# Turning lidded Boxes
# Detroit Area Woodturners Demo

# Jim Scarsella (jscarsella@asconsultants.com)

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**References Books/Articles:**

1. Turning Boxes with Richard Raffan, by Richard Raffan, Publisher: Taunton Press; Rev edition (March 1, 2002)
2. Turned Boxes: 50 Designs, by Chris Stott, Publisher: Guild of Master Craftsman (May 28, 2002)
3. Turning Boxes with Friction-Fitted Lids, by Bill Bowers, Publisher: Schiffer Publishing; 1st edition (May 28, 2008)
4. Making Boxes, by Michael O'Donnell, Woodturning magazine, May 2011, Issue 226

**Reference DVDs:**

1. Turning Boxes with Richard Raffan, 2007
2. Box Making with Ray Key, Three DVD Set, 1993

**Steps in turning end-grain boxes:**

1. Rough out the blank into a cylinder, turn tenons on both ends, divide lid and base with thin parting tool.
2. Rough hollow both lid and base, insuring there is enough wood in base section for flange.
3. Thoroughly dry the blank.
4. True up the tenons on both lid and base and turn back to balanced cylinder.
5. Mount the lid and chamfer the end grain slightly concave.
6. Cut the flange using a square-end scraper; make certain it is cylindrical by checking with inside calipers.
7. Finish the inside of the lid (scrapers, sand, finish).
8. Rough shape the outside of the lid.
9. Mount the base blank and establish the approximate diameter of the base flange.
10. Hollow, shape, sand and finish the inside of base.
11. Mark the exact internal depth on outside of base and part a line identifying the absolute bottom of finished box.
12. Refine the base flange to jam fit the lid.
13. Shape, refine and detail the outside profile of base and lid.
14. Sand and finish outside of box.
15. Fine-fit the lid and finish the base flange.
16. Part-off (finishing cut with saw) the base.
17. Reverse chuck (jam-chuck) the base.
18. Turn concave profile in bottom, sand and finish bottom.

**Other Considerations:**

1. **Wood selection**
    a. Dry- kiln dry or roughed out and thoroughly air dried
    b. Straight grained and Quarter sawn
    c. Stable wood species

2. **Lid fit**
    a. Suction fit or not- not always desirable
    b. Over-fitting vs. in-fitting lid
    c. Ergonomics- make sure you can grip the profile if making a tight fitting lid
    d. Don't sand the lid contact parts if making a tight fit

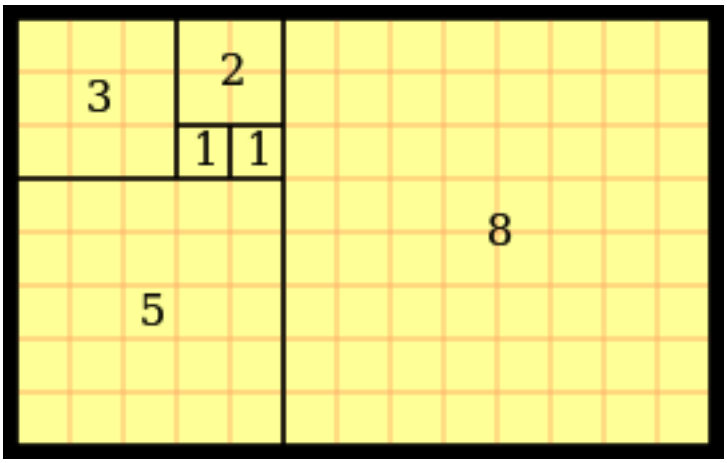
3. **Scrapers – use on end grain**
    a. Very light pressure for finishing cuts
    b. Burr?
    c. Not a profile tool, use small part of tip and sweep tool
    d. Use largest diameter possible, just smaller than diameter of curve

4. **Various ways to hollow end grain**
    a. Spindle gouge back cut
    b. Carbide hollowing tools, Hunter tool, etc.
    c. Drill
    d. Ring tool
    e. Back-hollowing cut

5. **Proper direction of cut with end grain**
    a. Opposite of side grain
    b. Small diameter to large diameter

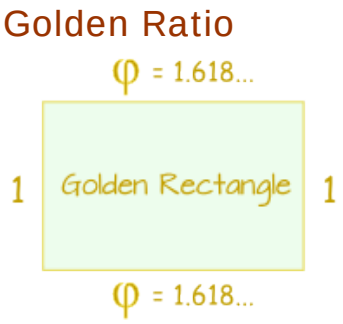
6. **Joint**
    a. Chamfer the end grain of the lid slightly concave to insure it will fully close on the outside rim.
    b. Match the grain across the joint by limiting the length of tenon (flange) and using a thin parting tool.
    c. Either make the joint a design feature and highlighting it with a fillet or chamfer, or disguise it with a turned feature on one or both sides of the joint.

7. **Design/ Proportion:**
    a. Fibonacci numbers or Fibonacci series or Fibonacci sequence are the numbers in the following integer sequence: 0, 1, 1, 2, 3, 5, 8, 13, 21, …..
    b. The next number is found by adding up the two numbers before it.



**8. Phi or the Golden Ratio**

If you take any two successive (one after the other) Fibonacci Numbers, their ratio is very close to Phi or the Golden Ratio "ϕ" which is approximately 1.618...




**9. Phi is the basis for the Golden Ratio, Section or Mean**

The ratio, or proportion, determined by Phi (1.618 …) was known to the Greeks as the "dividing a line in the extreme and mean ratio" and to Renaissance artists as the "Divine Proportion". It is also called the Golden Section, Golden Ratio and the Golden Mean. What makes phi even more unusual is that it can be derived in many ways and shows up in relationships throughout the universe.

**Phi ( ) is simply the ratio of the line segments that result when a line is divided in one very special and unique way.**

Divide a line so that:


the ratio of the length of the entire line (A)
to the length of larger line segment (B)
is the same as

the ratio of the length of the larger line segment (B)
to the length of the smaller line segment (C).

**This happens only at the point where:**

**A is 1.618 … times B and B is 1.618 … times C.**
**Alternatively, C is 0.618… of B and B is 0.618… of A.**