TSME Hints - May 2019

2019-04-29

Using Various Materials to Validate CNC Machining

Member, Ken Strauss described the use of various materials and strategies to evaluate CNC programs, and machining strategies. Advantages of this capability includes ensuring the part will be as expected and tool paths are appropriate and will not cause part damage, finally any mistakes found are not made using expensive materials. Readily available lower cost products for this work include, PVC fascia board available from building / wood supply companies in 1“x4”, 1“x6”, 1“x8”, and 1“x10” sections. It can be glued together using PVC pipe cement to create create larger sections; machinable wax and machinable foam are other products which are often used. Machinable wax tends to be more expensive and a block 3“x3”x8” can be purchased for between $20 and $40 from various supply companies.

These evaluation materials can be cut at very high cutting speeds, compared to metal. Feed rates of 20 to 100 IPM and cutter speed of 10,000 RPM or greater are possible. Wax can be cut at up to 100 IPM. It was noted that G-Code can often be left as calculated by the G-Code preparation software for cutting metal, and feed rates increased on the CNC controller for the validation runs using these softer materials.

The Good Old Hockey Puck

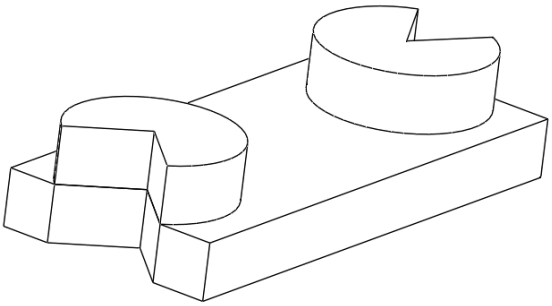
The hockey puck is a remarkable workshop device. It is dimensionally stable, at 1 inch thick, and 3 inches in diameter. The top and bottom surfaces are both smooth and flat. It is made of high density rubber and offers several uses in the workshop. The pucks can be machined on the lathe and milling machine.

Lee Valley sells pucks at a cost of $1.10 to $1.30 each depending on quantity purchased. Lee Valley also sell a high-friction sheet material to apply to the top and bottom of the puck to increase friction. Bought as stick-on pieces 3” diameter, they cost $4.80 for eight.

A list of suggested workshop uses include:

1. Resilient foot or leveller for a machine tool.
2. A sacrificial block for drilling machine.
3. As a bench block support for work piece when working free hand. See the design diagram below.
4. A resilient block which will take a lot of shock, It can be used as a pad for forming and beating of metal, or for center pop and riveting work.
5. A pad while cutting out packing materials using craft knives and dies to cut bolt holes.
6. Since they can be machined, anywhere you need a firm rubber coupling it would make a good material.
7. Use as a buffer on steam railway riding cars.

8. Mill or cut a slot in the puck and use as an adaptor between the metal foot of a trolley or car jack and the sill (rocker panel) of an auto-mobile, to save crushing the sill seam.



(a) Hockey Pucks Shaped for Hand-working -
Screwed to a Wood Base

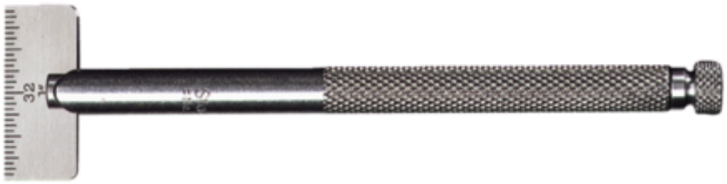
(b) Hockey Puck as a Door Stop
(Thanks Tim Hortons)

A Very Short Rule for Easy Measurement During Machining

A 6” rule is often not convenient when machining components on the lathe. A simple solution to use a very a short rule.

The Starrett 1 inch Rule, part C604R-1 Steel Rule with Inch Graduation $19.50 USD, combined with 110 Gauge Holder For Small Steel Rules part 110 $24.00 USD is a very convenient tool, but the price may deter amateur machinists from buying one.

Two alternatives are available, find a second hand one at lower cost, or make an equivalent rule in the workshop. A 3/4” Binder Clip, $1.99 for 12, provides a good alternative, with a handle glued to the back, this only takes a few minutes to make.



(a) Starrett Rule and Holder with 1” Rule

(b) A Simple Alternative Using a Binder Clip

Figure 2: A Short Machinists Rule