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Signed: \_\_\_\_\_

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# Project Report

By Stephen McDonald

## Introduction

The brief for this project was to make a window frame with the following cutting list:

No.	Length	Width	Thickness	Materiel
2	550	45	22	Red Deal
2	370	45	22	Red Deal
1	300	80	22	Red Deal

The frame would consist of two open mitred tenons on the top rail, a wider doweled rail at the bottom, also mitred on the inside, and a middle splitter rail consisting of stub tenons with the corners mitred top and bottom. At the back of the frame is a rebate and at the front a 6mm stepped groove. There was 9 hours in total given for completion.

## Timber Selection and Marking

First off was timber selection, checking the available wood for any defects such as cracks, shakes or knots. After picking what I thought was the best of the remaining timber I marked the face side, edge and location of all the pieces by marking the two styles with a triangle and the three rails with the same method. I then proceeded to mark the waste on all the pieces, followed by the tenons on the top and middle rail, the location of the doweled bottom rail and the mortises on the two styles. While I was doing this I also marked in all the 6mm mitred corners. The bottom rail was cut to the desired length for doweling so I just needed to mark the mitred corners.

## Mortises

Setting up and cutting the mortises was the first job I wanted to do. I'd marked a line 31mm down on the end grain of one piece as a guide when setting up. The 31mm consisted of 25mm for the tenon on the centre rail plus the 6mm for the mitred corners. It would also serve for the open tenons. I could mortise down 31mm one side and flip the piece over (keeping the face side in against the fence) and come from the other side, this would stop break out. I then used a hand chisel to clear any excess waste from inside the mortise. Fig 1 shows an example of a similar morticer to the one used.



Fig 1

[http://www.timber-team.com/used\\_machines/images/mortiser-14.jpg](http://www.timber-team.com/used_machines/images/mortiser-14.jpg)

## Tenons

Having previously marked the tenons with a mortise gauge I proceeded to cut down the cheeks of the tenon. Stepping approximately 1mm to the outer side of the lines I ripped down the cheeks for all four tenons with the Japanese pull-saw. I left the extra 1mm to pare back with the chisel to give a polished finish and good fit. After the cheeks were ripped I used a marking knife to mark the shoulders below the tenons, then cross cut the waste off with the Japanese saw. I then proceeded to pare back the tenons to the pencil line checking the fit as I was going along. Once I was happy with the thickness on the tenon I marked and ripped down the 6mm on the inside of the top rail and either side of the middle rail.

## Rebates and Grooves

The rebate was tricky at this stage. Because I had I had done the mortises before-hand I ran a higher risk of breakout or damaging the piece on the spindle moulder. By running it through very slow at the end of the piece (with a push stick) I was able to avoid damaging the timber. Then it was just the grooves at the front of the pieces to do. For this I used a table router which like the spindle moulder had been previously been set up for depth of cut but the guard at the front had to be readjusted for the different width of the bottom rail. Because it was only taking a small amount in thickness off, again, I had to push the pieces through very slowly. Below in figure 3 and 4 are examples of a spindle moulder and table router.



Fig 2

[http://www.brisbanesaw.com.au/mach\\_wood.htm](http://www.brisbanesaw.com.au/mach_wood.htm)



Fig 3

<http://www.countertopresource.com/rockler-offers-new-router-table-packages/>

## Dowels

Next thing I needed to do was the dowels. I cut the waste off the bottom of the styles leaving a flat edge that could be pressed against the fence of the Multi-Borer. I then adjusted the pneumatic press that holds the piece in place to within a millimetre of the piece of timber. Then once the piece was positioned against the fence, using a piece of waste to hold it, I activated the machine with foot pedal. I repeated this until all eight holes were drilled, keeping the face side up the whole time. Below in fig 4 is an example of a similar Multi-Borer to the one used.



Fig 4

<http://www.machinio.com/listings/1223923-Nanxing-MWE-MZ7121>

## Mitred Corners

The last thing to do before sanding for finishing was to cut the mitres. Using a mitre block clamped to the piece of timber with a vice I gently pared back the mitres to the 6mm line. This was made easier because the groove on the face side of the timber was also 6mm so it acted as a good guide. For the centre piece mitres I made a number of saw cuts down and pared back the excess waste to the line. Unfortunately the lines were marked slightly off on one side of the bottom rail. This meant I had pared back too much and left a gap between the mitre at that corner.

## Sanding and Gluing

The last thing to do before gluing up was a good sanding. First I gave each of the rails and the styles a light run of a smoothing plane to remove pencil marks or blemishes on the timber. Once this was done I only needed to give a light sanding. Before gluing up properly I did a dry fit of the frame making sure everything fitted right. Once this was done I got three sash cramps to pull the frame together, positioning them at each joints. I put a solid piece of waste between each cramp and piece of timber to avoid marking the frame. Then I glued and cramped the frame, making sure it was sitting level and that it was square by measuring the corner to corner lengths. I also left a small bit of waste on the end of each tenon to be planed off after the glue had set.

## Conclusion

In conclusion there are a few things I would have done differently if I was to do it again. The order in which I did things would be slightly different. I would have done the rebates earlier. I spent time ripping down the 6mm on the styles that was unnecessary as the rebate would have taken off the waste anyway. Also if I had done them before the mortises I wouldn't have had to worry about break-out on the Spindle Moulder. I would also have spent more time on the mitres as I ended up with gaps because they were rushed. I could also do better managing my time. Apart from these areas I am happy with how the over-all project turned out.