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TIP 110 — Tilting Angle Table with Sine Plate Modification/Timothy Reck

Tim Reck sent us a write-up for a simple modification he made to his Sherline tilting angle table (P/N 3750) for setting precise angles. He had a project that required an angle be milled at 11.3°, but the angle markings on the tilting angle table side plate are only engraved with one-degree increments (see Figure 1). A decimal angle can easily be set using a sine plate with gage blocks.

Tim writes, "With a sine plate set-up in mind, I took note of an existing threaded hole on the side of the top plate of the tilting table (see Figure 2). I turned a steel cylinder with a diameter equal to the thickness of the top plate. I drilled a through-hole and fastened the cylinder with an 8-32 cap screw (see Figure 3). The hole is slightly larger than the screw so the cylinder can be fitted flush with the bottom of the plate.

I drilled and tapped holes on my tooling plate and mounted the tilting table so the pivot is parallel to the X-axis. I can then place gage blocks between the tooling plate and cylinder. I made sure the top plate rested flat on the bottom plate and tightened all the bracket screws.

The angle is set as follows: multiply the SIN of the angle by the distance from the center of the pivot to the center of the cylinder. Add to this, the thickness of the bottom plate. Place a gage-block stack equal to that value under the cylinder and tighten the top plate.

Checking with a precision bevel protractor and testing several angles up to 45°, I was able to set angles with better than 0.1° precision. To achieve this, I adjusted the value I was using for the centerline distance until I had repeatable results.

For the 11.3° angle shown, the calculation is: SIN (11.3) x 2.425" (constant center distance) = 0.475". To this, add 0.362" (bottom plate thickness) for a total dimension of 0.837" (for the height of the gage-block stack).

While this won't have the ultimate precision of a true sine plate, it seems to be a pretty quick set up and takes some guess work out. For someone who doesn't have gage blocks, they could easily mill or face a block to the required length as needed. The calculations are the same as using a commercial sine plate with the added dimension for the bottom plate thickness."

Thank you,
Timothy Reck

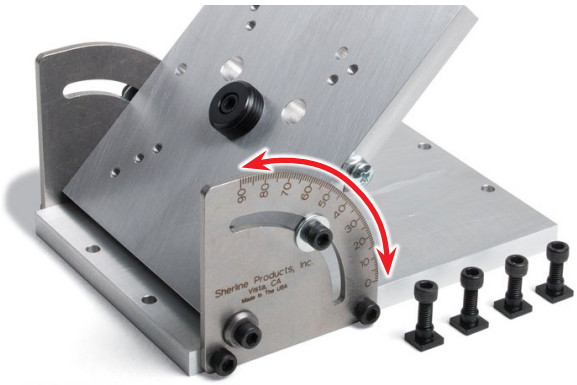

FIGURE 1—The red arrow shows the engraved angle markings (0°-90°) on the tilting angle table side plate.

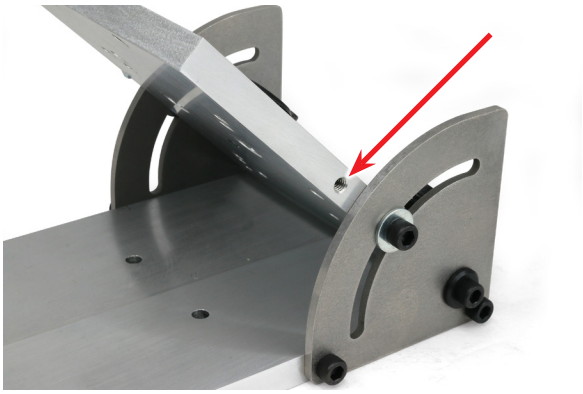

FIGURE 2—The red arrow is pointing to the 8-32 threaded hole on the back side of the tilting angle table top plate.

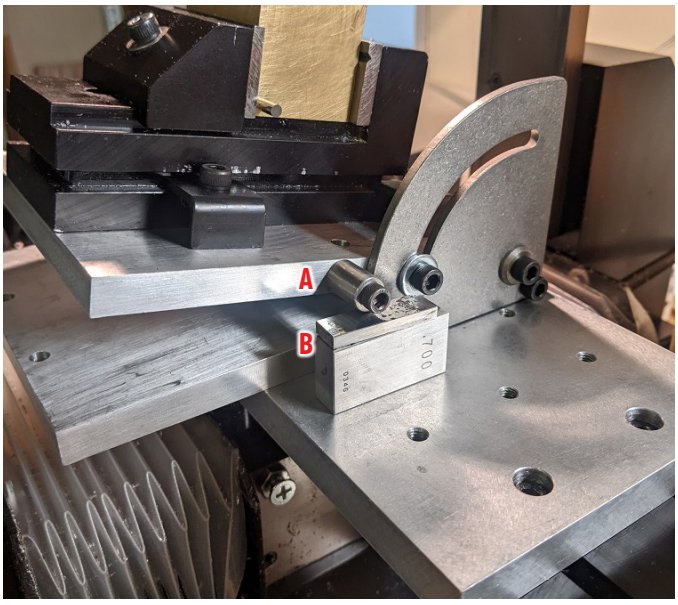

FIGURE 3—Tim's sine plate set-up. A: Steel cylinder fastened to the top plate. B: Gage-block stack in place.

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