

The Geotek Core Splitter



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The Geotek Core Splitter

The Geotek core splitter is designed to split soft sediment cores stored in plastic core liners. The samples can be up to 1.5 m long and between 40 and 150 mm in diameter. Three cutting methods are employed, vibratory cutters (plaster cast cutters), knife blades (plain or hooked) and a 'cheese wire'. Any combination of these can be used to split cores and the user should thoroughly test the splitting process on some empty core liners to determine the best way of splitting their cores. The best method will depend primarily on the liner material and thickness.

The splitter comprises three main parts; the central adjustable ladder frame that sets the vertical position of the core section relative to the cutting tools and hence the position of the cut, the moving bridge onto which the cutting tools are mounted, and the driving mechanism that moves the bridge along the length of the core section to make the cut.

The cutting tools can be removed from the bridge as required but care should be taken with the sharp knife blades and the sharp ends of the 'cheese wire' as these can cause injury if not handled correctly.

The ladder frame has rails that support the core section whilst it is being cut. There are two positions for the rails; a narrow and a wide setting which are appropriate for smaller and larger core sizes.

Unpacking and Configuring

The core splitter and all its components are delivered in a single box. The loose components in the box should be removed before the core splitter is removed from the box. These include, the vibratory cutters, the handle and any spares and tools.

To configure the splitter the device should be mounted on a bench and the handle fixed to the drive mechanism. The handle can be fixed to either side of the system and is fixed to the drive shaft using a single M6 bolt (see Figures 1 & 2).

The vibratory cutters are attached to a sliding plastic part that fit on either side of the bridge. These are fixed into place using the two M6 bolts shown in Figure 3. Ensure that the cables are routed away from areas where they can be trapped or cut. Ideally the cables should be fixed above the splitter to keep them clear of the mechanism.

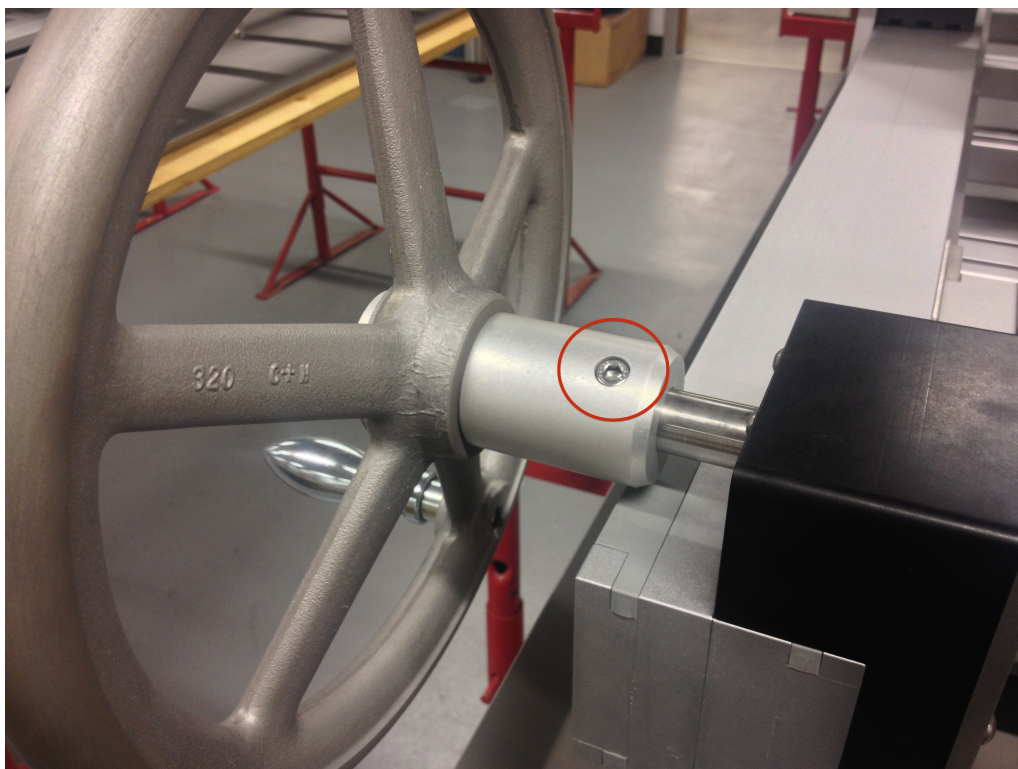


Figure 1. Attaching the handle to the drive shaft.

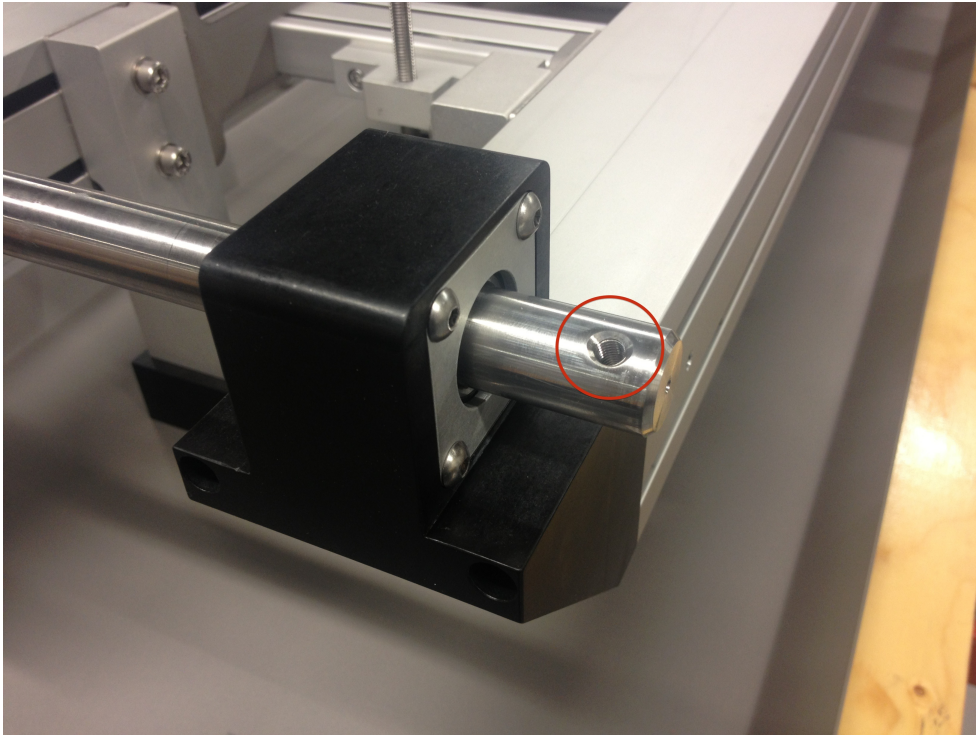


Figure 2. The handle can be attached to either end of the drive shaft for convenient location.

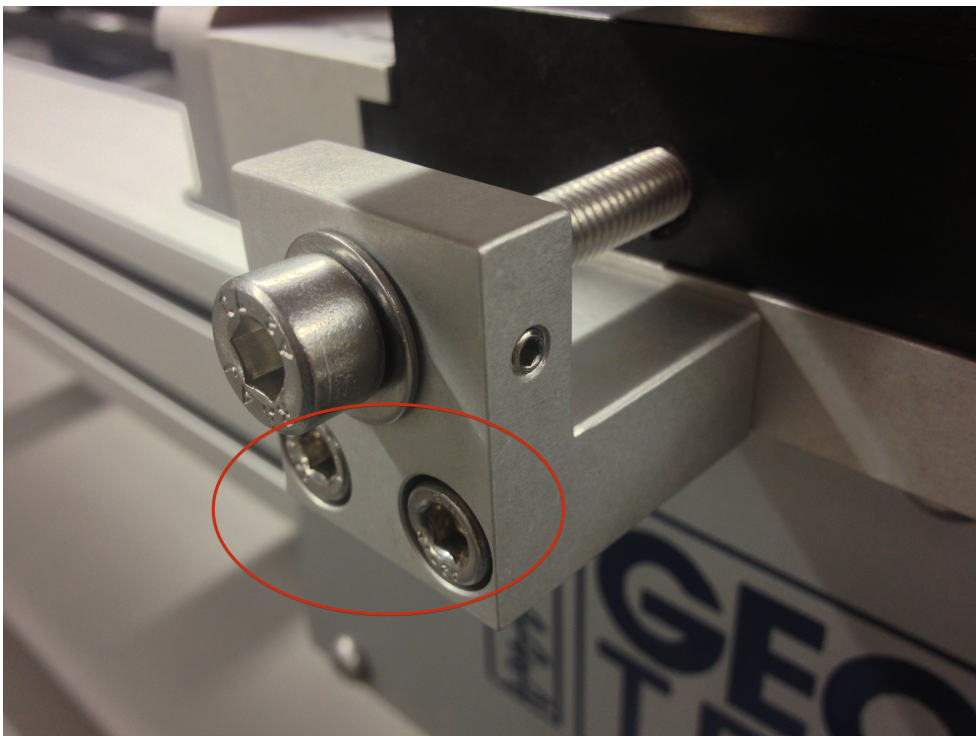


Figure 3. The fixing bolts for the sliding vibratory cutters.

Core Splitting Set Up

1. The position of the rails should be set for the core size to be split. The wide position for the rails is suitable for core sizes between 80 and 150 mm in diameter whereas the narrow position is suitable for core sizes between 40 and 90 mm in diameter. The rails can be removed by undoing the nine M6 bolts positioned on the rail supports along the ladder (see Figure 4). The rails are fixed to 'sleepers' with two position settings and can be changed between the two as required.



Figure 4. The position of the bolts holding the rails in place on the ladder.

2. The height of the core section in the device should be adjusted by jacking the ladder section up or down using the 2 M10 adjustment bolts at either end of the ladder (see Figure 5) ensuring that the locking bolts are loosened before adjustment. Positioning is aided by a scale at either end of the adjustable ladder in the centre of the splitter and this should be used to position the ladder approximately before finer adjustments are made with a core section in place. The scale marked in blue is for the wide rail setting and the scale in red for the narrow rail setting. Both ends of the ladder should adjusted to the same height to avoid producing wedge shaped half cores.

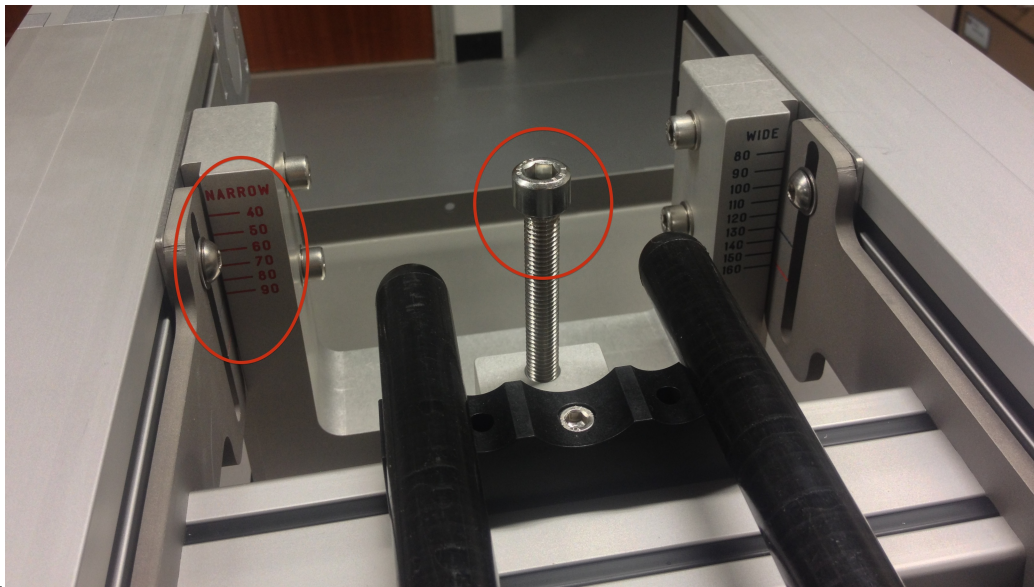


Figure 5. Ladder height adjustment and scale.

Fine adjustment is best made with a piece of core liner on the rails so the user can check the position of the blades at each end of the core section. Once the vertical position is set correctly the locking bolts should be secured to stop movement of the ladder while splitting.



Figure 6. Upper rail mechanism.

3. On the top of the bridge there is an upper rail mechanism to keep the core section in place vertically and rotationally. During the splitting process, this should be positioned so that the rails push down on the core, but with enough movement in the leaf spring to account for any width variation or to move over end caps. Too much pressure is applied if the springs are fully compressed with the rails sat on the liner. This is adjusted by turning the thumb screw on top of the bridge, and locking it in position with the lock nut pressed against the top plate.

4. The cutters being used should then be positioned to cut the core liner.
 - 4.1. If the vibratory cutters are to be used the easiest way to set these is to position the bridge so that the vibratory cutters can touch the core liner then adjust their position using the M8 bolts shown in Figure 7 so that they touch the outside of the core liner. These will be moved further in so that they can make a cut after the knife blade position has been adjusted.



Figure 7. Adjustment screw, locking grub screw and M8 grub screws for the vibratory cutters.

- 4.2. If the knife blades are to be used then these should be positioned so that they *just* cut through the core liner. The knife blade position can be adjusted by slackening the two M8 bolts holding them in position (see Figure 8) and sliding their mounting blocks in or out to the correct position. Note: the knife blades should be held in the clamping mechanism such that only the length of blade required to cut the liner is exposed.

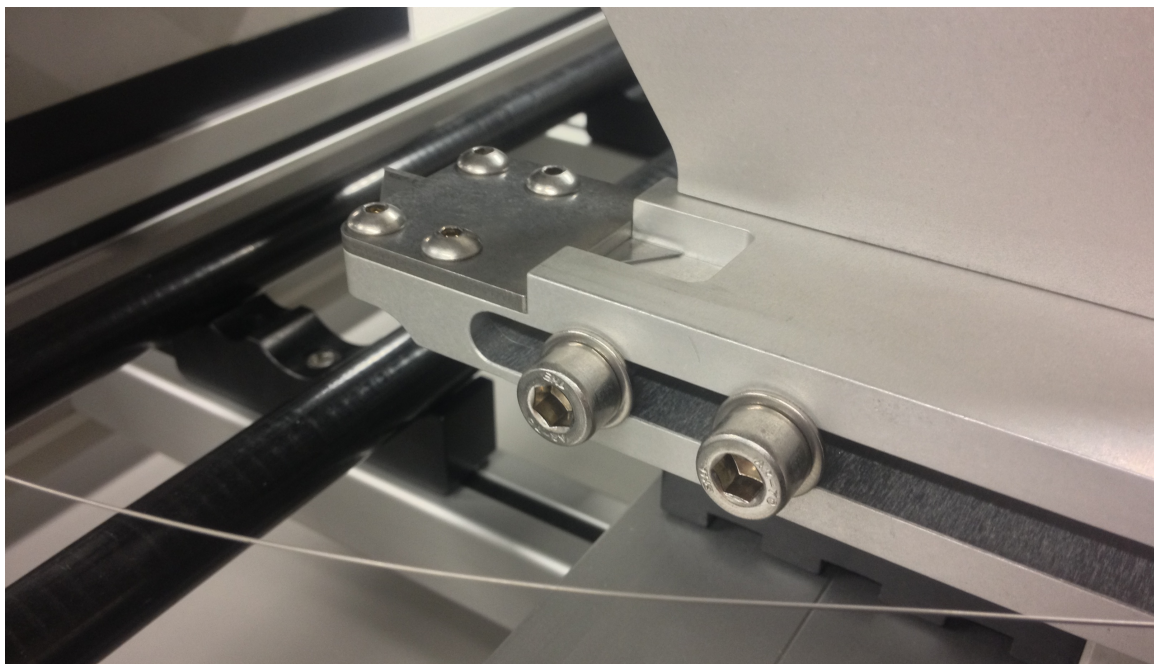


Figure 8. Knife blade position adjustment.

- 4.3. Having adjust the position of the knife blades the vibratory cutters (if required) can now be positioned to cut the liner. If used they should cut the liner so the knife blades have the minimum amount of cut to make. Adjustment is made easier by a scale marked on the slide mechanism (see Figure 9). Once in position the adjustment screw should be locked into place using the grub screw, and the cutter slide held by tightening four M8 grub screws as shown in Figure 7. **Do not over tighten the M8 grub screws.** Look down the core with the cutting tools at eye level, and check that they are all positioned correctly.



Figure 9. Adjustment scale for the vibratory cutters.

- 4.4. The 'cheese wire' should not need any adjustment unless a longer length is needed.
- 4.5. A final check that the cut will be good at both ends of the core liner section should be made to compensate for changes in liner thickness or roundness along it's length.
5. The splitter is now ready to test. It is recommended that the user makes several test cuts on empty pieces of core liner to ensure that the splitting operation will be successful.

Core Splitting

With the device set up for the correct core size and the splitting operation tested, real core sections can now be split. It is conventional to split from top to bottom so if you wish to follow this conventional position the core section to be split with the bottom end against the stop (see Figure 10).

If using the vibratory cutters, it is advised that you wear ear defenders and eye protection. The bridge can then be moved using the handle steadily along the core splitting as it travels. Use the experience gained during testing to use the appropriate rate of feed. Take care when the 'cheese wire' gets close to the start and end of the core section and the end caps as the wire will have to be guided by hand into the cuts made by the knife blades and (or) the vibratory cutters. Also, although the wire may cut through the end cap (depending on the material and thickness) it is better to cut the end cap across the diameter to avoid the wire trying to pull the end cap into the core at the start point or off the core liner at the end.

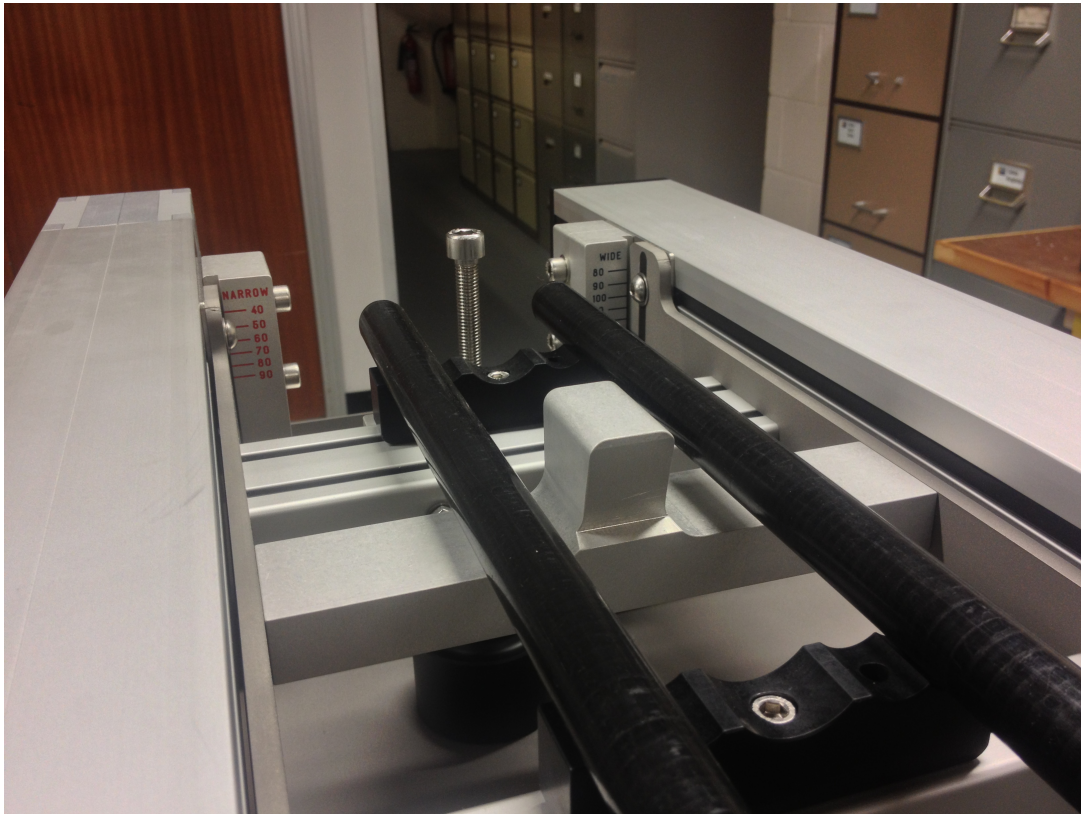


Figure 10. Core section stop.

Maintenance

Changing the Knife Blades

The knife blades can be changed by loosening the four M5 bolts holding the blades into their mounting (see Figure 11). Having done this the old blades can be slid out and new ones slid in. If it is difficult to slide the blades out then the bolts can be completely removed to give easier access.

Note: the blades must sit flat in the slots cut for them in the mount and with only the required length of blade exposed. This helps support them during the splitting process.

Take care when handling the knife blades, they can be very sharp.

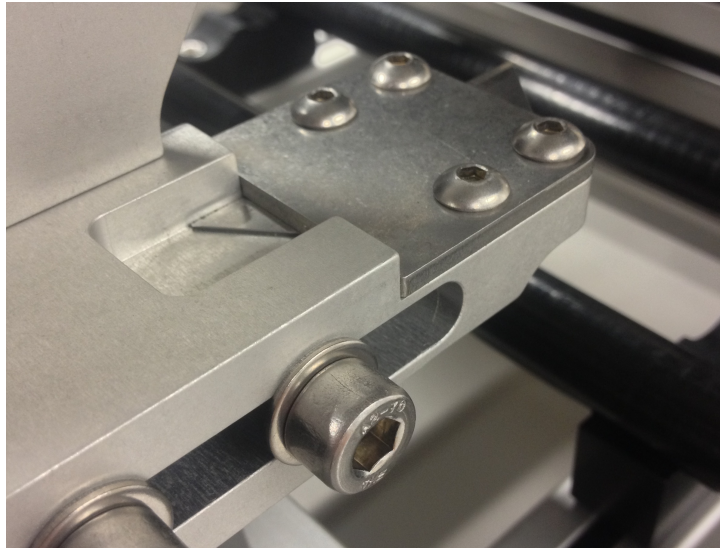


Figure 11. Plate and bolts securing the knife blades .

Changing the 'Cheese Wire'

The 'cheese wire' can be changed by undoing the wing nuts behind the knife blade mounting point (see Figure 12). Old wire should be removed using pliers and a new wire wrapped around the threads, between the two washers. Position the bridge at the end of the track, and ensure the length of the wire is *just* sufficient to cut past the end stop. Take care when handling the wire the ends are very sharp.



Figure 12. Wing nut mounting points for the 'cheese wire'.

Changing the Vibratory Cutter Blades

1. To remove a vibratory cutter blade from the cutter, first remove the cutter and slide assembly by unscrewing the fixing bolts shown in Figure 3.
2. Turn the assembly upside down and unscrew the two bolts that hold the plastic slide to the cutter.
3. Lift the lever on top of the cutter so that it is flipped over approximately 180°. The black pin in the centre of the blade can now be removed and the blade removed. (Figure 13)

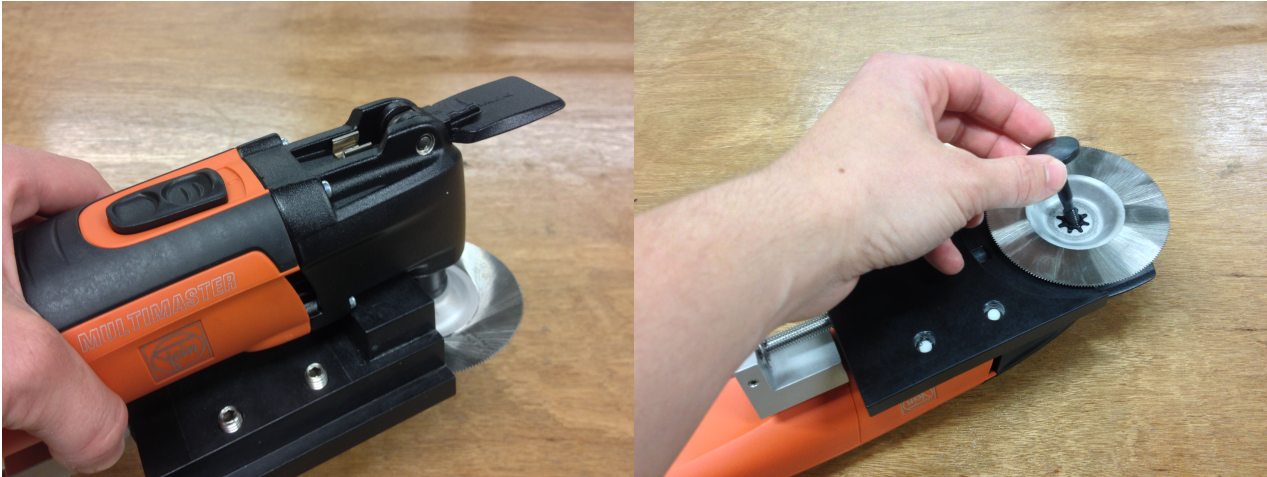


Figure 13. Removal of blade from FEIN MultiMaster cutter.

4. The blades supplied have a larger cutting area than is used so the blades can be rotated in their mounting as they become worn thus prolonging their useful life. Adjust the existing blade or replace completely, then screw the pin back into the centre of the blade.
5. Whilst holding the pin in place, flip the black handle back to its original position, then check that the blade is held securely in place.
6. Fix the plastic slide back onto the cutter being careful not to over tighten the bolts.
7. Slide cutter assembly back into the bridge and replace bolts.