball is truly round.

With the lathe set at medium speed, turn the ball to shape, checking your progress frequently with the template. There is not much to remove so don't be too aggresssive with your cuts. The centre of each panel will remain virtually full thickness (18mm) while the turning process will thin their edges down to around 12mm.

When you have finished, you will be left with a small diameter spigot of plywood at the lathe centres. Part them off or cut them away and clean up the affected area on the ball with a light touch against the disc sander.

You can now apply your preferred finish. I chose Wattyl Estapol.

Stand

The stand consists of a simple shape with a concave recess in the top to accept the ball. It can be readily turned from a solid blank, but as usual I tend to make mine from segmented wood. The base in Photo.1 has 98 pieces, comprising Rock Maple segments separated by 1.5mm thick divisions of Jarrah. After the shape was turned, the map was engraved and the lines coloured. W

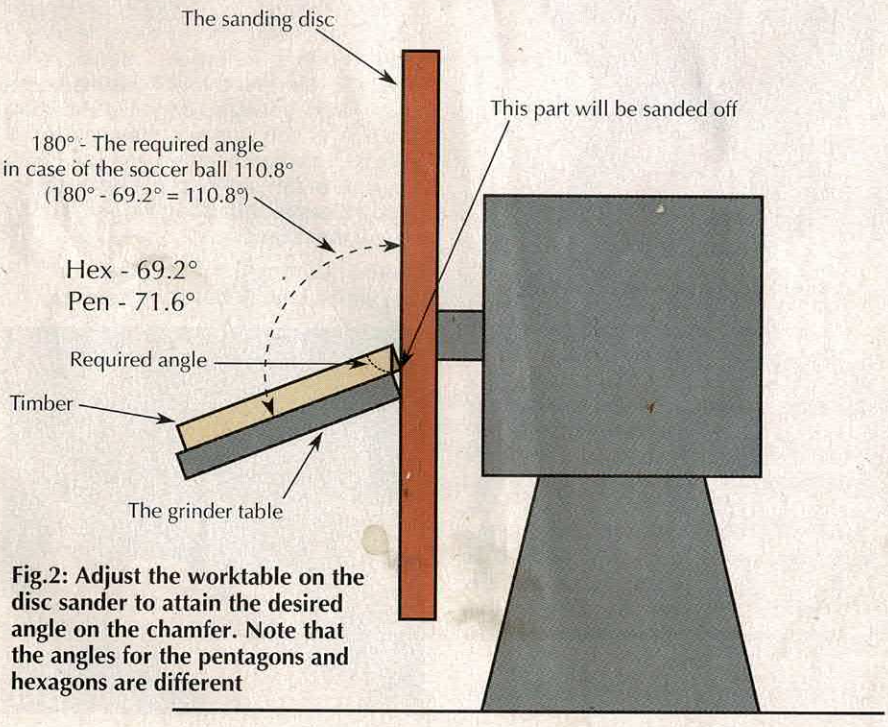


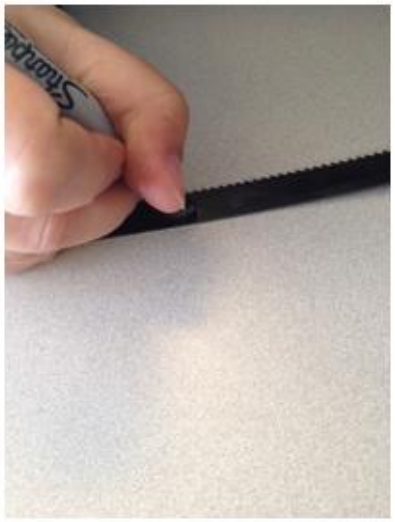
Fig.2: Adjust the worktable on the disc sander to attain the desired angle on the chamfer. Note that the angles for the pentagons and hexagons are different

Photo.3: An earlier ball made from Maple and Jarrah

How to Determine Bandsaw Blade Length

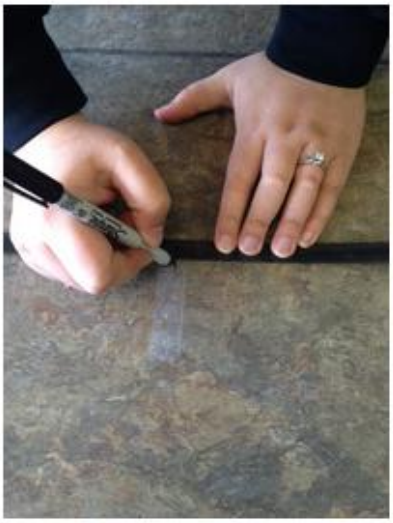
Bandsaw blades come in a wide variety of lengths, widths, thicknesses, and tooth configurations. In order to determine bandsaw blade length for your saw, please reference our Bandsaw Blade Lengths & Manufacturers page for a list of common saws and sizes. If you cannot find your saw model or are unable to locate a manual, Detroit Band Saw can teach you how to determine bandsaw blade length. You will need a tape measure, pencil/pen, and a clear path or floor space. Just follow these 5 steps.

Step 1



Make a mark on the blade.

Step 2



Place a piece of tape on the floor and make a mark to determine your starting point.

Step 3

Roll the blade in a straight line until the mark you previously made comes back and hits the floor.

Step 4

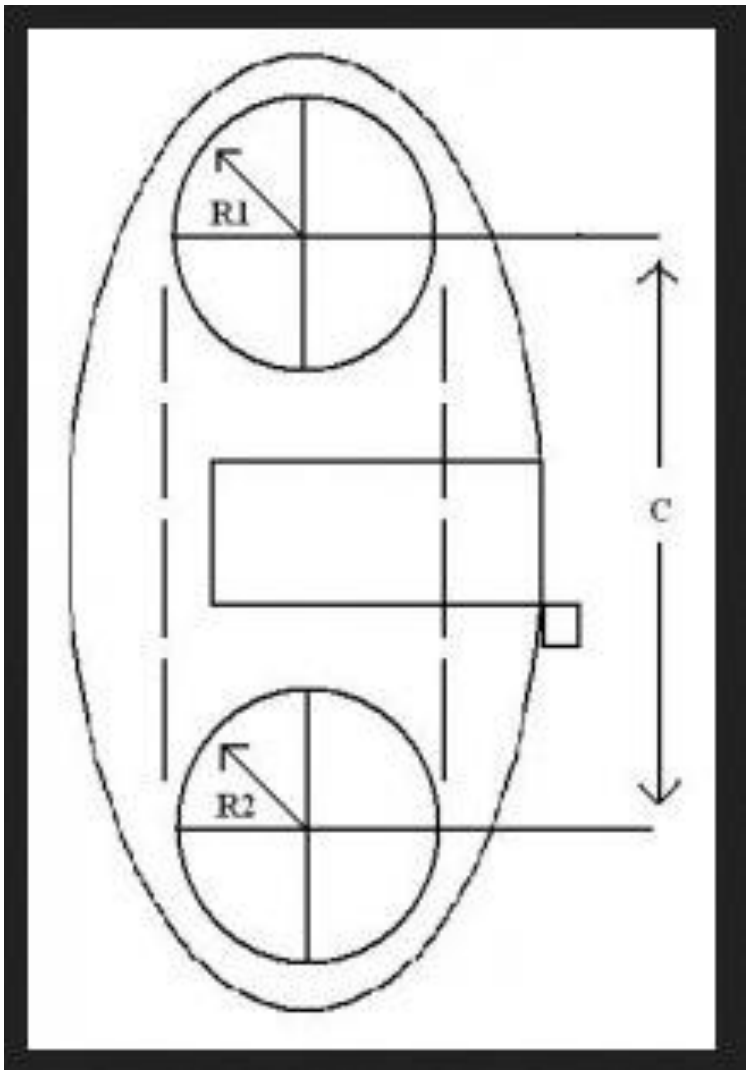
Make a second mark on a piece of tape.

Step 5

Measure the distance between your two marks on the floor. You now know the length of your bandsaw blade!

If you do not have an existing blade, there is a mathematical equation to help determine saw blade length in inches.

1. ***Fix the pulleys or wheels into working position***
2. ***In inches, determine the distance from the center hub on the upper and lower band wheels (later referred to as "C")***
3. ***In inches, determine the radius of each wheel. The radius is the measurement from the center hub to the outside of the wheel (later referred to as "R1 and R2")***
4. ***Apply the following formula: (R1 x 3.1416) + (R2 x 3.1416) + (2 x C) = Saw blade length***



How to Select Bandsaw Blade Width & Teeth Per Inch (TPI) Chart

Bandsaw blade width can determine how straight you can make a cut, how tight a curve (radius) or the shape you can achieve with your bandsaw. The blade width is measured from the tooth tip to the back edge of the blade, as per the example diagram.

TOP TIP: Refer to the machine manufacturer's instructions to determine the minimum and maximum blade widths your machine permits.

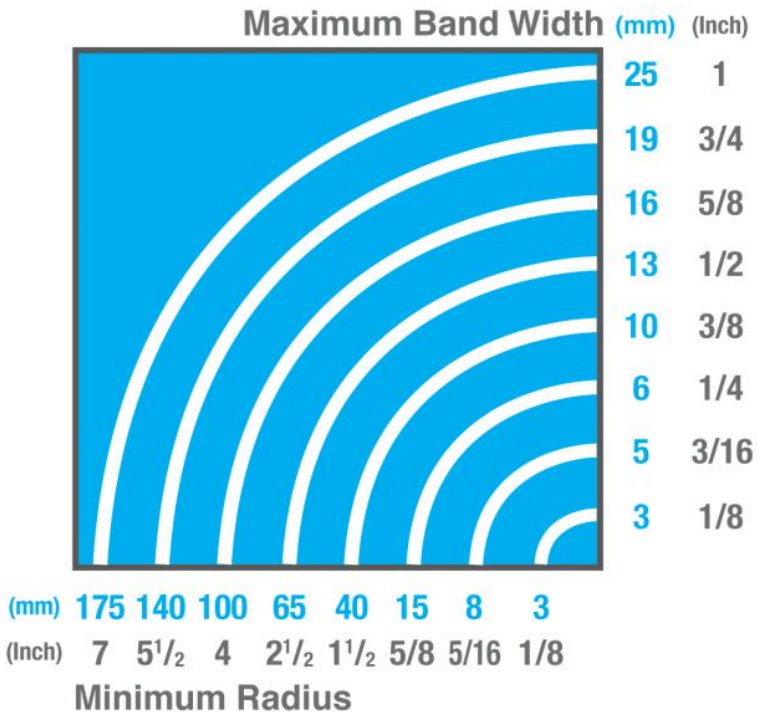
CONTOUR (CURVED) CUTS

For cutting curves and radii, the blade should be as wide as the machine permits but still narrow enough so that it can cut the desired shape (radius).

STRAIGHT CUTS

For straight cutting, the blade should be as wide as the machine permits. The wider the blade, the more beam strength it has to promote straighter, more accurate cuts.

Use the chart below to select the correct band width for your project.

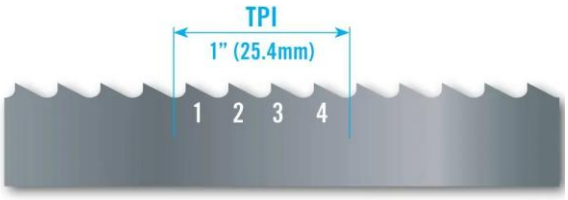


EXAMPLE:

You need to cut a radius of 50mm (2") in a piece of timber. The blade width you should select would be a 10mm (3/8") wide bandsaw blade. If required, this blade width selection would allow you to cut a minimum radius of 40mm (1 1/2").

Band Saw Blade Teeth Per Inch (TPI) Chart

You must select the correct Teeth Per Inch (TPI) for the thickness of material you are cutting. If the correct TPI is not chosen the blade life will be dramatically reduced. TPI selection is arguably the most important decision when selecting a band saw blade.



The number of TPI defines the pitch of the blade and can vary from 1 to 32 TPI. On some bandsaw blades there are different pitches on the same blade referred to as Vari-Pitch. TPI is measured from gullet to gullet, not tooth tip to tooth tip – this is known as pitch.

The general rule of thumb is:

- ***For wood and soft materials aim for 3 – 6 teeth in the workpiece.***
- ***For metals and harder materials aim for 6 – 24 teeth in the workpiece.***

Some things to note:

- ***Too few teeth may straddle the work and break teeth.***
- ***Too many teeth can cause gullet overload and strip teeth.***

Use the bandsaw teeth per inch chart below to select the optimum TPI for your project needs.

TPI Selection — **Carbon**
Wood/Plastic/Aluminium

Teeth Per Inch (TPI)										
24	18	14	10	8	6	4	3	2	1.3	1.1

Material Thickness										
(mm)	1	2	2.5	6	10	18	25	38	50	127
(Inch)	0.04	0.08	0.1	0.2	0.4	0.7	1.0	1.5	2.0	5.0

TPI Selection — **Bimetal**
Round Solid Metals

Teeth Per Inch (TPI)									
24	14	10/14	8/12	6/10	5/8	4/6	3/4	2/3	1.1/1.5

Material Thickness									
(mm)	2	7	10	15	20	25	50	127	254
(Inch)	0.08	0.3	0.4	0.6	0.8	1.0	2.0	5.0	10.0

TPI Selection — **Bimetal**
Tube/Pipe/Profile Metal Section

Teeth Per Inch (TPI)								
14	10/14	8/12	6/10	5/8	4/6	3/4	2/3	1.1/1.5

Material Thickness								
(mm)	2	2.5	4	5	7	15	27	50
(Inch)	0.08	0.1	0.15	0.2	0.3	0.6	1.06	2.0

Folding Bandsaw Blades: Simple as One, Two, Three

Hold the blade in front of you with one hand, keeping the teeth pointing away from you.

Wear a glove if you've got one handy.

Put your foot inside the loop and step on the blade, securing it firmly to the floor.

Simultaneously rotate and lower your hand as you hold the top of the blade.

By the time your hand makes three-quarters to one full revolution, the blade will have popped into three coils.