Tormek Accreditation Notes

Introduction

Tormek is a Swedish Company that has championed and evolved a *wet stone* grinding machine that has the following key features for woodwork tool sharpening:

1. The grinding wheel runs in water and reduces the heat transferred to the tool being ground. This retains the hardness of the steel in the tool.
2. The grinding wheel rotates relatively slowly (90 rpm) compared to direct drive, high speed grinders (1750-3600 rpm) and so minimises the friction heating of the woodworking tool being sharpened.
3. The Tormek's set-up templates, the *Angle Master* and *Turning Tool Setter* (for turning tools) allow one to set up precise, repeatable and accurate bevel angles on the tool for grinding and honing (polishing).
4. The Aluminium Oxide grinding wheel can be conditioned from 220 to 1000 grit (coarse to fine).
5. The *Leather Honing* and *Composite Honing Wheels* uses metal polish to hone the bevels and remove burrs and give an extremely fine polish to bevels.
6. The Tormek has evolved over the years with functional improvements and the jigs and set-up templates that are compatible across the different machines.

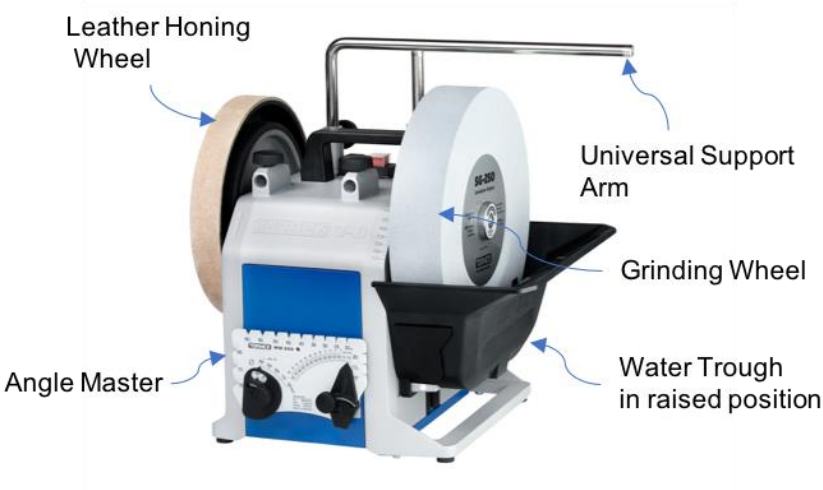

Fig 1 Some Features of Tomek Grinders

Accreditation at the Guild is a way to ensure that members know how to use the machine properly, so they don't hurt themselves or the machine. The basic Tormek models come with a set-up ready to grind straight edge tools like plane blades and square edge chisels. Accreditation on the Tormeks is based on this basic sharpening approach. However, there is an extensive range of jigs that can be acquired that allow for different woodworking blades and chisel profiles, including turning chisels, to be sharpened. These are not covered in these notes but are covered in the Handbook *"Water Cooled Sharpening of Edge Tools"* (2016); co-located with the machines at the Guild.

The Guild's Woodworking Tools Sharpening Equipment Accreditation Practical incorporates the use of the Tormek Grinder. This Accreditation follows three activities:

1. Read the
   1.1. Guild's **General Machinery Safety** instruction,
   1.2. the **Bench and Pedestal Grinders** accreditation notes, AND
   1.3. the Safety Instruction regarding the **Tormek Grinder** in the notes below prior to step 3.
2. **pass the Online Grinder Accreditation Test.**
3. Participate in a practical exercise on the Bench Room sharpening station with a Guild 'Sharpening' Assessor to sharpen and hone a plane or chisel blade.

Safety Instruction

The Guild's ***General Machinery Safety*** instruction and accreditation notes for ***Bench and Pedestal Grinders*** apply to the ***Tomek***

There is, however, a key difference with the Tormek in that the machine sits on a rotating base and the direction of rotation can be changed by turning the machine around (see Figures Below). So, the *Grinding Wheel* and the *Polishing (Honing) Wheel* can be changed in rotation direction in relation to you, the operator.

It is critical that when Honing or freehand sharpening that the wheels are moving away from you.

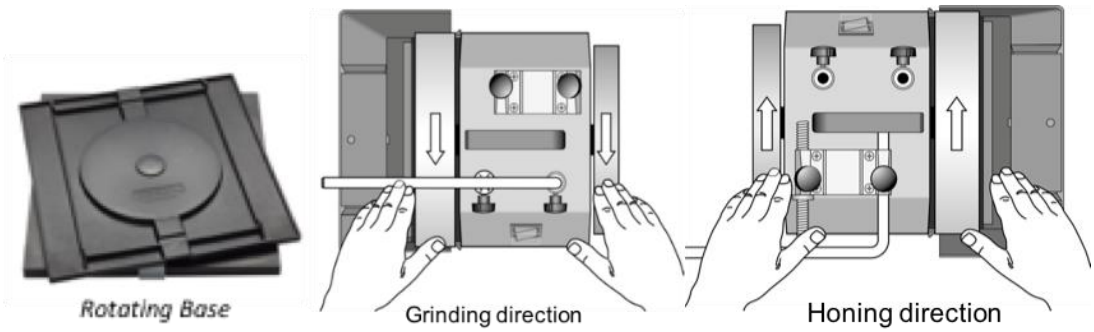

Fig 2 Wheel direction changes

Tormek - Sharpening
1. Set-up

1. Turn the Tormek on its turntable so that the Grindstone is rotating towards the tool and you (i.e., on the left-hand side of the machine). *Note: the Grinding Wheel has a more aggressive cutting action with the rotation towards the tool.*

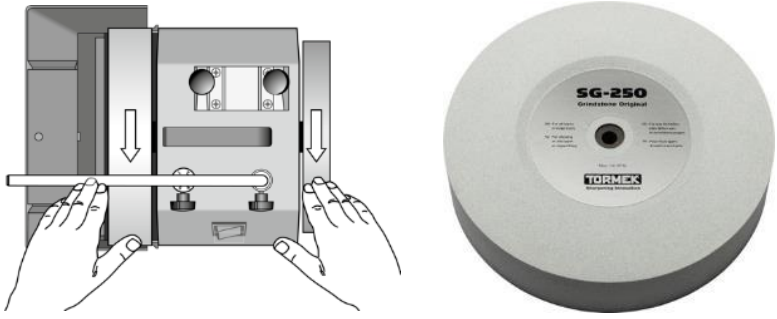

Figure 3 Tomek set up for sharpening

2. The grinding stone when dry absorbs water and needs to be saturated before starting to grind.
   2.1. Raise an empty water trough to the lugs on the green machines and to the top of travel on the new machine – pictured above.
   2.2. Fill the *Water Trough* to the tide level (marked in the trough). Turn the motor on and allow the wheel to become saturated; topping up the water to maintain the water level. When no more water is absorbed one can begin sharpening.
   2.3. If you are taking over from someone else just check the water level on the trough and top up if needed.
3. Make sure the Universal Support Arm is mounted in the vertical position (See Fig 1).
4. When reconditioning a primary bevel, it is a good idea to set the grit level of the *Grinding Wheel* to 220 grit (a more aggressive cut). This is achieved using the rougher side of the *Stone Grader* while the wheel is turning - hold the Grader on the wheel moving it left and right, sideways with medium pressure for 20 to 30 secs. (Fig 4)

Fig 4 Changing wheel grit level using Stone Grader

2. Tormek - Setting the Bevel Angle

5. Set up the tool in the *Square Edge Jig* for grinding the primary bevel. See figure 5 below.
   5.1. With a projection (P) of about 50 to 70 mm with the bevel to be ground facing down
   5.2. Aligned the edge of the tool with the right-angle shoulder of the jig.
   5.3. Tighten the knobs that clamp the tool in the jig

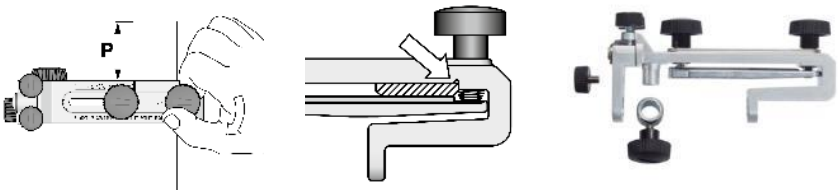

Fig 5 Setting up the tool in the Square Edge Jig

(Note the Guild has various older models of the *Square Edge Jig*. However they all perform the same function across each machine.)

6. Setting the angle for the primary bevel grind involves sliding the jig on the Universal Support Arm and setting the angle presented to the *Grinding Wheel* using the *AngleMaster* protrator and the *Micro Adjuster*.

   Note. The aluminium oxide grinding stone looses material in the grinding process and when trued with the grit accumulating in the *Water Trough* below over time. This means the diameter of the wheel gradually reduces over time. So you need to measure the diameter of the *Grinding Wheel* with a ruler and set the diameter on the scale on the left hand side *Diameter Compensator* scale accordingly. (A new stone has a diameter of 250 mm).

Fig 6a Angle Master

7. The angle you want to set up for the bevel grind is set up on the right hand scale, called the *Angle Setter*. As in the diagram above the flat edge of the *Angle Setter* is placed on the back face of the tool and the tool adjusted up or down with the *Micro Adjuster* nut (see left image below) on the *Universal Support Arm* until the *Angle Setter* and the tool are aligned.

Fig 6b Micro Adjuster Nut

3. Grinding the Bevel

8. With the the *Grinding Wheel* turning apply slight pressure to the tool moving it across the face of the wheel left and right and not going more that 2 mm off either side of the stone edge. Keep your fingers close to the edge of the tool for good control
   8.1. Move the tool across the face of the stone to even the wear and keep the surface of the wheel square.
   8.2. After 10 - 15 seconds take the tool and jig off the *Universal Supprt Arm* and check how the grind is going by checking the bevel being ground.
   8.3. Make any adjustments needed.

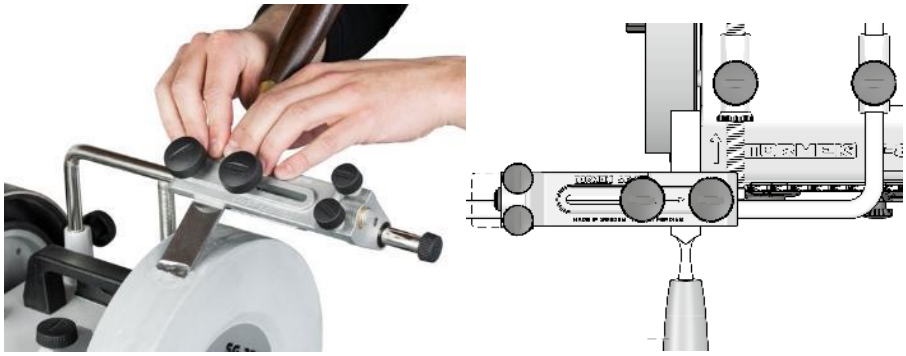

Fig 7 Grinding the primary bevel

9. Once the Primary Bevel has been ground as needed it is time to use the *Stone Grader* again using the smoother side and condition the stone to 1000 grit (Fig 4). This will give a finer scratch pattern on the bevel. After the 20 to 30 seconds grading place the tool and jig back on the *Universal Support Arm* and keep grinding, checking after a suitable time and see how the scratch pattern is finer.

Honing and Polishing

10. In grinding the primary bevel to the cutting edge a metal burr will form on the back face of the blade. This needs to be removed to achieve a super cutting edge. This is where the leather or composite honing wheel involving metal polish is used. In this case the Tormek machine needs to be *rotated* so the honing wheel is rotating away from you and the tool.

11. The tool needs to be taken out of the *Square Edge Jig,* as removing the burr is done by holding the tool in your hands.

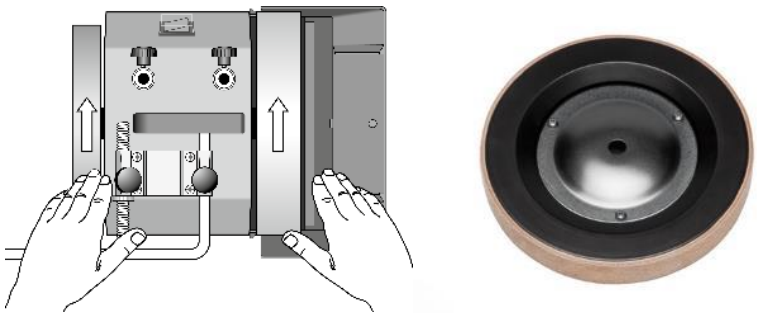

Fig 8 Set up for honing – wheel direction travelling away from operator

12. The leather Honing Wheel needs to be loaded up with metal polish after every 4 to 7 honing sessions. The honing paste or metal polish is in a tube and needs to be applied to the wheel. The metal polish is in the draw associated with the Tormek accesries. We also have a composite honing wheel that has a metel polish embedded it its structure. Removing the burr is achieved by presenting the tool to the honing wheel at a *tangent* to the surface as seen below. Presenting the tool at the wrong angle can produce a back bevel which can prove unwanted in future honing procedures.

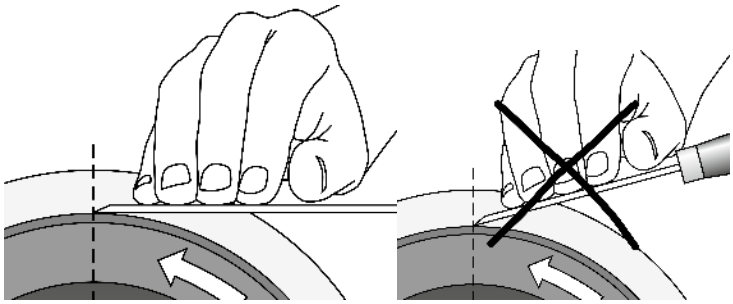

Fig 9 Angle of tool for honing away grinding burr

Finishing Up

13. It is critical that when the machine is left that the Grinding Stone is not left in the water trough. There are two reasons for this:
    13.1. Over an extended period the stone in the water can become waterlogged at the bottom and the rest of the stone dries out causing the wheel to be out of balance and not useable the next day as it is out of balance.
    13.2. If the water freezes overnight and the stone is saturated the stone will crack and have to be replaced.
14. In two out of the three water troughs in the Bench Room there is a magnet on the outside that attracts the steel particles that are removed during sharpening. The iron filings need to be cleaned out as well.

15. Before leaving the sharpening station you should:

- Ensure the Water Trough is lowered and cleaned out ready for the next user.
- If there are any defects on the machine and its accessories then you should tell one of the Accredited Instructors.
- Turn off the lights at the end of the session.