

DIY NETWORK

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TORSION BOX -- CREATING A DEAD-LEVEL SURFACE

From "[Wood Works](#)"

episode WWK-409 -- [More Projects](#) »

In this episode of *DIY Wood Works*, host David Marks does *not* create a piece of fine furniture. Instead, he builds a key ingredient to making fine furniture: a woodworker's assembly table, also known as a **torsion box**. A torsion box (**figure A**) is a fixed, dead-flat, level work surface that's ideal for developing designs, laying out projects, dry-fits, glue-ups, clamping and other elements of furniture assembly. When making fine furniture, it's vital to have a perfectly flat reference. This assembly table provides just that -- a consistent, flat plane that aids in the building and glue-up of woodworking projects.

The inner core is a grid that's built with pieces of MDF that's cut and stapled together. The outer skin is half-inch thick MDF and the entire top is framed in mahogany. The three-sided base is simply constructed from banded plywood and reinforced with corner bracing. Tables built in the torsion box style are known to carry great weight and are resistant to twisting and bending.

MDF was selected over kiln-dried hardwood, softwood or plywood since MDF has a uniform density and is very stable. Whether you use MDF or another material, the important thing is to build the entire grid from only *one* material to ensure consistency and structural integrity. Do *not* combine materials.

Materials:

1/2" MDF
 3/4" MDF
 Table saw or chop saw
 Jointer
 Power planer
 Sawhorses
 Wood shims
 Yellow woodworker's glue
 Carpenter's level
 Carpenter's pencil
 Safety glasses or goggles

Note: Cut sizes may vary. For exact measurements, please contact David Marks through his Web site -- information below under Resources.

Safety Alert: *Always* wear safety goggles or safety glasses when working with wood, power-tools, saws, drills, routers, etc.

Torsion Box: Creating a Level Surface

Steps:

- The assembly table is made from an enclosed grid of MDF board, and is "skinned" on the top and bottom with sheets of 1/2-inch MDF. To dress up the functional



The torsion box provides a flat, dead-level surface for assembling and gluing up woodworking projects and is one of the most important tools a furniture maker can have.



Figure A



Figure B



Figure C

table, the work surface is framed with mahogany. The internal core of the table is made of 1/2"-thick MDF cut into long dividers and short cross-supports (**figure B**). The frame of the grid is made from 3/4" MDF. Once the grid is assembled, it will support a great deal of weight, and will not flex once the skin is on.

- The initial challenge of creating the torsion box is to have a flat surface to reference -- in order to make the flat surface of the torsion box itself. Begin with two sawhorses on an area of floor that's as flat as possible. Level the sawhorses using a long carpenter's level and some wood shims (**figure C**).
- At the chop-saw, cut four 2x4s to equal length: 5 feet.
- Use a jointer to joint one side of each of the 2x4s perfectly flat (**figure D**).
- Use the power planer to flatten the opposing side of each 2x4 (**figure E**) so that the faces are perfectly parallel, and the width of all boards is exactly the same.
- Lay the milled 2x4s across the sawhorses, spacing them evenly and confirming the level on each board (**figure F**).
- To complete the building surface, slide a layer of 1/2" MDF onto the 2x4s, then set a second layer of MDF on top of it (**figure G**). The two layers of MDF add weight, and stabilize the work table.
- The steps thus far provide a work surface that is ostensibly flat and level. To be absolutely certain of a dead-flat surface, a traditional technique is used by employing **winding sticks**.
- Our two winding sticks were made from mahogany and walnut. Contrasting woods were used to make them more easy to differentiate in this visual check. It is essential that the winding sticks be jointed and planed so that they are truly flat and parallel.
- Set the winding sticks on each end of the work surface, making certain that they are parallel to each other (**figure H**).
- Once they are in position, sight down the edge of the winding sticks. If the plane of the two sticks are uneven with each other, the difference will be visible because of the contrasting color of the woods (**figure I**).
- Add shims to the feet of the sawhorse (**figure J**) to level the surface, using a carpenter's level to confirm alignment.
- Work back and forth in both directions until the two winding sticks are dead-even with each other (**figure K**).
- This is a slow, deliberate process. Don't rush. The end result is a flat, level surface.

In the segment that follows, work begins on the grid of the torsion box.

Sponsored Resource

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RESOURCES :



Figure D



Figure E



Figure F



Figure G



Figure H



Figure I

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David Marks Website

David Marks, DIY's *Wood Works* host, is a master woodworker. For more information on cut sizes and project details, please contact him via his Website at www.djmarks.com

▶ ALSO IN THIS EPISODE:

- [Torsion Box -- Creating a Dead-Level Surface](#)
- [Torsion Box -- Support Grid](#)
- [Torsion Box -- Attaching the Top and Bottom Skin](#)
- [Torsion Box -- Finishing Touches](#)



Figure J



Figure K