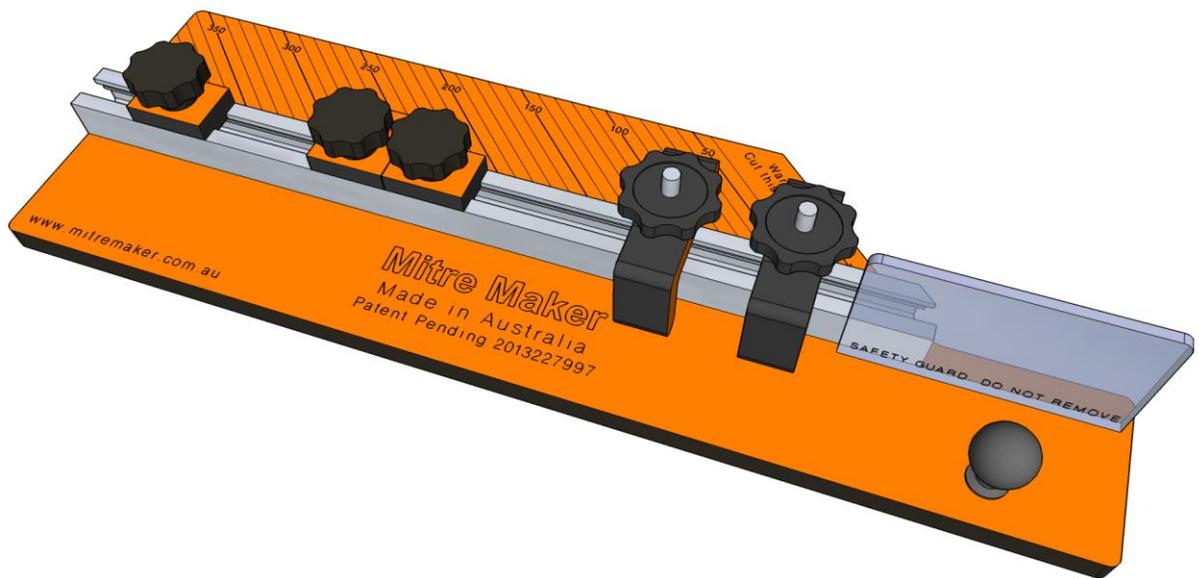


Mitre Maker



Owner's Manual

www.mitre maker.com.au

Second Edition
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<p>Title: Mitre Maker Owner's Manual. Second Edition</p> <p>Author: Joel Stewart</p> <p>Document Reference: Mitre_Maker_Owner's_Manual_SECOND_EDITION.docx</p> <p>Synopsis: This is the Second Edition owner's manual for the Mitre Maker. It covers the main components of the Mitre Maker, recommended use, care and maintenance and optional extras to enhance the versatility of your Mitre Maker. It includes the use of a packing piece for obtaining the full 11-22mm range of the tongue and groove cutter.</p>

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SAFETY FIRST

Woodworking and working with a table-mounted router is potentially dangerous. Please read and follow the instructions in this Manual before using the Mitre Maker for the first time, and ensure that you have appropriate safety equipment including:

- Ear protection;
- Eye protection (safety glasses); and
- Dust extraction or dust mask.

When using the Mitre Maker:

- Always push the Mitre Maker away from you when cutting your workpieces;
- Keep a firm grip on the Mitre Maker handle and keep your hand behind the safety guard when cutting your workpieces. Your left hand should be braced against the left side of the Mitre Maker, be well away from the cutting blade and behind the fence;
- Always ensure your workpiece is securely clamped before cutting, that the clamps are away from the Mitre Maker cutting edge, and your cutters are sharp;
- Always move the Mitre Maker and workpiece away from the router after completing a cut;
- Switch off your router before removing the workpiece and clamping down the next part; and
- Always unplug your router before changing cutters.

CONTENTS

Safety First	1-1
Contents	1-2
List of Figures	1-3
1 THE MITRE MAKER	1-4
1.1 Introduction	1-4
1.2 Mitre Maker Component Overview	1-5
1.3 Baseplate and Fence	1-6
1.3.1 The Baseplate	1-6
1.3.2 The Fence	1-6
1.3.3 Fence Extension	1-7
1.3.4 Fence Replacement	1-8
1.3.5 Material Sizes	1-8
1.4 Stops and Clamps	1-8
1.5 Cutters	1-9
1.5.1 Tongue and Groove Cutter	1-9
2 USING THE MITRE MAKER	2-10
2.1 Introduction	2-10
2.2 Recommended Method of Use: Straight or 'butt jointed' Mitres	2-10
2.2.1 Step 1: Design and sketch your intended frame	2-11
2.2.2 Step 2: Prepare your timber	2-11
2.2.3 Step 3: Position the workpiece for the first half of the mitre joint	2-12
2.2.4 Step 4: Set the height of the cutter	2-13
2.2.5 Step 5: Cut the first half of the mitre joint	2-13
2.2.6 Step 6: Flip the workpiece and set the sliding stop and positioning stops	2-15
2.2.7 Step 7: Cut the second half of the mitre	2-15
2.3 Interlocking (Tongue and Groove) Mitres	2-16
2.3.1 Step 3a: Position the workpiece for the first half of the mitre joint	2-16
2.3.2 Step 4a: Set the initial height of the tongue and groove cutter	2-17
2.3.3 Step 7a: Cut the second half of the interlocking mitre	2-18
2.3.4 Getting the full range of out of your Tongue and Groove cutter	2-19
2.4 Using Timber Mouldings	2-19
3 CARE AND MAINTENANCE	3-21
3.1 Mitre Maker Baseplate and Fence	3-21

3.2	Cutters	3-21
4	OPTIONAL ADDITIONS TO YOUR MITRE MAKER	4-22
4.1	Fence Extension	4-22
4.2	Additional Cutters	4-22

LIST OF FIGURES

Figure 1-1.	Key Components of the Mitre Maker	1-5
Figure 1-2.	Mitre Maker Baseplate	1-6
Figure 1-3.	Mitre Maker Fence at the Mitre Cutting Edge	1-7
Figure 1-4.	Fence Extension Components	1-7
Figure 1-5.	3D-printed nut holder to assist with fence removal and replacement	1-8
Figure 1-6.	Mitre Maker hardware (L-R): Clamp, Sliding Stop and Positioning Stop	1-9
Figure 2-1.	Sketching out the frame side lengths	2-11
Figure 2-2.	Prepare the timber: cut the timber oversize	2-11
Figure 2-3.	Position the workpiece for the first half of the mitre	2-12
Figure 2-4.	Ensure the workpiece slightly extends beyond the edge of the fence	2-12
Figure 2-5.	The cutter bearing runs along the black core material of the baseplate	2-13
Figure 2-6.	Clockwise from top left: a) Beginning the cut by taking away material b) Taking small amounts of material away at a time c) Removing the bulk of the waste and d) Making the final clean-up pass running the bearing along the Mitre Maker Cutting Edge	2-14
Figure 2-7.	Positioning the Stops	2-15
Figure 2-8.	At least 5mm of the workpiece extends beyond the Mitre Cutting Face at the Fence for Interlocking Mitres	2-16
Figure 2-9.	Setting the height of the tongue and groove cutter. The bearing may be partially below the table surface	2-17
Figure 2-10.	Setting the height of the tongue and groove cutter for the second half of the interlocking mitre joint	2-18
Figure 2-11.	Cutting an interlocking mitre on a 12.5mm piece of timber with and without the packing piece	2-19
Figure 2-12.	Clamping timber moulding to the Mitre Maker	2-20
Figure 2-13.	Using spring loaded clamps to secure timber moulding	2-20
Figure 4-1.	Fence Extension Components	4-22
Figure 4-2.	Mitre Maker cutters from left: tongue and groove , 38mm straight cutter and 50mm straight cutter	4-23

1 THE MITRE MAKER

1.1 Introduction

Congratulations and thank you for choosing a Mitre Maker. The Mitre Maker will have you cutting very accurate mitres using your table-mounted router in no time. No more calibrating your drop saw or changing your drop saw blades every time you want to cut a sharp, accurate mitre. You can now make perfect mitres using your table-mounted router.

The Mitre Maker consists of:

1. A baseplate and integrated fence with an assortment of clamps and sliding stops to fasten and accurately position the workpiece on the Mitre Maker;
2. A handle and guard to provide the woodworker with a firm and safe grip on the Mitre Maker; and
3. An inverted flush trim router bit to use in your table-mounted router to cut clean and accurate mitres.

The Mitre Maker is operated by moving it across a router table by hand, causing the mitre cutting edge to run along the bearing of a router bit. Moving slowly, but carefully, the cutting blade neatly and safely trims the workpiece forming a perfect 45 degree angle between the edge placed against the fence, and that placed along the mitre cutting edge.

Key features of the Mitre Maker include:

1. A sliding stop, operating between two positioning stops, to create a solid and reliable reference point to locate a workpiece for cutting. This ensures multiple workpieces can be cut to the same size, time and time again;
2. Two positioning stops to allow the sliding stop to be accurately located for two workpiece lengths, meaning that positioning the jig for rectangular frames is just as easy and accurate as for square frames; and
3. The Mitre Maker's solid baseplate and hard surface finish ensure the tool is durable, it slides easily over the router table surface and won't deform or lose the accurate 45 degree angle.

The remainder of this chapter provides more detail on the key features and components of your Mitre Maker. Chapter 2 describes the proper and recommended operation of the Mitre Maker, followed by chapters describing care and maintenance, optional additions and frequently asked questions.

Our website, www.mitre-maker.com.au, features more information on the Mitre Maker, including videos and free downloads.

1.2 Mitre Maker Component Overview

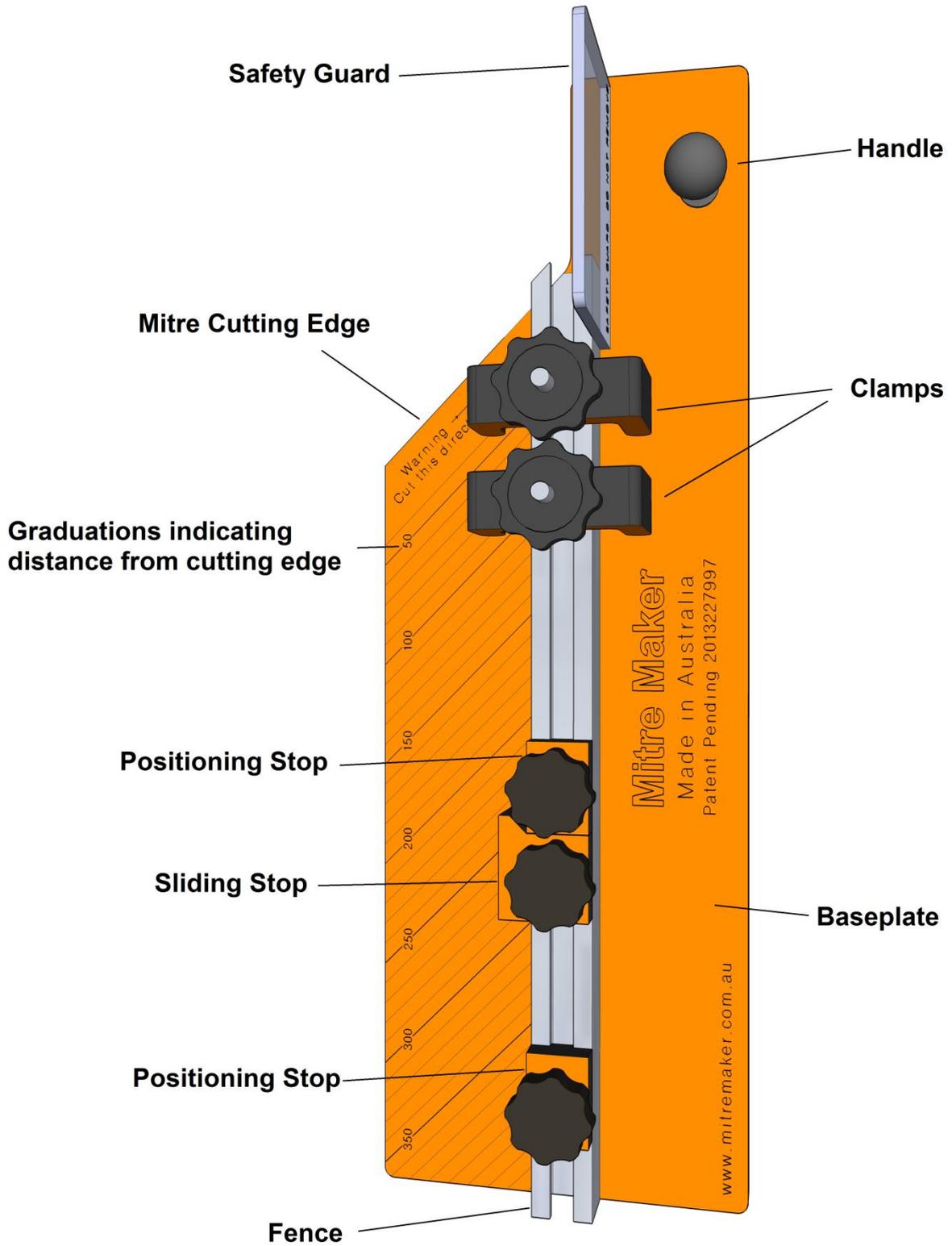


Figure 1-1. Key Components of the Mitre Maker

1.3 Baseplate and Fence

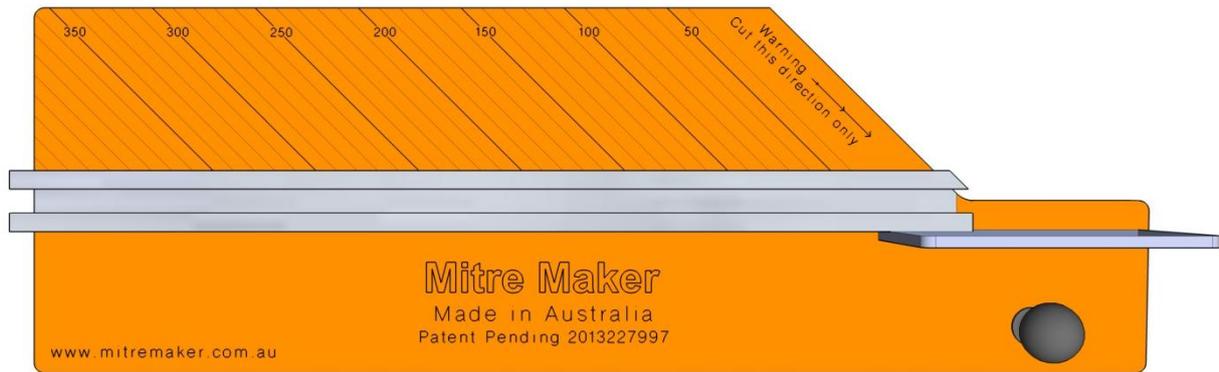


Figure 1-2. Mitre Maker Baseplate

1.3.1 The Baseplate

The Mitre Maker baseplate has the following overall dimensions:

- 545mm length;
- 180mm width; and
- 13mm thick.

The baseplate is CNC machined from a laminate with hard, scratch resistant surfaces on the top and bottom. The core material of the baseplate is dark grey to black and the bearing on included router bits will run smoothly along this material.

The core material along the mitre cutting edge may experience build up of dust after frequent use which may affect the accuracy of your mitres. This may be cleaned by gently scraping with the end of a steel ruler to remove the dust, and/or polishing with an old toothbrush to return the edge to a smooth surface.

We never recommend re-machining of the mitre cutting edge as a cleaning option. If the cutting edge of the baseplate is damaged by a router bit, then we recommend replacement of the baseplate.

1.3.2 The Fence

The Mitre Maker fence is made from extruded aluminium and contains slots for stops, clamps and extension hardware. The fence is trimmed flush with the baseplate on the mitre cutting edge as shown in Figure 1-3.

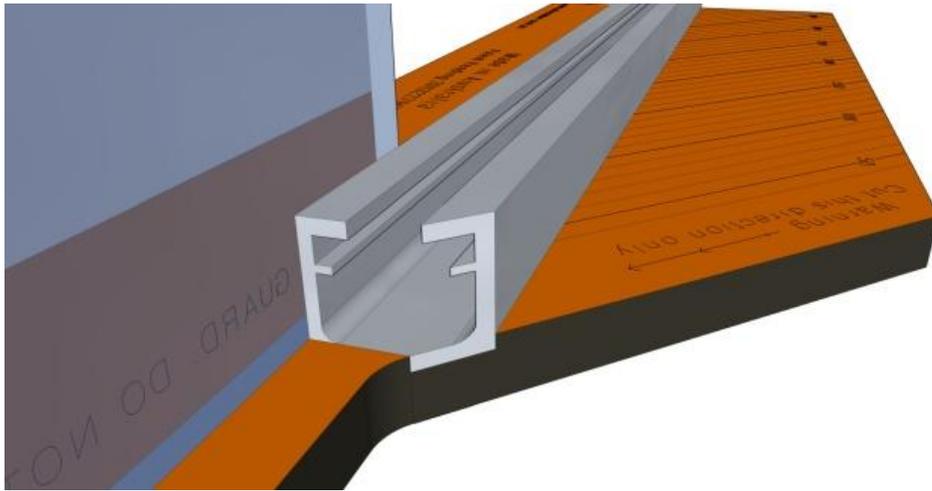


Figure 1-3. Mitre Maker Fence at the Mitre Cutting Edge

The fence is recessed into the baseplate for accurate alignment with the mitre cutting edge and is attached to the baseplate using 4x M5 bolts.

The fence can be removed and replaced if required.

1.3.3 Fence Extension

The Mitre Maker fence can be extended to accommodate stop positioning for workpieces in excess of 400mm. This extension kit is available separately, and is included in our Mitre Maker Pro Pack.

- The 550mm fence extension and connector increases the range of the sliding stops.
- Multiple extensions may be added for even longer workpieces.

The fence is extended by removing the fixing bolt furthest from the mitre cutting edge and installing a fence extension kit. The fence connector is tapped for a 5mm bolt which is included in the kit.

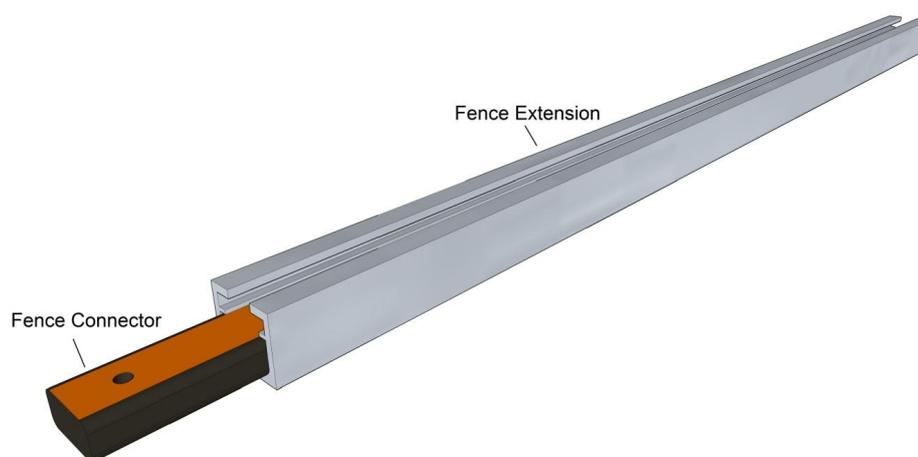


Figure 1-4. Fence Extension Components

1.3.4 Fence Replacement

A replacement fence may be fitted, if required, by removing the fixing bolts. This may be necessary if a tongue and groove cutter has cut away some of the existing fence or if the fence has been damaged.

A nut holding tool (see Figure 1-5. 3D-printed nut holder to assist with fence removal and replacement) is a useful tool for removal and replacement of fence bolts. A 3D printable version of this tool and is freely downloadable from the Mitre Maker website (www.mitre maker.com.au).

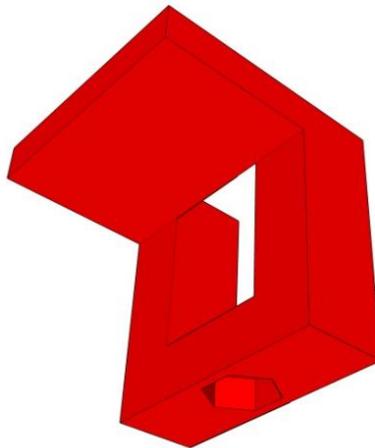


Figure 1-5. 3D-printed nut holder to assist with fence removal and replacement

1.3.5 Material Sizes

- The maximum **length** of material that can be mitre cut using the Mitre Maker is not determined by the size of the baseplate, as excess length of material can overhang the baseplate.
- The maximum **width** of material that the Mitre Maker baseplate can accommodate is 80mm for mitre cuts.
- The maximum **thickness** of material that the Mitre Maker can accommodate is determined by the cutter height and is typically:
 - 38mm with the standard supplied cutter;
 - 50mm using the tall cutter option; and
 - 11-22mm for the tongue and groove cutter used for interlocking mitre joints.

1.4 Stops and Clamps

The Mitre Maker is supplied with the following stops and clamps:

- 2 x positioning stops;
- 1 x sliding stop to move between the two positioning stops; and
- 2 x hold down clamps.

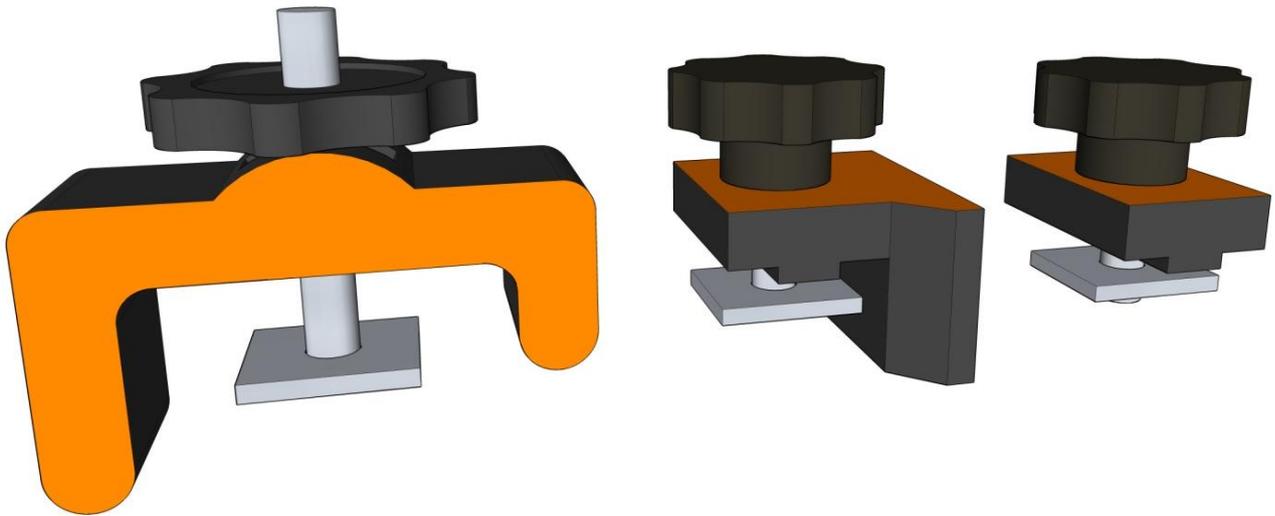


Figure 1-6. Mitre Maker hardware (L-R): Clamp, Sliding Stop and Positioning Stop

1.5 Cutters

The Mitre Maker is supplied with a 1/2 inch shank 38.1mm carbide tipped inverted flush trim bit with down shear.

Cutters must be securely mounted in an appropriate table-mounted router with adjustable cutter height.

No fence is required with the use of the Mitre Maker.

Additional cutter options include:

- Tall cutter: 50mm cutting blade on a 1/2 inch shank inverted flush trim bit; and
- Tongue and Groove cutter with fitted bearing and collar.

1.5.1 Tongue and Groove Cutter

The Tongue and Groove Cutter assembly upgrade (Interlocking Mitre Kit) can be used to cut strong interlocking mitre joints that generally do not require additional splines, biscuits or mechanical fasteners after gluing of the frame pieces.

An additional fence replacement may be undertaken when switching back from the tongue and groove cutter to the flush trim cutter if too much of the fence has been removed by the tongue of the tongue and groove cutter.

2 USING THE MITRE MAKER

2.1 Introduction

In this chapter we describe the recommended method of use of the Mitre Maker to produce mitred timber for picture framing, box lids and other joinery. We describe the recommended method of use for the two main joint types that the Mitre Maker specialises in:

- straight or 'butt mitred' joints; and
- tongue and groove (interlocking) mitred joints.

We also describe recommended methods for making joints when using timber mouldings.

2.2 Recommended Method of Use: Straight or 'butt jointed' Mitres

Before beginning, the woodworker should ensure that:

- The stock they wish to mitre is no wider than 80mm with parallel edges, be properly dimensioned on all sides and be no thicker than the height of the cutting blade of the cutter (typically 38mm if using the standard cutter or 50mm using the tall cutter);
- The cutter must be mounted in the router as per the manufacturer's directions; and
- The router must be switched off.

The following sections describe the seven recommended steps for creating perfect mitres using your Mitre Maker. These steps are:

Step 1: **Design** and sketch your intended frame

Step 2: **Prepare** your timber

Step 3: **Position the workpiece** for the first half of the mitre joint

Step 4: Set the **cutter height**

Step 5: **Cut** the first half of the mitre joint

Step 6: **Flip the workpiece** and set the sliding stop and positioning stops; and

Step 7: **Cut** the second half of the mitre joint

2.2.1 Step 1: Design and sketch your intended frame

Determine the length of the sides of the frame being made. It is usually easiest to work with the external frame dimensions. In this case the frame is 250mm x 175mm.

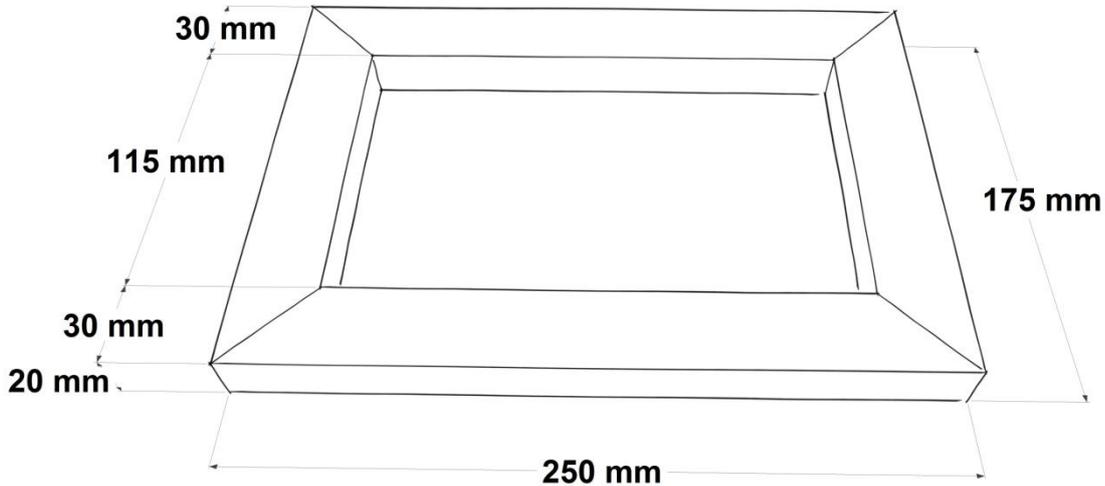


Figure 2-1. Sketching out the frame side lengths

2.2.2 Step 2: Prepare your timber

Dock and trim the working stock such that the resulting length of each piece is oversized by 5-10mm to allow the Mitre Maker to precisely trim the remaining stock. You may choose to dock the timber with your drop saw or hand saw, either at 90° or at 45°.



Figure 2-2. Prepare the timber: cut the timber oversize

2.2.3 Step 3: Position the workpiece for the first half of the mitre joint

With the router turned off, position the workpiece on the baseplate of the Mitre Maker such that:

- The external side of your frame piece is positioned along the fence (Figure 2-3); and
- The workpiece extends a few millimetres beyond the fence and overhangs the baseplate (Figure 2-4).

Position and tighten the hold down clamps until the workpiece is held firmly.

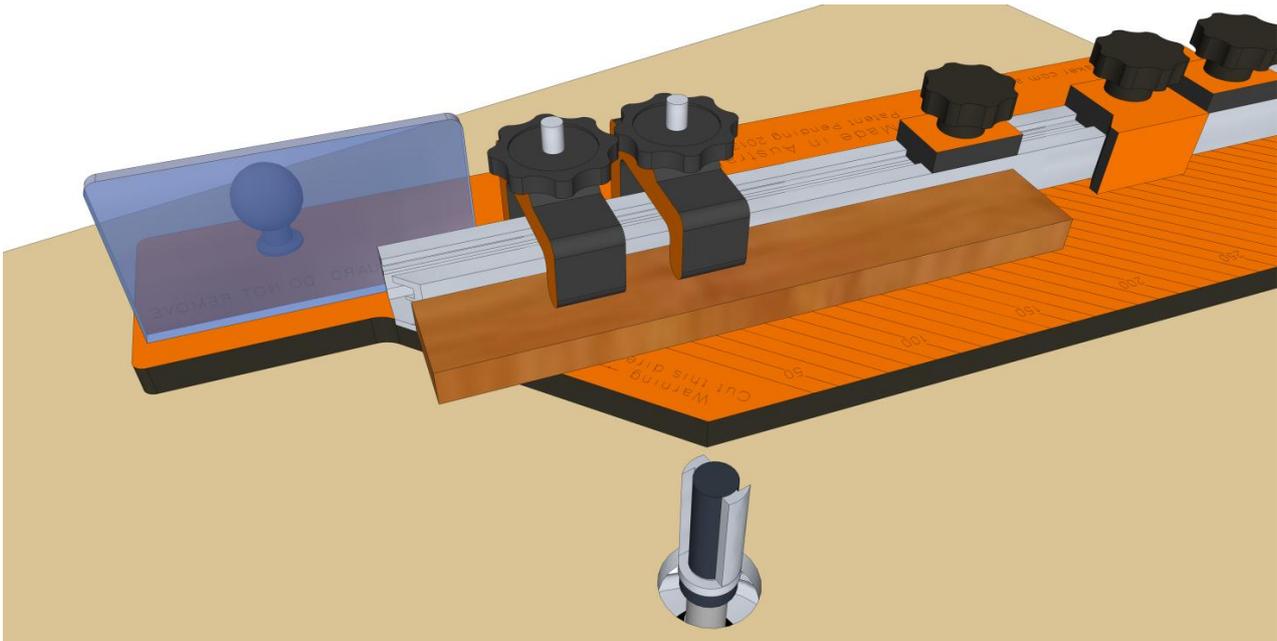


Figure 2-3. Position the workpiece for the first half of the mitre

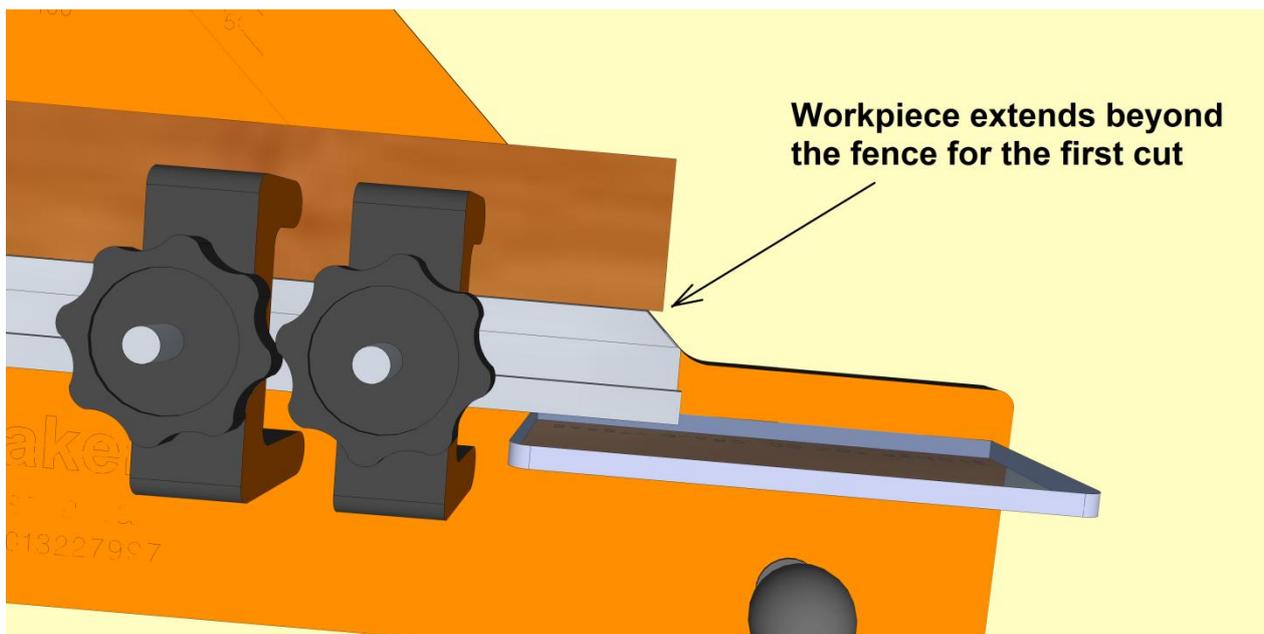


Figure 2-4. Ensure the workpiece slightly extends beyond the edge of the fence

2.2.4 Step 4: Set the height of the cutter

With the router turned off, slide the Mitre Maker over your router table and position the mitre cutting edge near, or against the cutter.

- Lift or lower the cutter so that the cutter bearing will run along the black core material of the baseplate. There is no need to be precise here so long as the bearing will run along the black core material of the cutting edge and the blade is slightly below the top surface of the baseplate.
- Ensure that the cutter is tall enough to trim the workpiece.

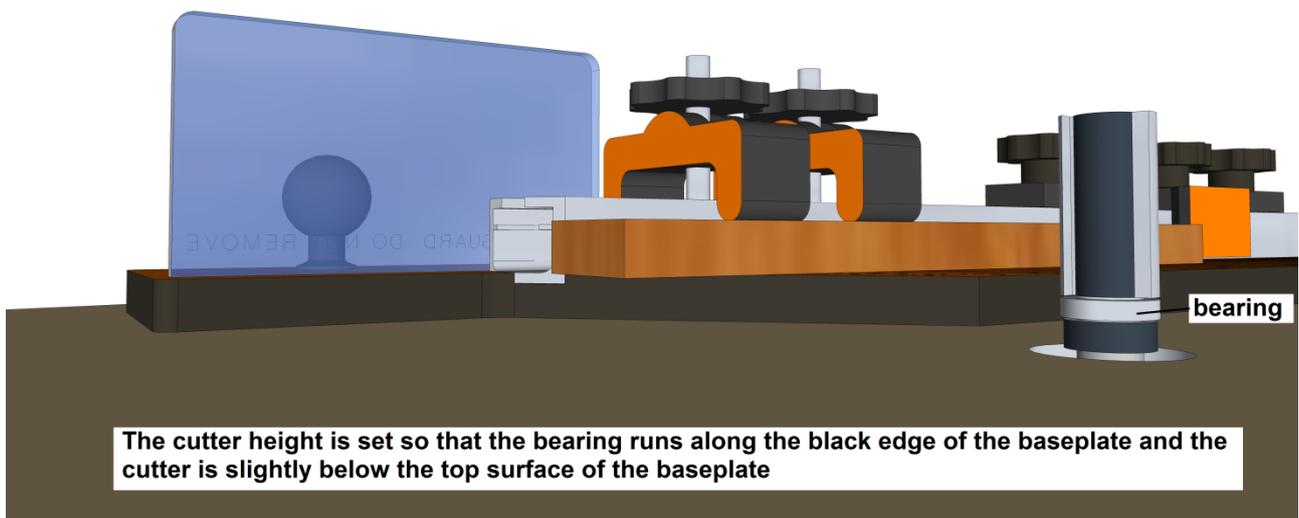


Figure 2-5. The cutter bearing runs along the black core material of the baseplate

2.2.5 Step 5: Cut the first half of the mitre joint

To cut the first half of the mitre joint, follow this procedure:

1. Ensure that the workpiece is securely clamped to the baseplate of the Mitre Maker and that the edge of the workpiece is firmly against the fence;
2. Move the Mitre Maker away from the cutting blade;
3. Turn on the router;
4. Place your right hand with a firm grip on the Mitre Maker handle and left hand supporting the Mitre Maker baseplate;
5. Move the Mitre Maker toward the cutting blade and begin to trim small amounts of material (4-8mm at a time) from the workpiece starting with the part of the workpiece farthest from

the fence and moving toward the fence. Always push the Mitre Maker away from you when undertaking workpiece cutting. Continue until most of the material has been trimmed; then

6. Complete the cut by positioning the mitre cutting edge against the bearing of the cutter and moving the Mitre Maker away from you so that the cutter moves toward the fence. Continue to maintain a firm pressure against the cutter bearing. A final clean-up pass is recommended to ensure that the joint is smooth and accurate; and finally
7. Move the Mitre Maker away from the cutting blade and turn off the router.

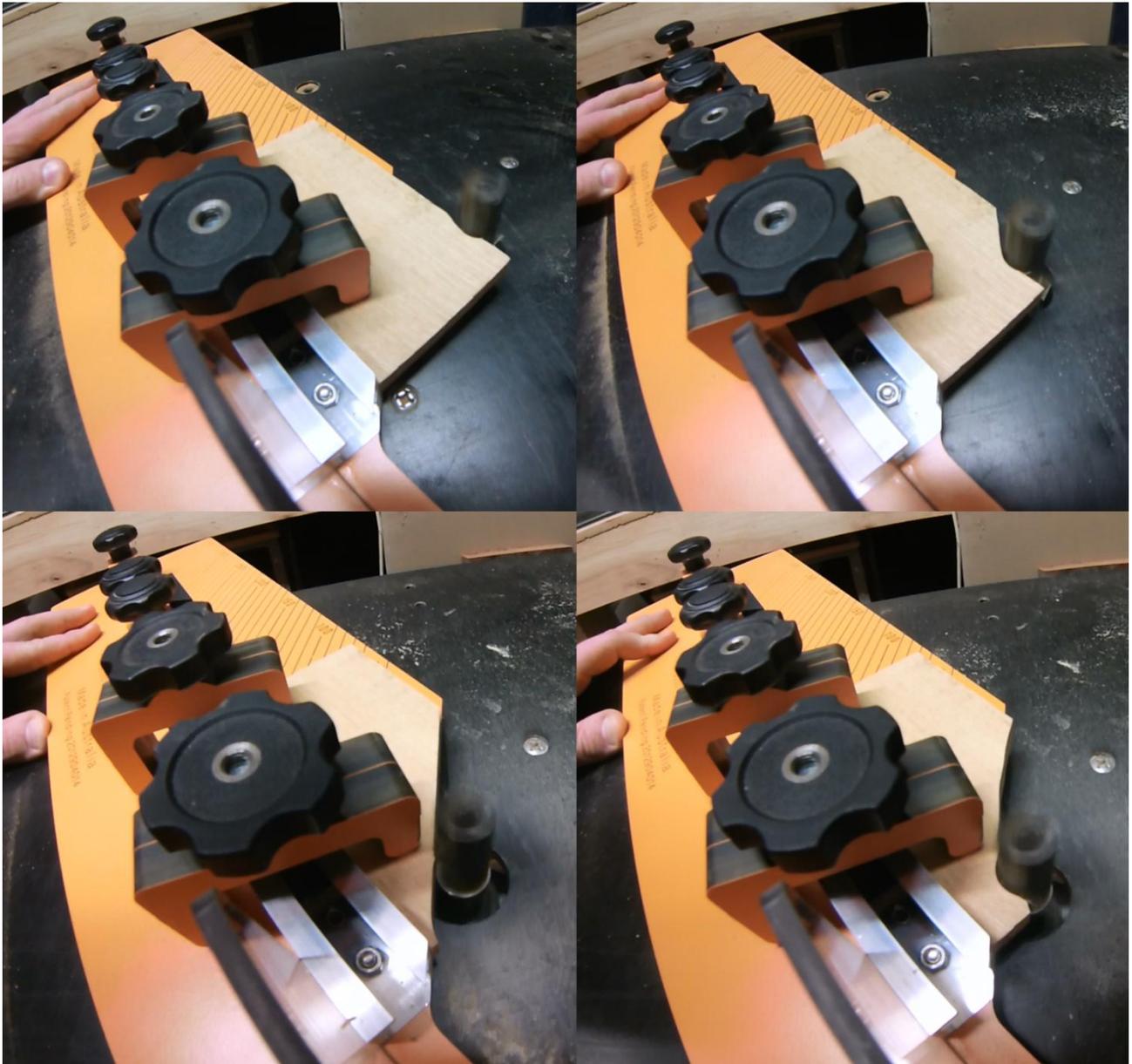


Figure 2-6. Clockwise from top left: a) Beginning the cut by taking away material b) Taking small amounts of material away at a time c) Removing the bulk of the waste and d) Making the final clean-up pass running the bearing along the Mitre Maker Cutting Edge

2.2.6 Step 6: Flip the workpiece and set the sliding stop and positioning stops

1. Unclamp the workpiece and flip it over so that the long edge is still positioned against the fence and the uncut edge is now overhanging the baseplate at the mitre cutting edge;
2. Slide the workpiece along the fence until the inside and/or outside of your workpiece is the desired length relative to the cutting edge. The engraved markings on the baseplate are intended as a guide to help with this positioning. They are angled at 45° and parallel to the mitre cutting edge, so you can use them to measure either the inner or outer frame length. Engraving increments are provided at 5mm spacing, or a steel rule can be used here for more accuracy;
3. After the length of the frame piece has been determined, clamp the workpiece so that it cannot move;
4. Move the sliding stop so that it comes into contact with the mitred edge of the workpiece and tighten the knob, holding it in place;
5. If the workpiece is the long side of the frame, move the outer positioning stop (the one that is furthest from the mitre cutting edge) until it meets the sliding stop and tighten the knob to hold it in place. Repeat the procedure for the short side of the frame, but instead, move the inner positioning stop until it meets the sliding stop and tighten the knob to hold it in place. With the stop positions successfully set, you can now you can move the sliding stop between the inner and outer positioning stops to cut the long and short sides of your frame pieces.

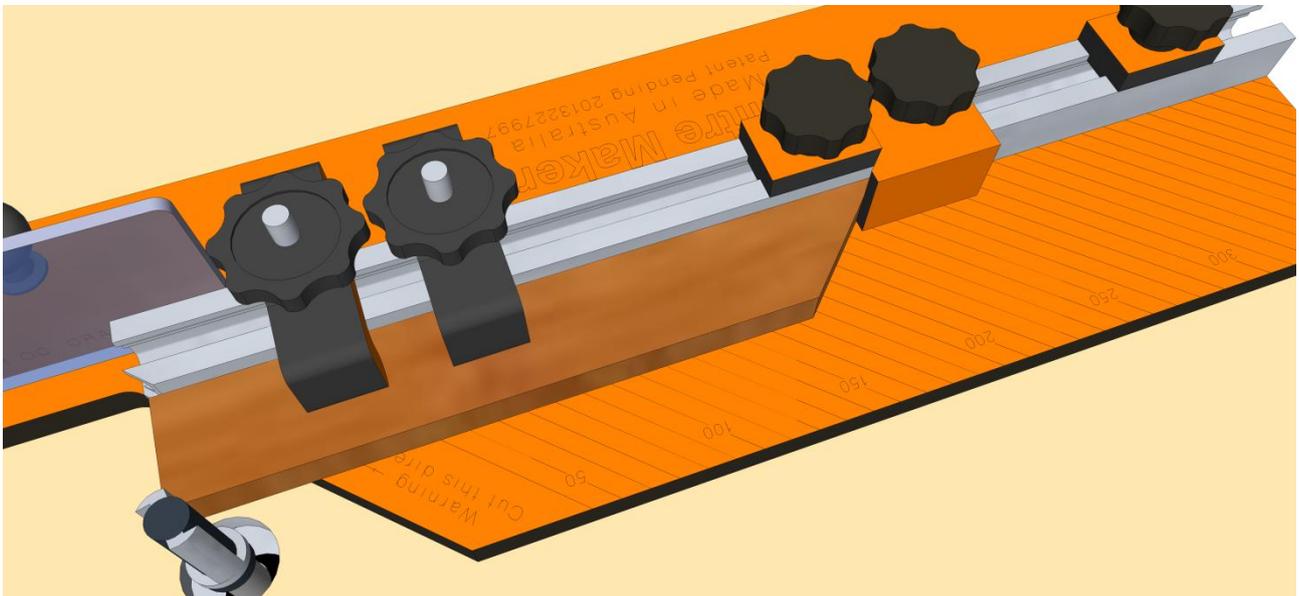


Figure 2-7. Positioning the Stops

2.2.7 Step 7: Cut the second half of the mitre

With the workpiece positioned firmly against the fence and the sliding stop, cut the second half of the mitre joint using the same technique as described in **Step 5**.

2.3 Interlocking (Tongue and Groove) Mitres

Cutting interlocking mitre joints follows a very similar procedure to cutting the straight mitre joint. The three key additions to the method outlined for the straight mitre are:

1. Positioning the workpiece (Step 3a)
2. Setting the initial cutter height (Step 4a); and
3. Resetting the cutter height for the second half of the mitre joint (Step 7a).

When cutting your workpieces to length and setting sliding stop positions, the engravings on the baseplate cannot be used for an accurate determination of frame side length. Use a steel ruler.

The recommended procedure for these steps is provided in the following sections.

2.3.1 Step 3a: Position the workpiece for the first half of the mitre joint

Like the straight cutter example, the workpiece should extend a little further from the edge of the fence and overhang the baseplate.

However the bearing on the tongue and groove cutter is larger than the diameter of the main cutting face, so the finished cut face of the mitre is going to overhang the baseplate and fence.

Therefore, position the workpiece so that it extends beyond the mitre cutting face at the fence by **at least 5mm**.

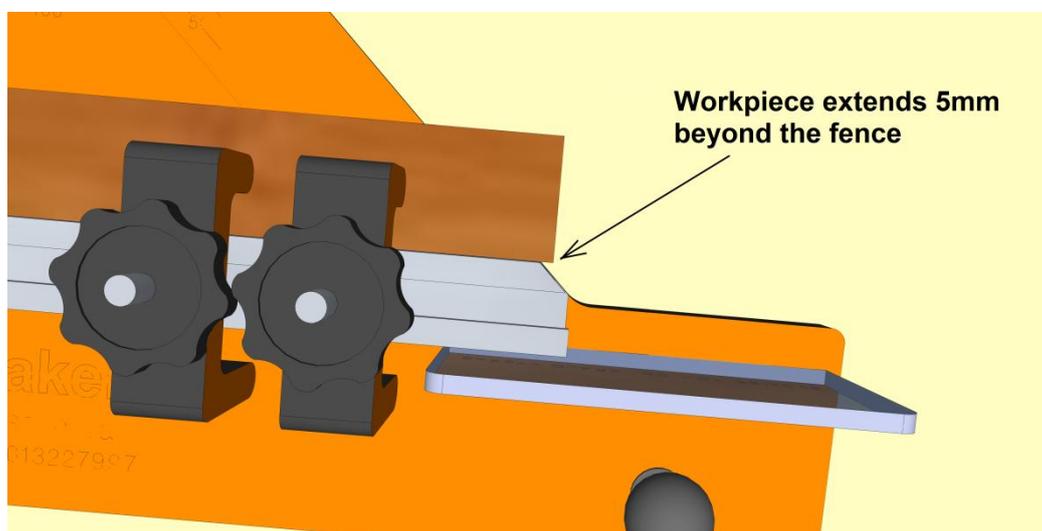


Figure 2-8. At least 5mm of the workpiece extends beyond the Mitre Cutting Face at the Fence for Interlocking Mitres

2.3.2 Step 4a: Set the initial height of the tongue and groove cutter

Like the straight cutter, the tongue and groove cutter has a bearing which must run along the mitre cutting edge. However, the typical height positioning of the tongue and groove cutter may be with the bearing partially below the router table surface.

The height of the tongue and groove cutter may need to be adjusted for the second half of the mitre joint. Therefore when cutting the first half of the mitre joint, some consideration may need to be given to the height positioning of the tongue or groove.

Generally, if the height of the tongue and groove portion of the cutter is positioned approximately in the centre of the workpiece, then only a small adjustment will be required in the cutter height to make the second half of the interlocking mitre joint.

Procedure

With the router turned off, slide the Mitre Maker over your router table and position the mitre cutting edge near, or against the cutter.

- Lift or lower the tongue and groove cutter so that the cutter bearing will run along the black core material of the baseplate. The bearing may be partly below the router table surface;
- Make a final adjustment to ensure that the tongue and groove portion of the cutter is positioned approximately in the centre of the workpiece; and
- Ensure that the cutter is tall enough to trim the work piece.

Then cut the first half of the interlocking mitre joint as per the recommended procedure in Step 5 (above).



Figure 2-9. Setting the height of the tongue and groove cutter. The bearing may be partially below the table surface

2.3.3 Step 7a: Cut the second half of the interlocking mitre

The tongue and groove cutter will most likely need some height adjustment before cutting the second half of the mitre.

To adjust the cutter height, ensure that the router is turned off and the tongue and groove cutter is still installed in the router, then:

1. Flip the workpiece that has had the first half of the interlocking mitre joint cut, but this time let the first half of the joint overhang the opposite end of the Mitre Maker;
2. Bring the overhanging workpiece to the cutter and adjust the cutter height until the 'tongue' of the cutter is closely aligned with the 'tongue' of the first half of the interlocking mitre joint;
3. To test the alignment of the joint, it is best to cut a test joint and check the fit before proceeding with the second half of the interlocking mitre joint on the intended workpiece; then
4. After cutting a test joint and you are satisfied with the alignment of the joint, install workpiece in the Mitre Maker and continue with Steps 6 and 7 as described above to complete the interlocking (tongue and groove) mitre.



Figure 2-10. Setting the height of the tongue and groove cutter for the second half of the interlocking mitre joint

2.3.4 Getting the full range of out of your Tongue and Groove cutter

When using the tongue and groove cutter on timber less than about 15mm thick, the bearing on the tongue and groove cutter can sit very low in the table. The current cutter design means that the bearing sits too low on the shank, limiting the full 11-22mm range of cutting thickness when placing the workpiece on the Mitre Maker.

To get the full 11-22mm range from the Tongue and Groove cutter, a 4.5mm packing piece is supplied with the cutter to sit underneath the workpiece, lifting the workpiece so that more of the bearing can run along the cutting face.

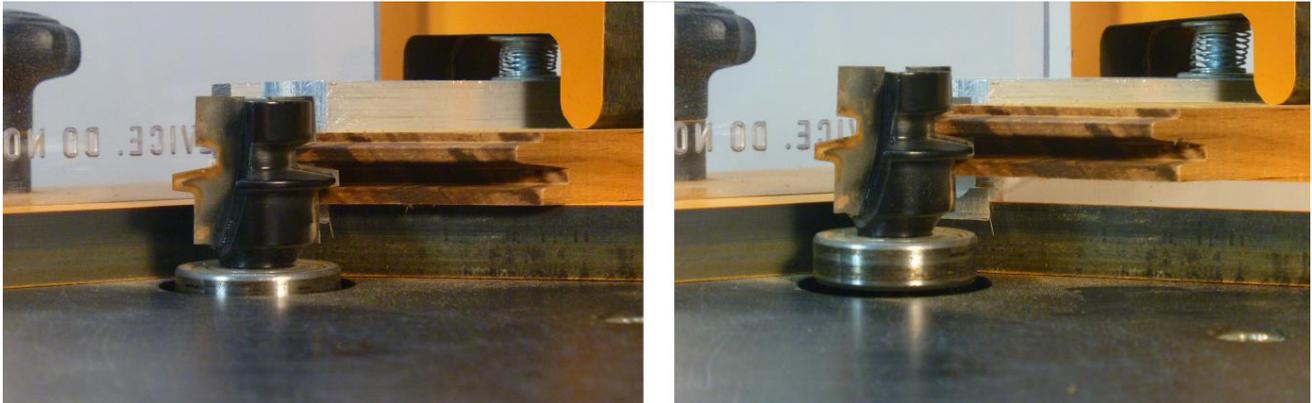


Figure 2-11. Cutting an interlocking mitre on a 12.5mm piece of timber with and without the packing piece

A 4.5mm thick clear Lexan packer is supplied with all Interlocking Mitre kits and Mitre Maker Pro packs so that you can get the most out of your Mitre Maker.

2.4 Using Timber Mouldings

Timber moulding can easily be cut using the Mitre Maker, however special care should be taken to securely clamp the moulding, especially when cutting the second half of the mitre joint where a flat edge may not be available for downward clamping.

In such cases, extra spring loaded clamps may be required to hold the material against the fence, or in special cases, blocks may be used to brace the moulding so that each half of the mitre is cut squarely.

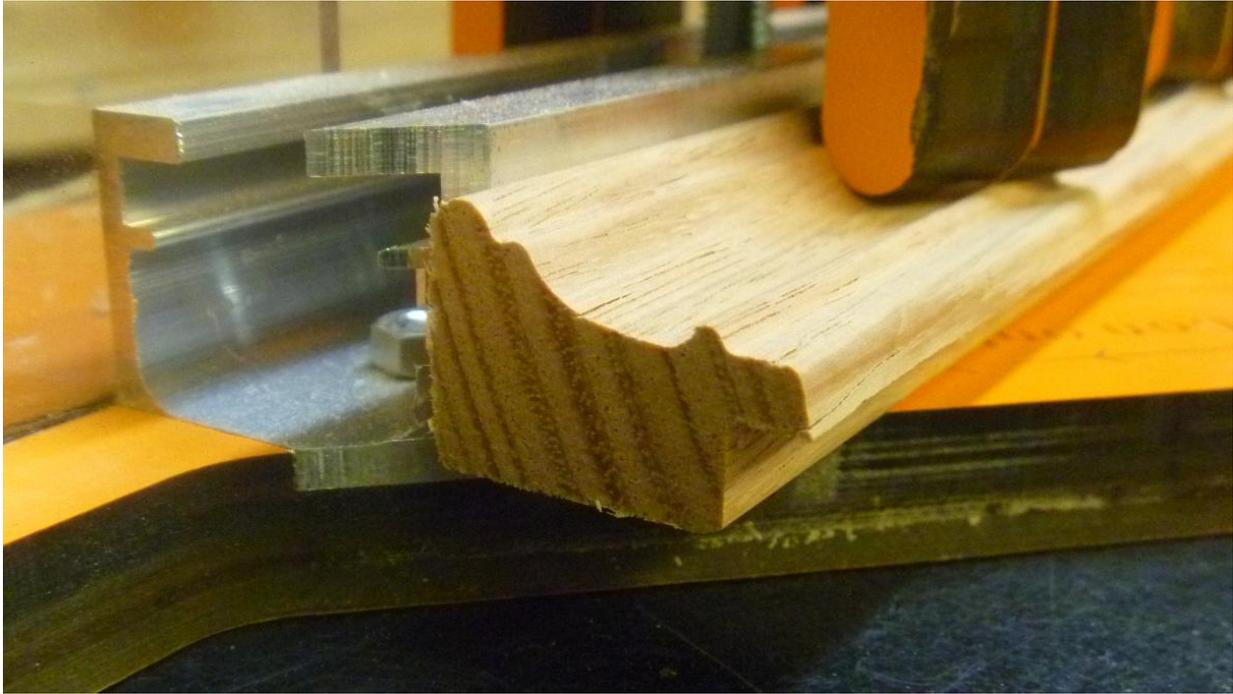


Figure 2-12. Clamping timber moulding to the Mitre Maker

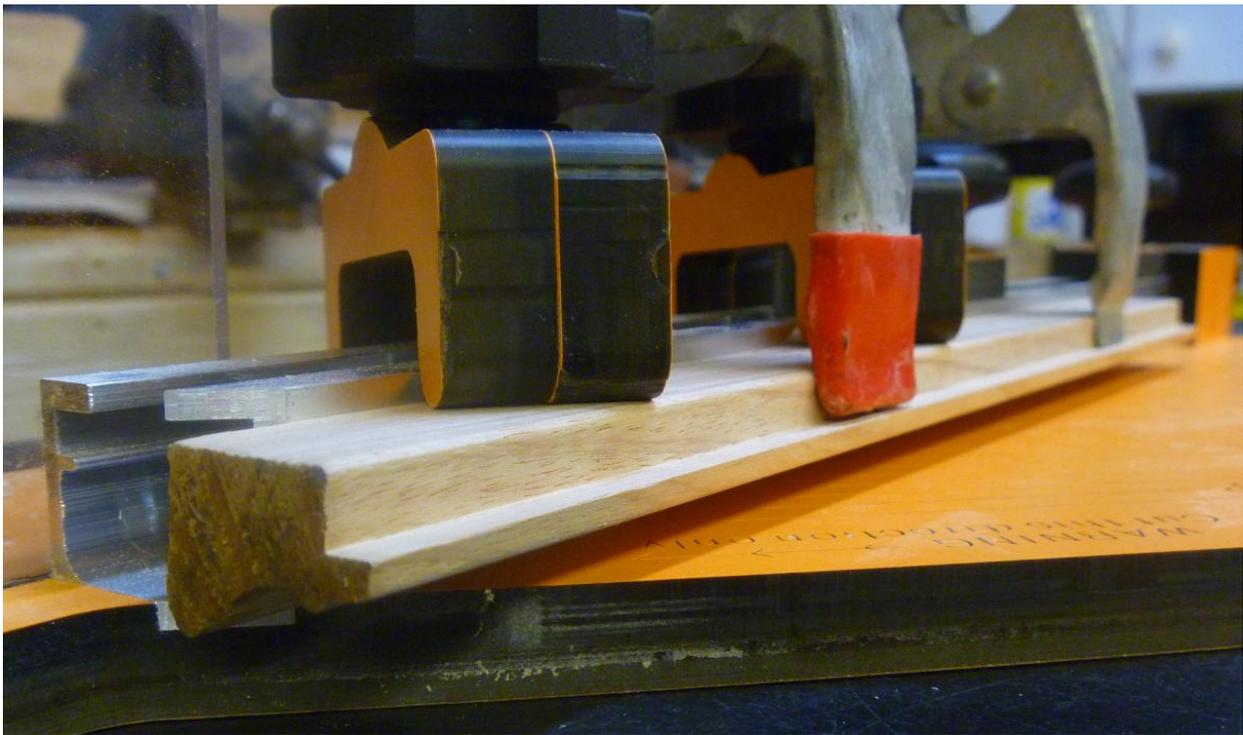


Figure 2-13. Using spring loaded clamps to secure timber moulding

3 CARE AND MAINTENANCE

3.1 Mitre Maker Baseplate and Fence

The Mitre Maker baseplate core material may experience build up of dust after frequent use and particularly after cutting timber with high resin content.

The mitre cutting edge may be cleaned using the end of a steel ruler using a scraping motion and/or polishing with an old toothbrush to return the edge to a smooth surface.

We *never* recommend re-machining of the mitre cutting edge as a cleaning option. If the cutting edge of the baseplate is damaged by a router bit, then we recommend replacement of the baseplate.

If the fence has been damaged by excess clamping force, abrasion or by a cutting blade, then we recommend replacing it with a new fence. This can be fitted, if required, by removing the fixing bolts.

3.2 Cutters

Sharp, precise mitres need sharp cutting blades. It is possible to sharpen the blades of your cutters, however after sharpening, the cutting blades will be slightly smaller in diameter than the bearing and therefore the workpiece will slightly overhang the baseplate and fence after cutting. This will mean that the measurement engravings on the surface of the baseplate may no longer give a precise indication of the finished workpiece length and the fence may not fully support the workpiece. In most cases however, these adjustments are relatively minor and are outweighed by the clean cuts offered by sharp cutters. A new fence can always be fit to the Mitre Maker and trimmed to the exact size if the cutter diameter is significantly less than the diameter of the bearing on the shank.

Alternatively, replacement cutters can be purchased direct from our website (www.mitremaker.com.au).

4 OPTIONAL ADDITIONS TO YOUR MITRE MAKER

Optional extras are discussed throughout this manual to improve the range and versatility of your Mitre Maker. These options are further discussed in the following sections.

4.1 Fence Extension

The Mitre Maker fence extension is 550mm long and comes with a connector to connect it to the existing Mitre Maker fence. Multiple extensions may be added for even longer workpieces.

The fence is extended by removing the fixing bolt furthest from the mitre cutting edge and installing a fence extension kit. The fence connector is tapped for a 5mm bolt which is included in the kit.

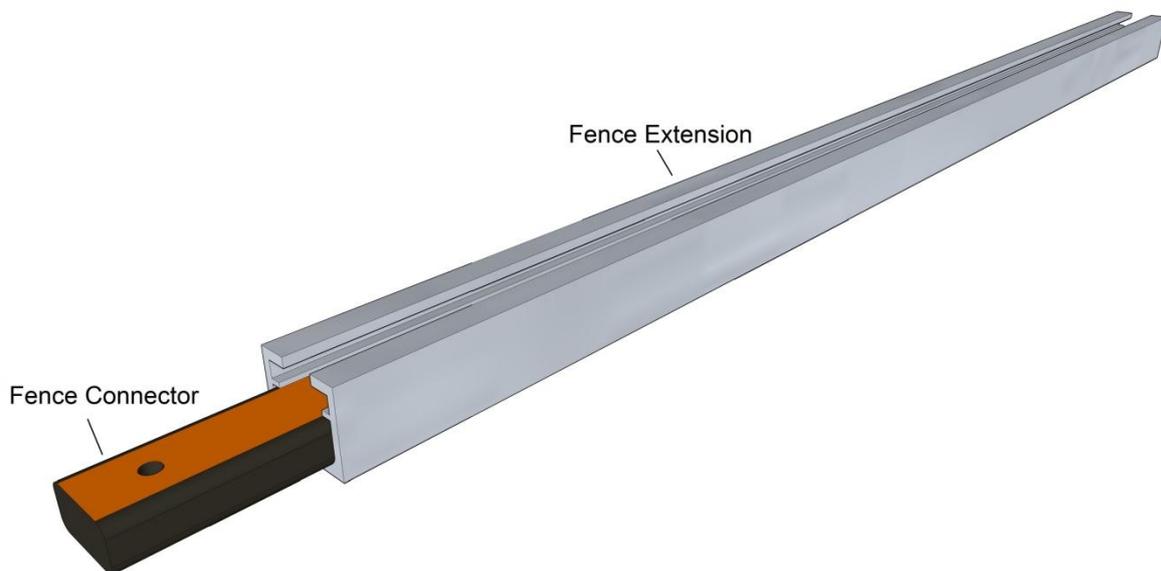


Figure 4-1. Fence Extension Components

4.2 Additional Cutters

Currently, two additional cutters may be used to enhance the versatility and range of the Mitre Maker:

- 50mm straight cutter; and
- Tongue and Groove cutter.



Figure 4-2. Mitre Maker cutters from left: tongue and groove , 38mm straight cutter and 50mm straight cutter

