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Controlled-Angle Support for Paper Wheels

Should we even explain importance of angle control?
When you finish your edge, the angle the knife attacks the abrasive becomes very critical.
1 degree too steep and you'll be gouging the edge into the abrasive dulling it.
1 degree too shallow and you'll be honing on the shoulder of the bevel, not the edge, honing and honing to no effect on the burr.
Freehand sharpening has been shown to deviate within 3 degrees from the target angle; a coated blade tosses another challenge to freehand sharpening, and the angle control helps maintain crisp bevels.

We tried both 8" and 10" paper wheels, getting comparable result.
But as our workshop sharpens knives on the larger Tormek, we get better results finishing on the 10" paper wheel as better matching the profile of the edge ground on the T7/T8 grinding wheel.
10" paper wheels are run on an 8" grinder/buffer, while 8" paper wheels are run on 6" grinder.

For honing we use slotted paper wheels. Typically, for mainstream knives one slotted paper wheel is with 5-micron diamond paste and another with a mix of 0.5 micron diamonds and chromium oxide. We use diamond paste because it covers all range of knife steels, including hard alloys.

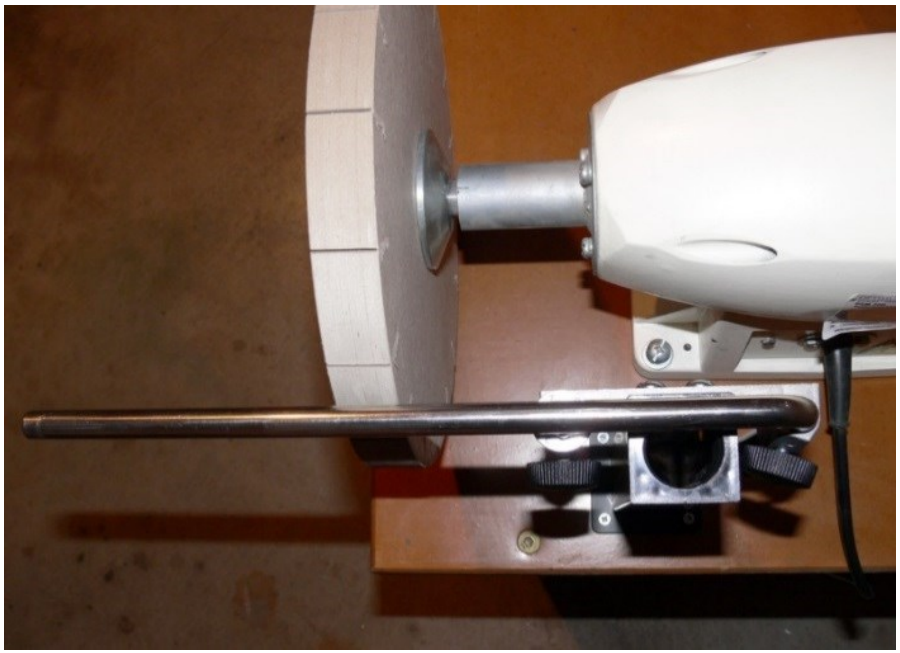
Angle-controlled honing on paper wheels invariably delivers a hair splitting edge.
Human hair cuticle is about 0.3 micron thick, and to split the hair, the edge must be thinner than that to get between the cuticles.

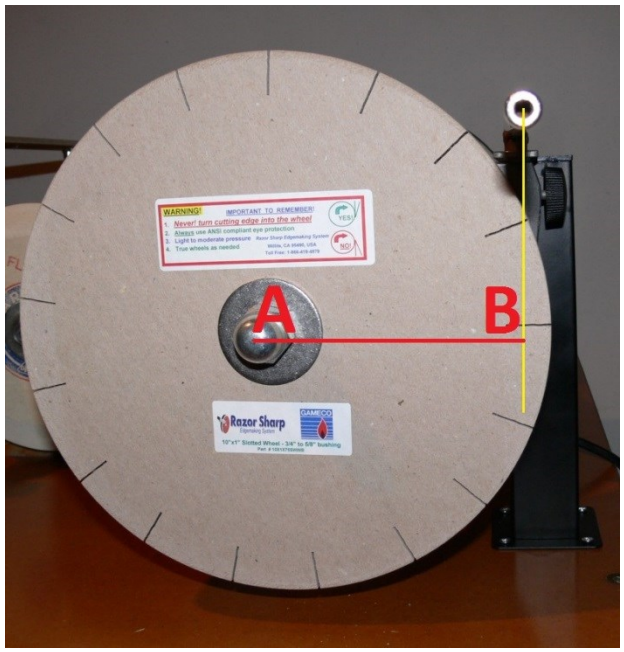
Mounting instructions

The support stand height is about 220 mm for an 8” grinder; for a 6” grinder it is 192-200 mm – you have to measure the actual height of your support.

The paper wheel support requires certain positioning in relation to your buffer/grinder.
Mount it on your grinder bench to work away from the wheel.

With the support bar inserted, align the bar with the grinder shaft (i.e. perpendicular to the wheel), with the middle of the bar length against the paper wheel as shown in the following photographs. The support bar must be positioned in parallel with the grinder shaft to the best of your ability.



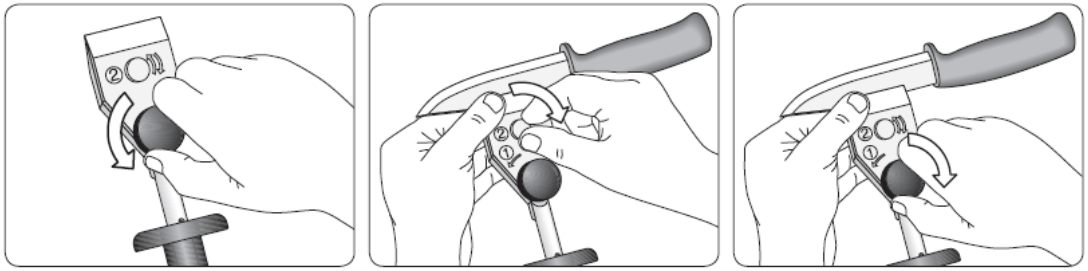


The distance **AB** between the grinder shaft centerline and the bar centerline should be approx. 9 cm for 8" paper wheel, and **12.5 cm for 10" paper wheel**. While parallel alignment of the grinder shaft and the support bar is very important, the distance AB can be approximate at this step.
Having properly positioned the support, mark the holes, remove the bar, and fasten the support to your grinder bench with the screws.

Operation

Clamp the knife in the Tormek Knife Jig as described in the Tormek handbook:

Mounting the knife in the jig



Check that the knob is loose.

Adjust the jig with the small screw to fit the thickness of the knife.

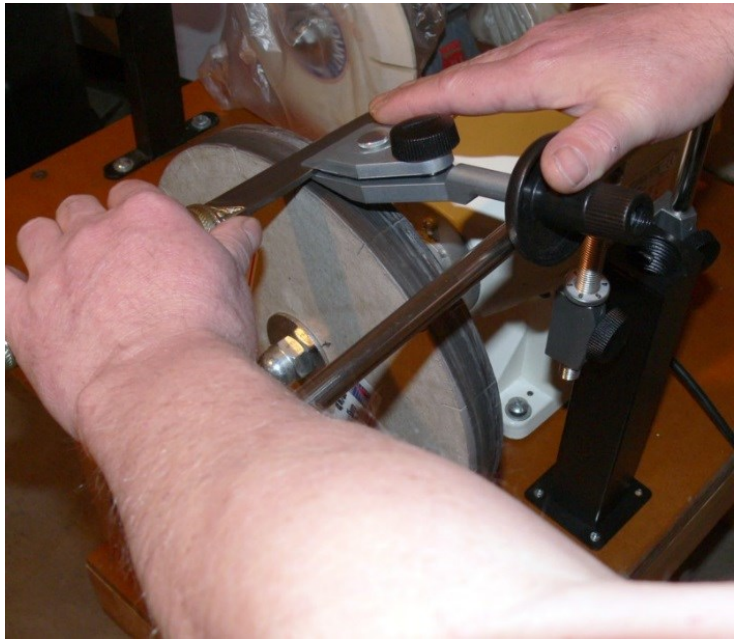
Tighten the knob. The knife is now firmly mounted in the jig.

Set the edge grinding angle by either:
- Tormek AngleMaster;
- Marker method;
- or for ultimate sharpness, our computer software for paper wheels.

Angle is changed by elevating/lowering the support bar, fine-tuned with the support micro-adjust wheel.
Fix the bar position with the black locking screws at the base.

On the photographs below is AngleMaster set for 30 degrees edge angle (included), on the left photo for 8" wheel, and right for 10".

Make sure that you press your thumb on the knife jig so that the jig is always pressed against the bar during operation.
Ensure the jig slides on the Universal Support perpendicular to the wheel and the blade is not shifting forward/backwards.
Don’t neglect safety glasses.

Move the knife over the paper wheel with light pressure just enough to maintain continuous contact of the blade with the wheel. Ensure that the blade is in contact with the entire width of the paper wheel; near the tip raise the knife handle following the taper.
Half-speed buffer/grinder is recommended.

To prevent edge burning at high RPM:
Use slotted wheels and half-speed grinder/buffer;
Now and then clean the paper wheel slots with a thread or floss;
When using diamonds for honing, use oil-based diamond pastes rather than sprays;
Lightly oil with a few drops of liquid paraffin;
Pull the blade across the paper wheel at a feed rate of approximately 5cm per 1 second on a half-speed speed grinder/buffer, and 10cm per sec on full speed - not slower!
Better do two quick passes than one slow.

Applet Installation

WINDOWS 7-10+ This applet runs on Windows 7, 8, 10 and future Windows OS.
Extract (unzip) the download.
Run by clicking the **Paperwheel_Angle_Setter** and click Install when prompted.
This installs and runs the applet, and the application can be uninstalled via Add/Remove Programs in the Control Panel.

WINDOWS XP and older: This applet doesn't require installation, you have just to unzip, and can run it straight away.
If on launching the applet you get a "Class not registered error", please follow instructions in the ***Class not registered error.pdf*** included with the download.

MacBook, iPhone & iPad applets can be bought directly from the **App Store**.
Android phone & tablet applets can be bought directly from the **Google Play**.
Search for **Paper Wheel Angle Setter**.

Using the computer applet to set honing/grinding angle

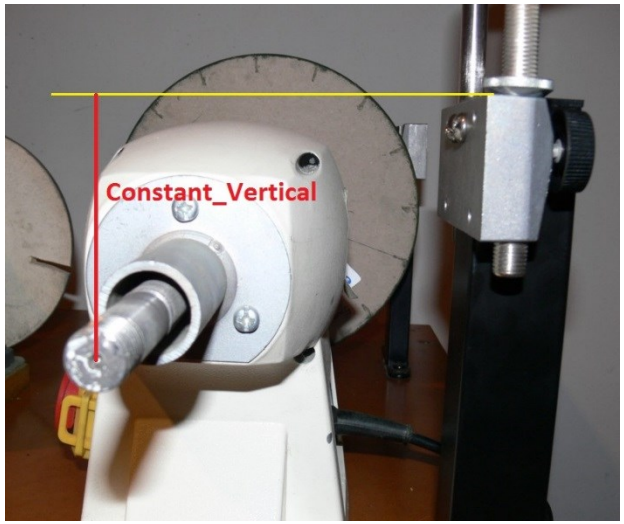
Having mounted the paper wheel supports next to your grinder or buffer, you have to take the following measurements in mm:

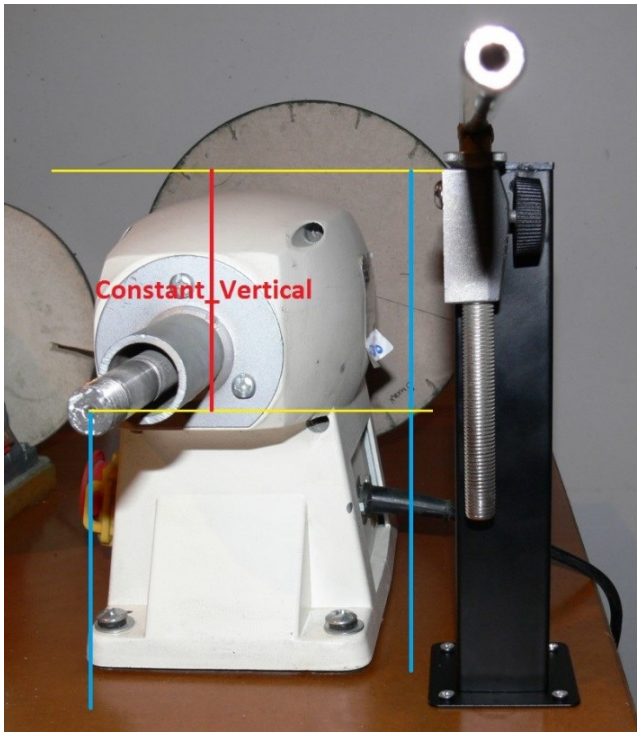
- Paper wheel diameter, which is commonly 256 mm in a new 10” wheel, and 203 mm in an 8”, but may vary.

- **Constant_Horizontal** – the horizontal distance between the grinder shaft centerline and the bar centerline. Recommended distance is 90 mm for 8" paper wheel, and 125 mm for 10" paper wheel, but you must measure the actual distance of your setup in mm.

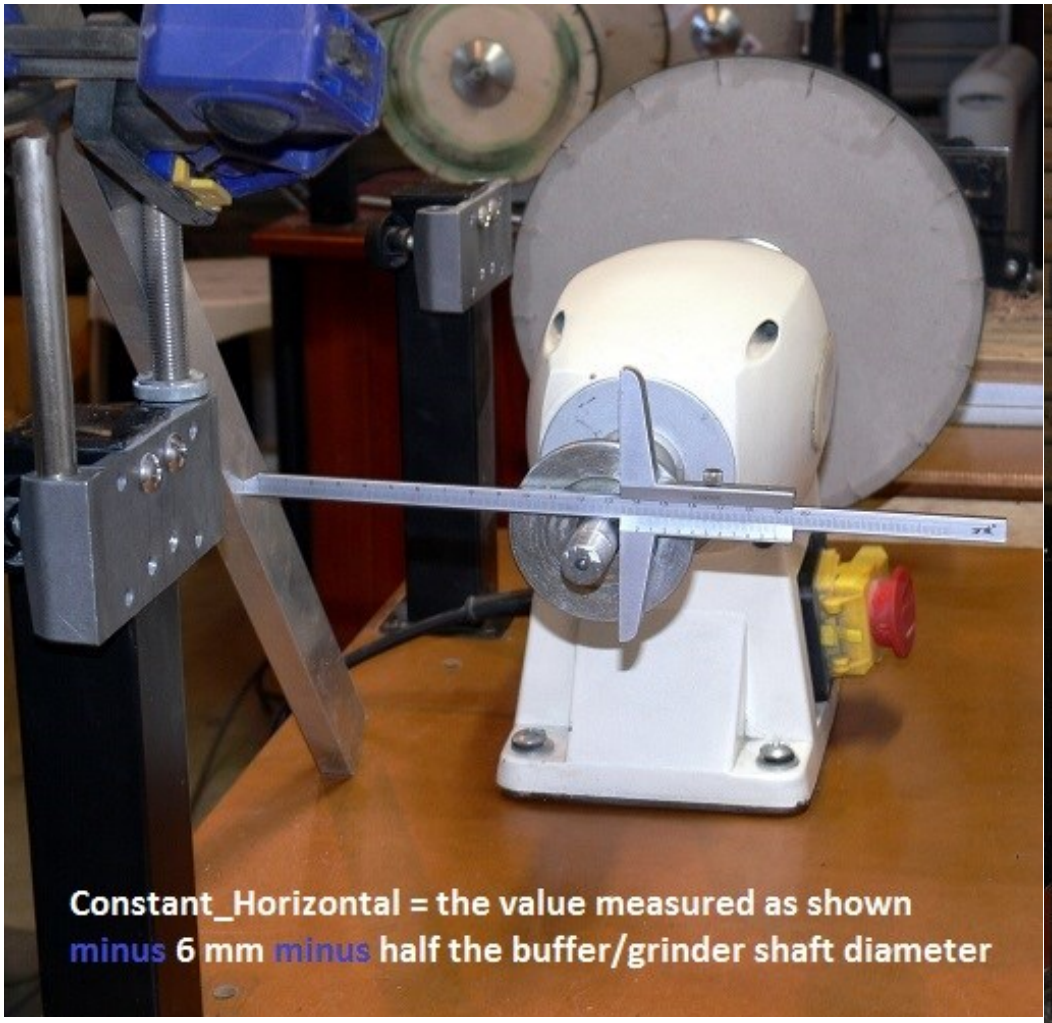
- **Constant_Vertical** – the vertical distance between the center of the grinder shaft, and the top of the support stand.
  It is the same as the **difference** between the support stand height, and the vertical distance from the center of the grinder shaft down to the bench.
  The support stand height is about 220 mm for an 8” grinder; for a 6” grinder it is about 190-200 mm – you have to measure the actual height.
  So for an 8” grinder the Constant_Vertical = **220 minus** [vertical distance from the center of your grinder shaft down to the bench].

These measurements you do only once, to tune the applet to your particular setup.

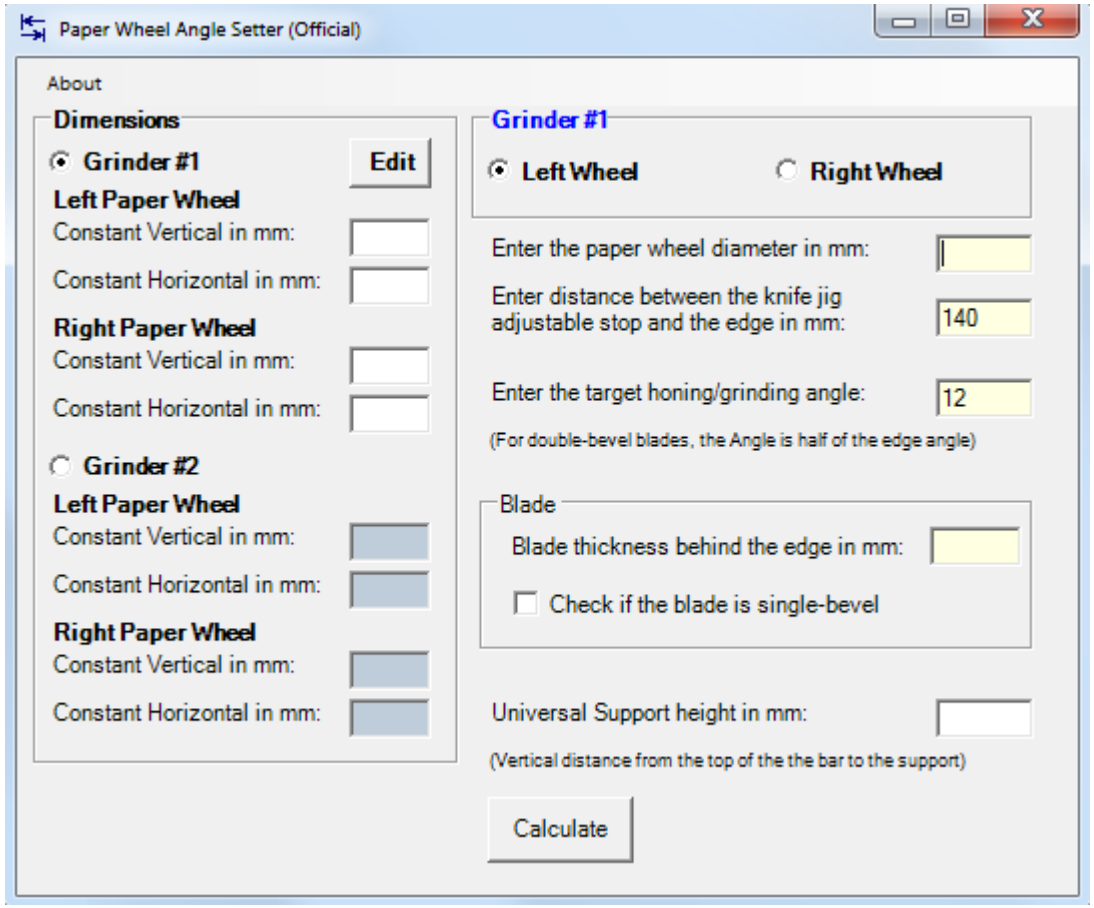




See how we measure the Constant_Horizontal and Constant_Vertical; must be done for each side, because distances are not the same on the left and right even in the best buffer/grinder.

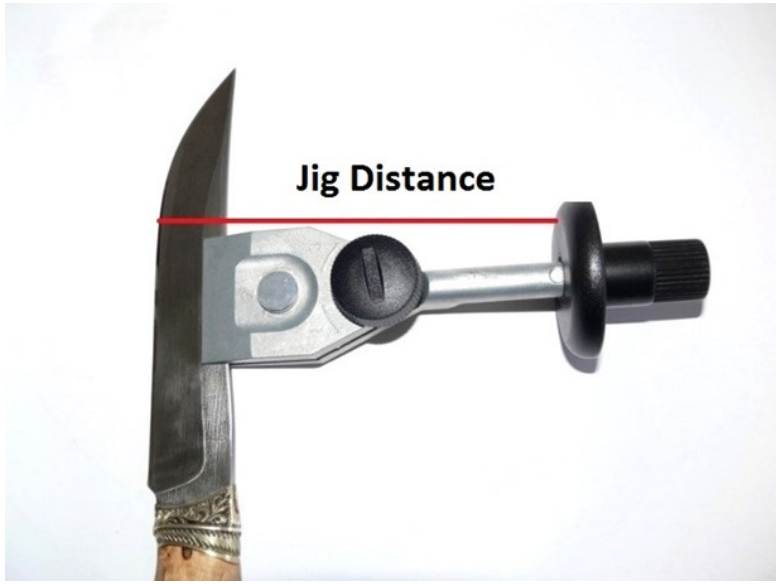


Click the Edit button to edit the constants in the applet with your measured values, and click the same button to save – you have to do it just once.



Measure the **Paper Wheel Diameter** in mm, e.g. Razor Sharp Edgemaking System makes 256 mm as 10” wheel, and 203 mm as 8”, but this may vary even in new wheels.

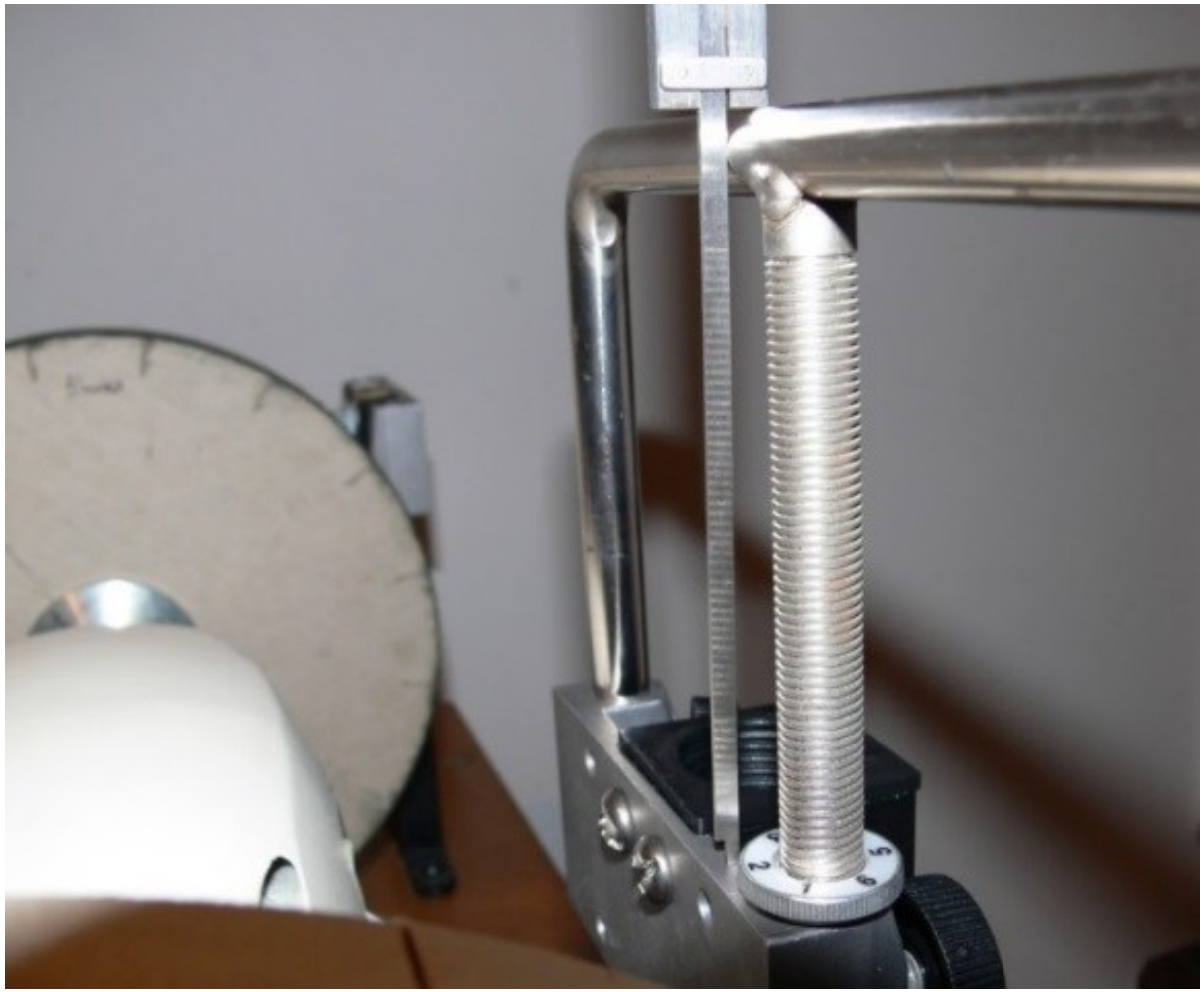
Jig Distance
Having mounted the knife in the knife jig, measure the distance between the knife jig adjustable stop (the flat black plastic part) and the knife edge in mm – you will need this value for the applet.



Blade thickness behind the edge
Measure at the edge bevel to a fraction of mm, using callipers or micrometre.

Select your grinder, left or right wheel, enter the wheel diameter, jig distance and the target honing/grinding angle, and press the Calculate button.
For your target honing/grinding angle, the applet will give you the support bar height as a vertical distance from the top of the bar to the top of the support stand.

Using the support micro-adjust wheel, set the bar height with the help of a caliper depth probe as shown on the photo, and lock position with the black locking screws.



This is how we set angle for honing on paper wheels in our workshop, and if needed you can use the same applet for your grinding gritted paper wheel as well.