

A Tornado in a Box Display

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The Tornado in a box was constructed to be a visual aid for, WFO Wichita KS, public weather training programs. The construction, shown below, is only an overview of the project. A good carpenter or handyman could incorporate different ideas to achieve the same results. The different parts and materials used to make this project came from discount stores and home improvement outlets. The dry ice used in this display came from a large grocery store chain but other sources can be found. Our over all cost of material and equipment was \$135.00.

Criteria for the Tornado in a Box:

1. The display had to be portable.
2. Strength had to be built into the display for rough handling.
3. The display had to be small enough to fit in a car or station wagon.
4. The display had to be user friendly.
5. Keep safety in mind, as a lot of people will be standing close by.

Construction of the Box: [\(Fig. 1\)](#)

Lumber used on this project:

1. 8 ft 1x1 dried straight pine boards that were cut to size.
2. 2x2" pine boards cut to size
3. 1/2 inch plywood.

Screws that were used were, low profile wafer head Phillip drive screws #8 x1 1/4".

The reason to use screws instead of nails was that they hold better and make it easier to take apart or to repair a section.

1. Outside measurements for the top and bottom sections are 22 x 22 inches. ([Fig. 2](#))

Corners were strengthened by using metal corner connectors. ([Fig. 3](#))

2. The box over all height is 38 1/2 inches. ([Fig. 1](#))

3. There are four 3/4 inch wide x 36 inch long air inlets. (See Illustrations)

4. Use some type of metal straps or connector to connect the eight 1x1 posts to the top and bottom sections. ([Fig. 6](#))

5. Visual or inside window size is 16 1/2 x 35 1/2 inches. Clear Acrylic

safety glazing sheets were used as glass. The sheets were 1/16 inch thick

and cut to 17 inches x 36 inches. Used a table saw to cut a 3/8 inch deep

by 1/16 wide channel the length of the 1x1 window frame. Using the above

cut, the windows should fit a little loose to account for expanding and

contracting. Assemble the windows as you assemble the frame.

6. Create a sliding door for your display by cutting an open slot on the top

of one of the windows. To slide the window up and down a handle can be added

to the bottom part of the window. ([Figs 2](#) and [7](#) view of top window slot)

Frame:

The frame was constructed from the 1x1 inch lumber. See pictures for details.

Floor Section: The floor section sealed the bottom and provided a platform

for the dry ice pan. ([Fig. 5](#)) Outside dimensions are 22x22 inches. To attain

that, cut two 2x2x18 inch boards, and a piece of 1/2 inch plywood 18 1/4

x 18 1/4 inches. Cut a hole in the center of your 18 1/4 x 18 1/4 inch plywood piece, the size of your dry ice pan. Attach the two 2x2x18 inch boards to the bottom of the plywood where they are parallel to one another and do not obstruct the hole. The floor section was then attached to the bottom of the main frame with 1 1/4 inch screws. It is a good idea to place some kind of hardware to protect furniture on the bottom.

Top Section:

The top section holds the portable fluorescent light and portable camping fan. ([Fig. 4](#)) The top section should not be attached to the main frame but remain a separate piece. This allows one to move the top off center, causing the vortex to rope and weaken.

To assemble, cut a piece of 1/2 inch plywood 20 x 24 inches. Cut a 6 1/2 inch hole in the center for the portable camping fan. Cut an opening behind the fan hole a little smaller than your widest part of your portable fluorescent light. This will allow the light to extend down into the display but not fall through. The fluorescent light illuminates the vortex. Painting the display white helped reflect the light.

Equipment and Supplies: ([Fig. 9](#))

1. Portable fan for camping, Camping Fan, sold by Wal-Mart. Runs on 6 D batteries. Note: Fan has a high and low speed, this helps change the vortex shape.
2. Fluorescent lantern, runs on 6 C batteries. Illuminates the vortex.
3. Tin foil pans 5 3/4 in. x 3 1/4 x 2 inch. Called baby loaf pans found in grocery stores.
4. Tongs to pickup and handle dry ice.
5. Hammer to break dry ice.
6. Two gallon Cooler to store and carry the dry ice.

7. Two quart thermos container and a cup to carry hot water.

*Note: Use hot tap water, hotter the better, to pour on dry ice for the smoke effect.

8. A 17 inch or so tool bag to carry the above equipment in.

*A note to remember in creating a good vortex, it's not how fast the air is moving through the display but how the inflow, outflow and dry ice induced smoke is balanced to each other.

An example of what the tornado will look like: [\(Fig. 10\)](#)

7/20/99 ICTK1 LFW TOR.BOX

















