Jere Osgood gave a lecture/demonstration on the safe and effective use of a shaper at a well-attended meeting at his workshop in Wilton on March 16. His extensive experience as a teacher was evident as he walked the members through a logical sequence of steps toward an understanding of the shaper, its scope of work, operating techniques, and safety rules. His presentation was supported by printed lecture notes which were distributed at the outset.

Osgood's shaper is an awesome machine. Made in Poland, it has the mass and solidity of a battleship (made in Gdansk?), operates 220 v with 4 speeds, both forward (counter-clockwise rotation) and reverse, with an integrated accessory of a sliding table for making tenons.

In a brief comparison of routers and shapers, it was pointed out where the shaper is more accurate (rabbetts and spine slots), safer (large panel raising bits and other large cutters), and generally gives a smoother, more even cut.

The scope of work that can be performed with a shaper was illustrated with samples of work and demonstrated cuts including the following: straight cuts for mouldings, curved cuts using a ball bearing collar, rabbetts, slots and splines, tongue and groove, cove cuts, rounding over edges, tenons, and pattern shaping.

Pattern shaping, a major use of the shaper, can be used to produce duplicate parts with compound curvatures to a high degree of accuracy. A pattern is made from 3/4" MDF and incorporated into a precision-made jig. In simpler cases, a single pattern is used to cut both side profiles. In more complex cases such as one of Osgood's furniture legs, a double pattern is used whereby the stock is mounted and milled in one position, and the shifted to the second position to finish the other edge. This work is done with a straight cutter with a ball bearing collar of the same diameter; the stock is bandsawn to 1/16" oversize.

The presentation also covered the various types of cutters (3 wing, cutters with interchangeable or disposable knives, loose knives with lockedge, and discs for tenons) of which the solid 3 wing cutters are the safest and most commonly used. Arbor sizes range from 1/2" to 1 1/4" with 3/4" a good general purpose size. Guidance was also provided for grinding your own knives from lockedge bar stock, and the detailed information that should be specified when ordering custom made cutters.

Safety considerations were discussed throughout the lecture and Osgood emphasized this subject by summing up the important safety rules for the shaper:
- Wear goggles or safety glasses.
- Disconnect the power when setting up or adjusting the machine.
- Use a lockwasher or two nuts ("If you forget to lock the tool on the spindle and start the shaper, the whole room will rotate")
- Double check the rotation direction.
- For counter-clockwise rotation, feed stock from right to left.
- Use guards and wooden finger hold downs.
- Run cutters below table level, if possible; eg, rounding over edges.
- Check stock for knots.
- Be sure spindle is unlocked.
- Use "faint guard" for pattern shaping (a guard above the cutter).
- Obey the 6" rule (fingers never closer than 6" to the cutters).

A two hour video of Jere Osgood's presentation is available from Peter Block.

Ed Epremian
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Like all power equipment the shaper must be used properly to be safe. Know and understand all the safety rules for this machine. Additional points on safety will be found at the end of these notes.

Shaper vs Router  Accuracy and safety

There are many cases where a router could be very dangerous (case of a large cutter) or inaccurate in the case of rabbetts which are almost impossible to cut accurately with a router. Spline slots are also difficult to do accurately with a router. Safety is a major consideration. Large panel raising bits in a router are risky. Large round over bits and long straight bits are dangerous to use. The alternative - using a shaper is a safer job with a good steady even cut.

What can be done with a shaper.

straight cuts for mouldings
curved cuts using a ball bearing
rabbetts
slots
rounding over edges
cove cuts
tongue and groove
splines
pattern shaping
tenons

Types of cutters

3 wing cutters  hs steel, S alloy- tantung, carbide tipped
arbor hole sizes generally  1/2, 3/4, 1, 1 1/4 inches
cutters with disposable knives
cutters with interchangeable knives
loose knife and lockedge
discs for tenons
GENERAL MOULDING

Most of the time the shaper is run counterclockwise and feed is from right to left.

Work with fence - be sure fence tight check cutter clearance double check rotation use wood hold down fingers

Run the cutter under the table if possible - it is safer and also in the case of a simple rounding over does a more accurate job because the thickness of the wood may vary.

For rabbetting the cutter must be run over the table for accurate work.

Tongue and groove

T & G set is great to have but in many cases can substitute a spline. In cases like this the good face is always run facing down.
CUTTERS

The safest cutter is a solid 3 wing - can be HS steel or tipped with S Alloy - Tantung or carbide if you work with a lot of plywood. The other type of cutter are loose knives that are used in a shaper collar. Always use lockedge knives. The shaper collars are available with or without a ball bearing collar.

For the set up of lock edge knives in the collar you will need a magnetic base dial indicator.

To order cutters made to order you should provide the following information.
1 Diameter, thickness, bore (spindle size), and #of wings
2 Specify cutter metal - HS steel, carbide tips, etc.
3 Indicate type of wood being cut.
4 State whether cut is with or across the grain.
5 Include dimensioned drawing or accurate sample of wood
6 Identify your shaper and whether spindle rotation is clockwise or counterclockwise.
7 Point out which surface of wood is in contact with the shaper table.

Shaper collar is of course needed if you use lockedge knives. The design with a ball bearing collar is more versatile as it can be used for straight or curved work. Sizes range from 2" dia. to 4" and are available in various bore sizes.
PATTERN SHAPING - The other major use for a shaper.

With a jig made to pattern and a straight cutter with a same diameter ball bearing collar you can make duplicate accurate parts. In some cases there is a saving of material because curved parts can be nested together in a plank.

The patterns are made from your full size shop drawing. They are best made out of a material that does not have much grain structure. 3/4" MD 44 is a good choice.

Patterns can be of two types -

A single pattern doing both side profiles.

Attach with screws or nails.

A double pattern - doing first one edge - then shifting the stock to cut the other edge.

Advantage is a heavier, safer more accurate jig.

The wood blanks for these jigs should be bandsawn about 1/16" or 1.5 mm oversize.

Note: Keep grain direction very much in mind when pattern shaping. This is a case where the spindle may need to be reversed.
Tenoning on the shaper

If you have a cross feed setup on your shaper you can produce very accurate tenons. You will need two matched cutters, spacer washers or collars and shims. A smaller shaper might be able to produce 1" tenons. For larger tenons a larger shaper that can handle the discs specifically made for tenoning would be needed.

Grinding your own knives from lockedge bar stock.
Remember the pattern of the cutter is not the same as the wood profile.

![Diagram of cutter pattern](image)

It is economical to make your own knives if you have the equipment.

You will need: bar stock - long enough pcs. to fill collar bluing gram scale good grindstone with a white stone

THE VERY IMPORTANT SAFETY RULES FOR THE SHAPER

wear goggles or safety glasses
pull plug when setting up machine
use lockwasher or two nuts - feed right to left double check rotation
use guards and wood fingers
run cutters under table if possible
check for knots
check for grain direction
be sure spindle unlocked rotation
use faint guard for pattern shaping
maintain about 6" margin of safety
STEPS FOR ACTUAL CUTTER SHAPE.

1. DRAW EDGE TO BE CUT
2. DRAW PLAN VIEW OF HEAD w/ CUTTER IN PLACE
3. PROJECT FROM PT 1 TO PT 2 ON & ON HEAD PLAN
   SWING TO 3 THEN PROJECT OVER TO 4