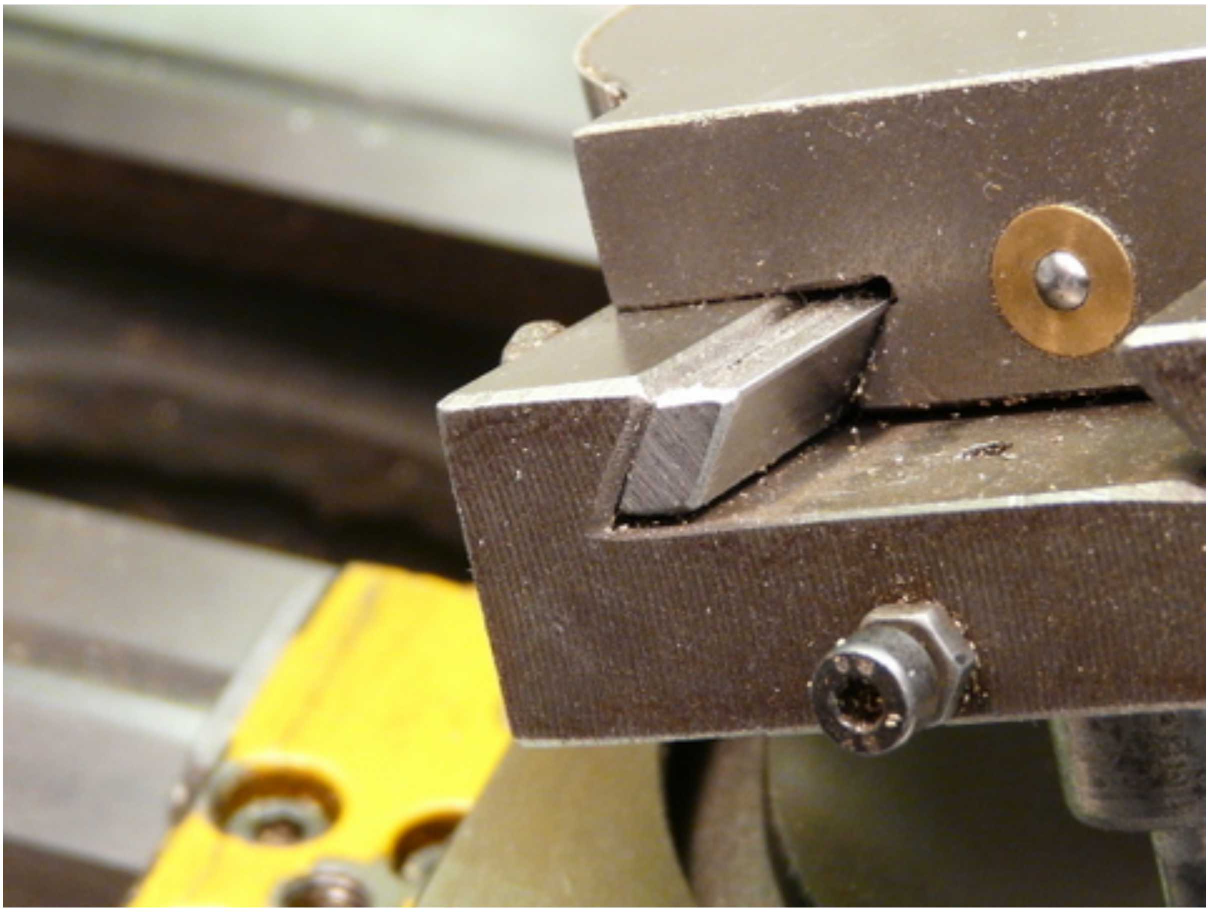
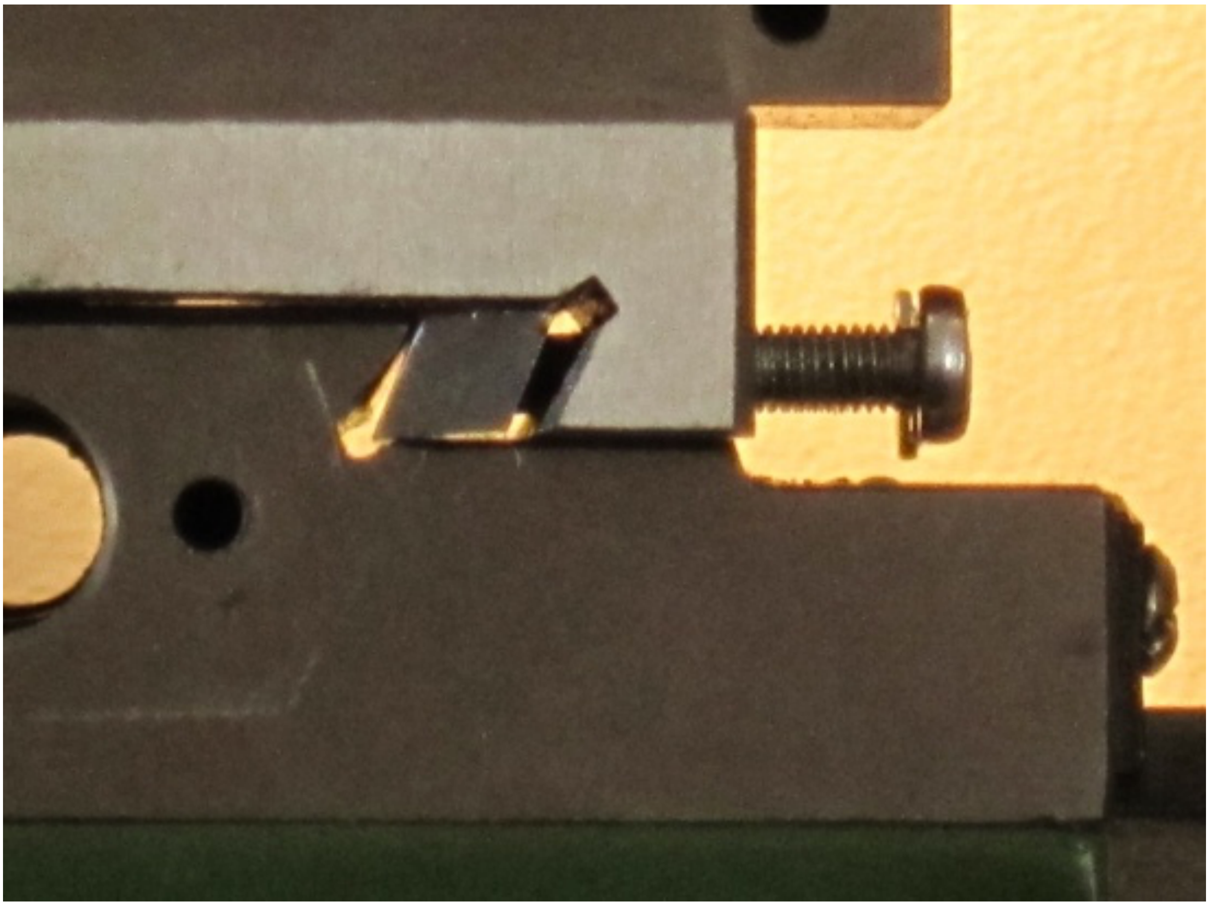
GIB strips in sliding dovetails
-physics and design optimisation

Many machines employ sliding dovetail design to allow translation between two components
The table on my lathe cross slide is one such component

The sliding dovetails are often manufactured with the female component made oversize and some kind of strip of metal used to fill in the gap. This is called a gib. The strip sits in the space and is compressed onto the male dovetail using set screws. The screws are tightened until there is no lateral play in the system but the dovetail is still able to slide (ie friction between the gib and the male dovetail does not prevent the movement)





There are a few reasons for using gibs, rather than just a tight dovetail. These are:

- Less taxing manufacture tolerances
- Ability to accommodate wear in the surfaces and improve longevity of the system

The concept is simple however there are many nuances that alter the effectiveness of the system. In machinery, accuracy requires tight tolerances down to <0.01mm.

The gib strip on my lathe cross slide was working well to reduce rotatory side to side movement but was failing at reducing torsional (twist on long axis) movement. When a torque is applied to the table as when cutting metal, the gib was rotating allowing the gib-side of the table to move up and down. This is shown in the short video below

https://youtu.be/rRsx2OqtdrI

It seems that the cross sectional fit of the gib strip (a parallelogram) may be at fault here and I am seeking to understand how the system works in more detail so as to correct the design.

Specific factors :

- Shape of the strip
- Fit in the space
- Which surfaces should make contact (diagram below) and which should be free?
- Shape of the point of the grub screws
- Point of contact of set screw
- Way the set screws engage the gib strip (grooves or slots etc)
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