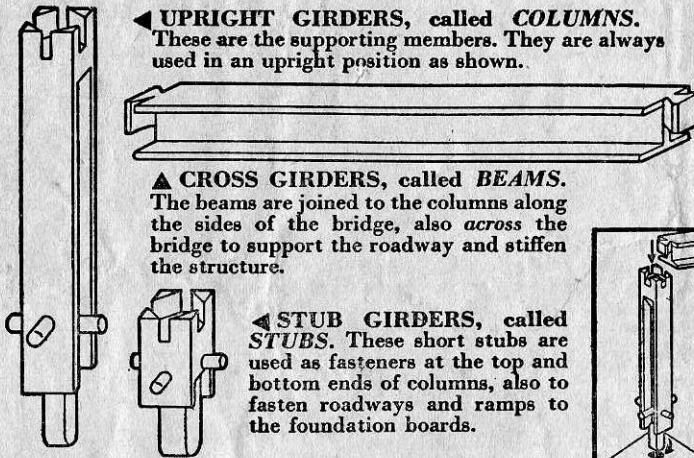


INSTRUCTION SHEET

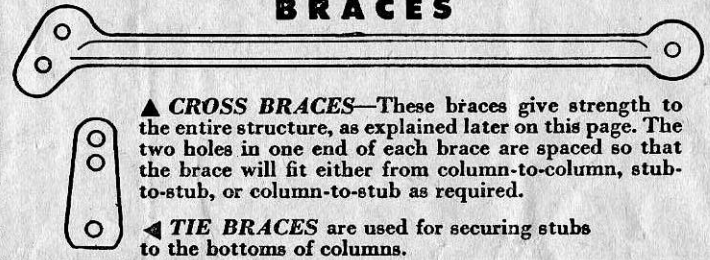
Now you can Design and Build Bridges and Roadways like a Construction Engineer
with CHAD VALLEY BRIDGE AND ROADWAY BUILDING SETS

HERE ARE ALL THE PARTS AND HOW THEY ARE USED

GIRDERS



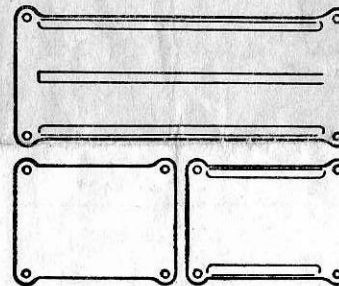
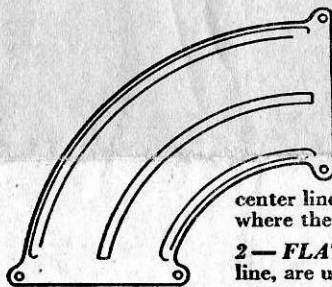
BRACES



FOOTINGS

These Masonite boards serve as bases for bridge piers and ramps. Columns and stubs fit upright into the holes in the footings.

ROADWAYS AND RAMPS

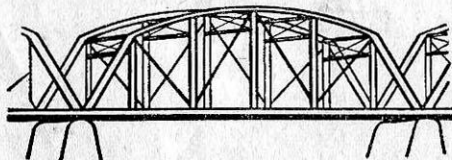


What makes a bridge STAY UP?

Except for suspension bridges, which are hung from cables, all steel bridges are made up of *girders and braces* arranged to form *triangles* like this:

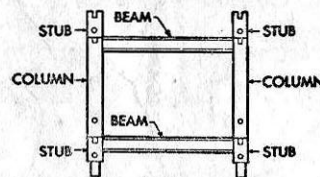


Look at any steel bridge and you will see that, whatever the size or shape of the bridge, the steel members cross and criss-cross to form triangles. These triangles brace the steel girders to make the bridge strong and rigid.

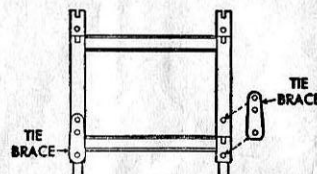


A STEEL TRUSS BRIDGE

To see how this triangular cross bracing is used in building bridges, and to learn how all the different parts fit together, first build a single unit like this:



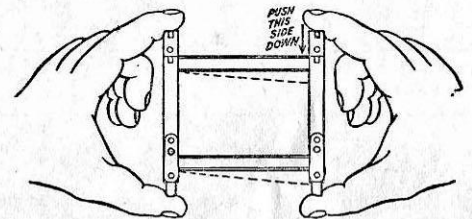
To hold the Stubs securely on the bottoms of the Columns, fasten them with two Tie Braces, like this:



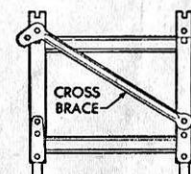
Snap the bottom hole in the Tie Brace over the rivet on the Stub and snap the top hole over the rivet on the Column.

(The middle hole in the Tie Brace is used only to fasten two Stub Girders together.)

Pick up this assembled unit and hold it in your hands like this:



You will see that the unit is wobbly when you push down with your right hand, because it is not cross-braced. The next thing to do is to add a Cross Brace to form triangles, as below:



Snap the hole in the narrow end of the Cross Brace over the rivet on the Column, then swing the Cross Brace until one of the holes in the wide end comes over the rivet on the Stub. Snap it on.

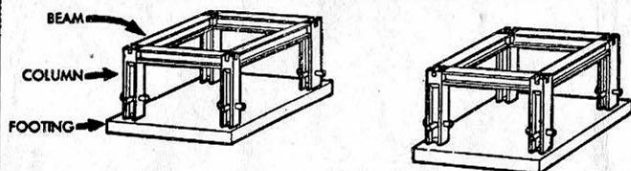
Now hold the unit in your hands as you did above and try to push the right side down. You can see how strong and rigid it is.

YOU ARE NOW READY TO BUILD A BRIDGE—

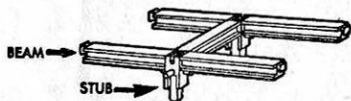
TURN THE PAGE

4 READ OTHER SIDE FIRST

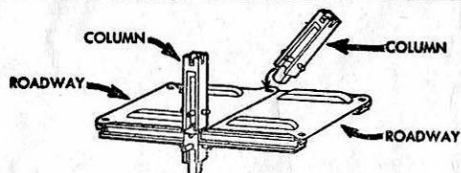
LET'S BUILD A SIMPLE BRIDGE



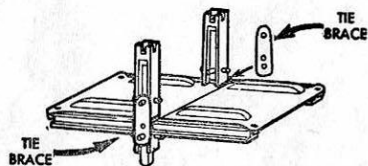
First build the end piers on two Footings. Place a Column in each hole and place Beams across the tops of the Columns to form a square.



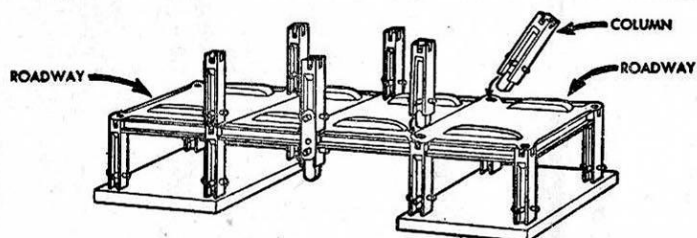
Begin to assemble the center span of the bridge on the floor by putting 5 Beams and 2 Stubs together like this.



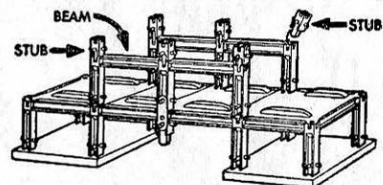
Place 2 short Roadway pieces so two holes on each come over the Stubs. Put on two Columns, pushing the tips of the Columns through the holes.



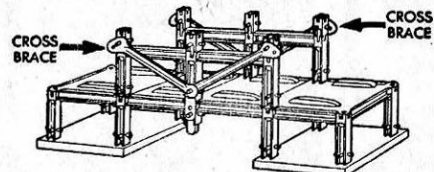
Put on a Tie Brace to fasten the Stub to the Column on each side. This will hold the assembly together so that the span can now be lifted into the piers.



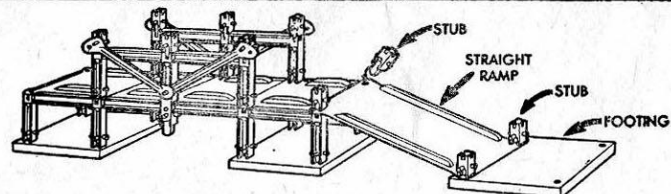
Fit the Beam ends of the span on the Columns of the piers. Now place a short Roadway piece on top of each pier and put on 4 more Columns as shown.



Place 2 Beams on each side to join the tops of the 3 Columns, and insert a Stub into the top of each Column.

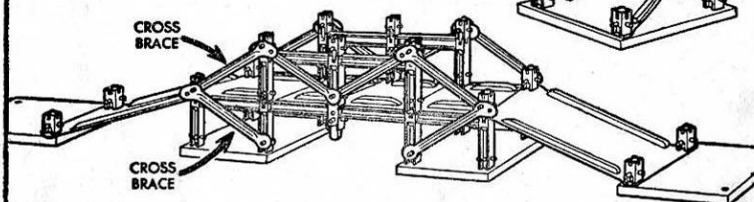
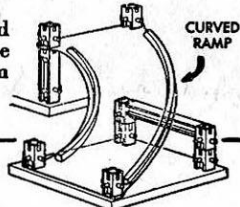


Now we are ready for the Cross Braces that will make the bridge strong. Attach Cross Braces on each side from the center Column to the Stubs on top of the end Columns.



Attach one end of a Straight Ramp to the end of the bridge with Stubs. The other end of the Ramp is fastened to a Footing with two more Stubs.

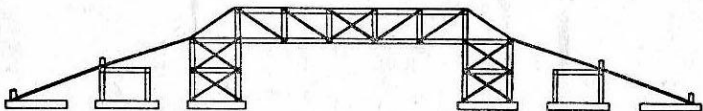
If a Curved Ramp is used, build a support for the Ramp on the Footing with 4 Stubs and a Beam like this . . .



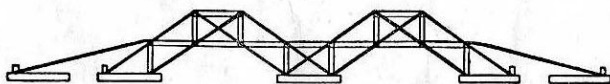
You now further strengthen the entire bridge by installing four additional Cross Braces on each side.

JUST FOLLOW THESE SAME STEPS TO CONSTRUCT MANY DIFFERENT BRIDGES.

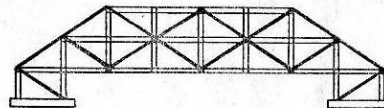
HERE ARE FOUR DIFFERENT BRIDGES BUILT IN THE SAME WAY



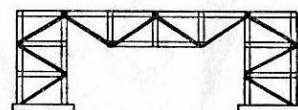
HIGHWAY BRIDGE • This bridge is like the simple bridge above except that it is longer and the piers are higher. Note the extra cross bracing on the piers, as well as on the center section of the span.



DOUBLE SPAN • For long bridges, an additional pier in the middle is often more desirable than building a large, complicated single span. Compare this with the Causeway Bridge on the lid of the box.



RAILROAD BRIDGE • Again, this is the same basic bridge but the sides are 2-columns high and they are joined across the top with beams for additional rigidity.



INVERTED TRUSS • All these bridges are of the type known as "truss" bridges. In this one the truss is upside down, making a level trestle for railroad tracks on top.

The Bridge and Roadway PLANNING BOOK shows many other bridges to build, also various roadway interchanges and cross-overs. Follow the same methods you have learned from this Instruction Sheet.

THE CHAD VALLEY CO. LTD., HARBORNE