Inside this edition:
Push Block techniques for cutting thin strips as demonstrated by Imants Udris

Also techniques on fixing crowning explained
Cutting Thin Strips

In this issue we meet up with Imants Udris to follow up on a previous technique of using Push Blocks featured in the June 25, 2013 edition of Wood Toy News. Today we will expand on this setup of Push Blocks and what you can achieve with this useful method. An accompanying video will visually help you follow along step by step. The purpose for the video and text is to demonstrate how you can accurately rip strips of wood for the next stage, gluing the strips together to make panels of common thicknesses and widths.

STEP 1

The first important set up is to guarantee that the table saw blade is 90° to the table saw surface. If it’s not, your result will be one edge wider that the other edge, which will be very visible during the glue up stage in making wide panels.

As you can see in the video, and below image, check the blade with an L-Square to assure a 90° angle.

The L-Square must be positioned in between the teeth in order to check for the 90°.

STEP 2

Next step is to move the rip fence into position for ripping 1/4" strips.

Using a tape measure for this step. We will make a series of 1/8" and 1/4" spacer templates from hardboard to set the saw blade for thin strips.

The templates are very accurate and with two of each thickness you can setup widths of 1/8", 1/4", 1/2", 5/8" and 3/4" by 12" lengths very quickly and easily.

Use the 1/4" spacer template as seen in the photo below. The spacer is positioned on the keeper side of the saw blade and sandwiched by the rip fence.

The video demonstrates how to accurately and safely cut 1/4" thick strips from a common piece of 2" x 4" spruce framing lumber, using a Saddle Push Block. The finished strips will be 1/4" x 1-1/2".

To view the Video in our How-To section on our website copy link & paste in browser: http://www.toymakingplans.com/website/how-to/toymaker-imants-udris-safely-saw-thin-wood-strips.html.

Note: After using the spacer templates for a while you will get a feel for how much pressure is required and a feel for your equipment in order to achieve the thickness you want.

Most of the time close is enough, 1/64 or 1/32 plus or minus is quite acceptable.
If 100% accuracy is required, do a test cut, measure your results and adjust the rip fence accordingly.

**STEP 3**

Using framing lumber is low cost but it is not made to the same standards of finished lumber. You will experience cupping, crowning and warping/twisting even on short lengths.

Do not attempt to rip a board that is warped or twisted, you will never achieve acceptable results.

Finished lumber is planed smooth on all four sides, so cupping and crowning is greatly reduced.

The first thing I checked for with the board I used was crowning and found the center of the board to be higher that the left and right edges.

You do not want to feed a piece of wood into the saw blade with the crown side down. The crown side should always be on the top. By doing this you reduce the risk of tilting or rocking the wood causing a pinch point which will bind the wood.

The board below is marked to show you the crown in the wood and which side should be facing down. The long edge of the board edge is also checked for crowning. I found the board to be straight and marked the straight edge with an arrow for reference.

**STEP 4**

Here a dedicated Saddle Push Block is used (see photo Page 4). This push block was made specifically to push 1-1/2" thick wood. It straddles the rip fence and is made with a couple pieces of wood and a wood spacer. The size of the spacer matches the width of your rip fence. One side of the block is the height of the wood your pushing through, in this case 1-1/2" or has a series of notches to “catch” the end of the workpiece.

Take your time; do not force the wood through the blade. Let the blade do all the work. One of the key features of using this type of push block is that your hand is nowhere near the saw blade. You are not in danger to any of the exposed teeth as you feed the wood through. You are perfectly safe. You are able to apply a downward pressure and a sideways pressure safely.

Another advantage of using a push block is that you can make the cut without stopping. Stopping during a cut creates burn marks and score marks.

The first strip is usually scrap, it's the rounded edge of the framing lumber. You can see that repeatable cuts are made with very little effort. After making a few cuts you will reach a point where it is unsafe to use your hand in applying the sideways pressure.

Now is the time to use another type of commercially available push stick. Notice the heel on this push stick below; this will assist you in pushing the wood through the saw blade. *NOTE: This is demonstrated in the video at about the 05:00 mark.* You could make your own push stick for this use, but make sure it has heel similar to the one shown below.

To view the Video in our How-To section on our website copy this link & paste in your browser:
By using another push stick we were able to rip an additional two strips.

You will reach a point where the remaining piece of wood you are ripping is thinner than the depth of the heel of the push stick. This is the time for you to stop. You do not want to damage the push stick by cutting into the heel.

The Saddle Push Block used below would be positioned on top of the workpiece when used and has a heel to push the workpiece safely through the blade.

The steps described here are the same as previously.

- Check blade angle.
- No tape measure is required.
- This time the 1/4" Spacer Template was replaced with a 1/8" Spacer Template.

The piece of framing lumber used in this section of the video did have crowning on the one edge.

Do not use this edge against the rip fence. Turn the piece in the opposite direction. The board also had crowning on the top of the wood block. The crowning face should be facing up. Again the dedicated 1-1/2" Saddle Push Block is being used.

The need for an additional push stick was required when the stock wood reached a certain width that would be unsafe to feed through the saw blade using your hand.

The keeper piece did not pass through the saw blade completely. This was caused by the heel of the Saddle Push Block breaking off leaving you with no forward pressure being applied to the keeper piece.

WARNING: You have just created a potential for a projectile to come shooting back at you. This is also referred to as Kick-Back.

HERE IS WHAT TO DO:
- Do Not Panic.
- If you cannot push your keeper piece all the way through the saw blade safely, make sure you are standing out of the line of fire from the possible projectile’s path.
- Continue to apply firm pressure on the keeper piece and do not let it move.
- Turn the saw off.
- After the saw blade stops rotating remove the possible projectile threat.
- Fix the problem. You may only be required to reverse the Heel and continue cutting.

Looks pretty good. If you look really close at the dial caliper you will see that it is a tiny bit larger than 1/4". This is more than acceptable.

That’s how you can cut 1/4" x 1-1/2" strips of spruce framing lumber using a Saddle Push Block.
It is not uncommon for the heel to be broken off, especially when ripping 1/8" stock. Expect this to happen and be prepared for it to occur. The video shows you the back of the Saddle Push Block with the missing heel.

The process of ripping additional 1/8" strips was halted and can only be continued once the heel is repaired or replaced.

We can use this heel another two times by just flipping it over and then using the flipped over side and rotating it. One heel, four repairs.

One additional strip off of the original block of framing lumber before the stock wood became too narrow to rip another strip.

Again, the width of the stock wood was too narrow for the depth of the heel of the push stick.

A dedicated Saddle Push Block for cutting only 1/8" strips and another for cutting only 1/4" strips was made.

The Push Blocks are easy to make and take very little time to construct, all from scrap wood.

**HOW TO ACCURATELY AND SAFELY CUT 1/4" THICK STRIPS BY 3/4" WIDE FROM COMMON PINE STOCK BOARDS**

Start with a piece of 3/4" thick, 10" wide and about 11" long pine board stock.

The resulting strips will be 1/4" x 3/4" x 11".

Setup again repeats the first setup breakdown described in this article.
- No tape measure required.
- Use of a 1/4" Spacer Template.

Check the board for crowning and flip the board over so that the crown side is facing up.

Lower the blade to a safe height.

You will notice that this Push Block (see photo Page 6) has a hole drilled through it. It serves no purpose at all ... remember, the Push Block was made from scrap from the wood bin.
You can easily, quickly and safely rip 1/4" strips to be either used as is or for gluing up to make some wide board panels.

**HOW TO RIP A PIECE OF 3/4" X 1-1/2" STOCK WOOD INTO 1/4" X 1-1/2" STRIPS USING A SADDLE PUSH BLOCK AND A HOT MELT GLUE GUN.**

You do not have to buy finished lumber with these dimensions. You can make your own from the wide plank.

The Saddle Push Block is not limited to a specific height. It could be made to any height you like. Make it to rip 2" high stock wood if you wish. However, when ripping 2" high stock the saw blade is raised higher reducing the amount of safe distance between your hand and the saw blade. You can increase the safe distance between your hand and the blade by making the top of the Push Block thicker and the sides higher.

I'm always thinking of safety first and have used the push block technique hundreds of times with the same high quality results. I'm also not fond of using narrow push sticks even to rip narrow strips. Following is my way to use wider push sticks to rip narrow strips allowing you more control.

The blade has already been checked to ensure the 90° angle to the table saw table has not changed.

Again, no tape measure is required. A 1/4" Spacer Template was used to set the rip fence.

We are going to rip this piece of 3/4" wood down the length of the wood as indicated by my hand movement in the video, without using a narrow Push Stick.

Using a piece of 2x4 and Hot Melt Glue Gun, the 2x4 is glued to the wood that I plan on ripping (see photo Page 7). This widens the piece of wood I wish to rip, providing less opportunity for the wood to tilt away from the rip fence, reducing an unsafe condition and providing more control.

To view the Video in our How-To section on our website copy this link & paste in your browser: http://www.toymakingplans.com/website/how-to/toymaker-imants-udris-safely-saw-thin-wood-strips.html.
I will be using the Saddle Push Block and have checked the condition of the heel. This one is good to go.

In the video you can see the control I have demonstrated and the ability to rip two 1/4" pieces from the 3/4" stock wood.

The piece of 2x4 did have a little remaining piece of hot melt glue on it which can be easily removed with chisel or utility knife allowing you to re-use this piece again and again.

Now that a stock pile of various strips have been prepared to the different thicknesses required, you can get to work using these strips.

Some toy plans require a wide piece of wood and a thickness that sometimes you can’t purchase locally, but this isn’t a problem because you can now create the pieces you need. Let’s say you’re new to toymaking and don’t own a board thickness planer, a band saw or even a jointer … yet.

All you need to have is a scroll saw and a table saw to follow these steps. With these two tools, you can now cut strips accurately and safely, providing the necessary stock required to glue the strips together to make panels to the various widths.

**PREPARE THIN STRIPS FOR GLUING**

Let us start by looking at the four groups of thin strips we just cut.

This is the material we will be preparing for the gluing up of wide boards.

**GROUP 1** – 1/8" x 1-1/2" Strips cut from common 2"x4" Spruce Framing Lumber.

![Let us look at the setup, tools used and the cuts achieved.](image)

![Let us take a look at the results.](image)

Looks good. Another successful rip cut 1/4" x 1-1/2". To view the Video in our How-To section on our website copy this link & paste in your browser: http://www.toymakingplans.com/website/how-to/toymaker-imants-udris-safely-saw-thin-wood-strips.html.
GROUP 2 – 1/4" x 1-1/2" Strips cut from common 2"x4" Spruce Framing Lumber.

GROUP 3 – 1/4" x 3/4" Strips cut from common dressed 1"x10" Pine lumber.

Dressed means that all four sides of the lumber have been cleaned up. No rough cuts.

GROUP 4 – 1/4" x 1-1/2" Strips cut from standard purchased stock of 3/4" x 1-1/2" finished Pine.

Gluing up thin strips of stock lumber to make wide boards requires the same preparations as gluing up large pieces of finished lumber to make wide panels for cabinet/furniture making.

To make wide panels for cabinets/furniture I would’ve used a ‘Jointer’ to make the straight and tight edge for gluing the boards. It would be unwise and unsafe to use a ‘Jointer’ to straighten thin strips by themselves.

Hence an alternate and safe method was required using tools you may already have in your workshop to accomplish the same results.

Each piece of ripped lumber, the thin strips you’ve cut, should be checked to ensure that the edges where the glue will be applied to are straight for a tight joint.

By doing this you eliminate the need for applying a lot of clamping pressure to overcome the ‘Crown’ or ‘Cup’ exhibited by each wood strip.

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HOW TO CHECK FOR ‘CROWNING AND CUPPING’

Most pieces of framing lumber will have a slight bow where the top of the wood is bowed and is referred to as the ‘Crown’.

‘Crowning’ is where the center of the board is higher than the edges. A better example is shown below.

When checked against a known straight edge as shown in the top board we can see that at the center point of each board where they meet there is a visible gap on the left and right edges.

You would not be able to glue these boards together successfully until the crown in lower board has been removed, yielding a straight and tight surface to the surface edge.

Let us look at the term ‘Cupping’. ‘Cupping’ is the opposite of ‘Crowning’. A cupped board is one where the edges are higher than the center of the board which is lower. In the next photo is an example of a ‘Cupped’ board.

When the top board is compared to a known straight edge, bottom board, you can see the cupping in at the middle of the upper board, the gap.

Again, you would not be able to glue these boards together successfully until the cupping in the upper board has been removed, yielding a straight and tight surface to surface edge.

Each thin strip you cut should be checked for ‘Crowing’ and ‘Cupping’ and corrected before beginning the glue up into wide boards.

The best known straight edge to use is a carpenters square as shown below.

Use a carpenters square to check for crowning and cupping.
Once you have identified which edge is ‘crowned’ and which edge is ‘cupped’, mark the ‘cupped’ edge.

It is very important you mark the ‘cupped’ edge. The ‘cupped’ edge will be positioned against the table saw rip fence when the strips will be trimmed to remove the crowned edge first. Then I’ll flip the board to remove the ‘cupped’ edge next.

You cannot straighten a board if the ‘crowned’ edge is placed against the rip fence. The board will rock like the bottom edge of a rocking chair. Yielding and uneven cut.

By placing the ‘cupped’ edge against the rip fence, you will have two constant points of contact on the rip fence, allowing you to remove the ‘crown’.

Once the ‘crown’ edge is removed, you now have a straight edge to put against the rip fence allowing you to trim off the ‘cupped’ edge.

The result is both edges of the strip will be parallel to each other. This guarantees a straight and tight joint between the two edges which will be glued.

**TOOLS NEEDED TO REMOVE ‘CROWNS AND CUPS’ IN A BOARD.**

You can make your own standard simple ‘Push Block’ with some modifications or use a commercially available one like the GRR-Ripper from Microjig.

Let us first discuss the home made ‘Modified Push Block’.

You may ask, “Why does the standard ‘Push Block’ have to be modified?” We need to modify it for basic safety reasons. The strips we are going to trim the ‘Crown’ and ‘Cupping’ off of were made from common 2”x4” Spruce framing lumber which was 1-1/2” wide. The resulting strips are 1/8” and 1/4” thick by 1-1/2”.

The simple ‘Push Block’ is made from the same material, 2”x4” common Spruce framing lumber.

Its footprint, or bottom, is also 1-1/2” wide. What that means is when the ‘Push Block’ is positioned over the strip to be cut, the table saw blade will be on the left outside edge of the ‘Push Block’. Your thumb will be exposed to the saw blade as you push the pieces through the saw blade. *NOTE: This is demonstrated in the video at about the 20:30 mark.*

This is not a very safe working condition. Modifying the ‘Push Block’ was necessary to protect your exposed thumb.

The modification is nothing more than making the simple ‘Push Block’ wider by adding a piece of 3/4” plywood to the left side of the ‘Push Block’ as you push it through the saw blade.

Once again, you will be making a tunnel for the saw blade to pass through as you are trimming the strips. The saw blade will not be exposed while making this cut, which provides full protection for your thumb.

To view the Video in our How-To section on our website copy this link & paste in your browser: [http://www.toymakingplans.com/website/how-to/toymaker-imants-udris-safely-saw-thin-wood-strips.html](http://www.toymakingplans.com/website/how-to/toymaker-imants-udris-safely-saw-thin-wood-strips.html).
The sandpaper was added to give a better grip when placed on top of the strip to be trimmed.

The length of the ‘Modified Push Block’ was also increased to help reduce the chatter or the vibration of the strip as it enters the saw blade.

The procedure for trimming the ‘Crown’ off of the thin strip will be:

1. Position the table saw rip fence so that a very small amount of wood will be trimmed off. All you want to do is to remove the ‘Crown’ in the wood. Lock the rip fence in position.
2. Position the strip to be trimmed, ‘Cupped’ edge facing the table saw rip fence and pushed up to the rip fence.
3. Place the ‘Modified Push Block’ on top of the strip, with the heel behind the rear edge of the strip.
4. By applying a sideways and downward pressure feed the ‘Modified Push Block’ and strip through the saw blade, thus removing the ‘Crown’.
5. Check the strip with a straight edge again to ensure the ‘Crown’ has been completely removed. If the crown is still there make a small adjustment to the rip fence and repeat the cut.
6. Do this for all the 1-1/2” wide strips you will be using to glue up your wide boards.

Once you have removed the ‘Crown’ from all the strips creating a new straight edge, you can now change the position of the rip fence and remove the ‘Cupping’ from all the strips.

The procedure for removing all the ‘Cupped’ edges is the same, but with one exception. You will be placing the new straight edge of the strip against the rip fence and with the ‘Modified Push Block’ you will repeat the cutting process.

Below and in the video I discuss the tools used and why they have been selected. Including the purpose of trimming the strips and removing the ‘Cupping and Crowning’ exhibited by each strip of the 1/8” and 1/4” pieces.

Straight and tight edges are required for the next step being the glue up stage. Do not use the standard ‘Push Block’ because the saw blade is exposed.

As explained above, the ‘Push Block’ is also 1-1/2” wide, same width as the strips. Use the ‘Modified Push Block’ which provided a tunnel for the blade to pass through with no exposed blade.

The video discusses the use of two shop tools, the ‘Modified Push Block’ and the purchased ‘GRR-Ripper’.

To view the Video in our How-To section on our website copy this link & paste in your browser: http://www.toymakingplans.com/website/how-to/toymaker-imants-udris-safely-saw-thin-wood-strips.html.
First thing to do is mark the ‘Cupped’ side of each strip.

The ‘Cupped’ side will be placed against the fence, for reasons explained earlier in this document.

Then using a piece of white chalk mark the ‘Crown’ side of the strip along the edge of the board.

After trimming the strip, if there is any chalk visible that means not enough of the ‘Crown’ was removed.

The rip fence will have to be repositioned closer to the saw blade and the piece will have to be trimmed again.

You do not have to use the chalk on each piece.

Listen to the saw blade as it rips through the length of the strip. You should be able to hear when you are cutting wood and when you are not. If the sound is constant, then the rip cut is good through the entire length of the strip. If you hear a gap while cutting, that means you were not cutting wood and a second pass is required.

The table saw rip fence is repositioned closer to the saw blade and locked in position.

The ‘Crown’ side of the strips is removed, giving us a straight edge.

This straight edge in now positioned against the rip fence and the pieces run through the saw blade to remove the ‘Cupped’ edge.

The strips now have straight edges, and the edges of each strip are parallel to each other. These strips are now ready to be glued up to make a wide board.

Now let’s demonstrate with the ‘GRR-Ripper’ (below) to trim off the ‘Crown’ side of the 1/8” and 1/4” strips. The process of trimming the pieces went a little quicker than using the ‘Modified Push Block’. The rip fence has been repositioned closer to the saw blade.

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The edge that was ‘Crowned’ was removed creating a straight edge. This straight edge is now positioned against the rip fence allowing us to trim the ‘Cupped’ edge.

As you can see the edges are nice and straight and will be perfect for gluing up.

There you have it.

Two methods of preparing the Group 1 Strips which were 1/8” x 1-1/2” and the Group 2 Strips which were 1/4” x 1-1/2” by removing the ‘Crown’ and ‘Cupped’ edges.

Both groups are ready for the next step which will be the gluing of the strips together to make thin wide boards. **NOTE: For step-by step directions on how to glue the strips to make wide boards be sure to download the September 17, 2013 Wood Toy News article, and view the companion video by copying and pasting this link in your browser: http://www.toymakingplans.com/website/how-to/toymaker-imants-udris-jig-for-making-wide-boards.html.**

Now you may ask, “What about Group 3 and Group 4?”

Group 3 Strips were 1/4” x 3/4” made from a piece of finished or dressed 1”x10” Pine board.

The piece of finished lumber used did not show any signs of ‘Crowning, Cupping or Warping’. It was flat and straight, so trimming wasn’t necessary.

Group 4 was also a piece of purchased finished Pine 3/4” x 1-1/2” which was ripped into 1/4” x 1/1/2” strips using a ‘Push Block’ and Hot Melt Glue Gun.

It also did not exhibit any ‘Crowning, Cupping or Warping. Again no trimming was necessary.

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