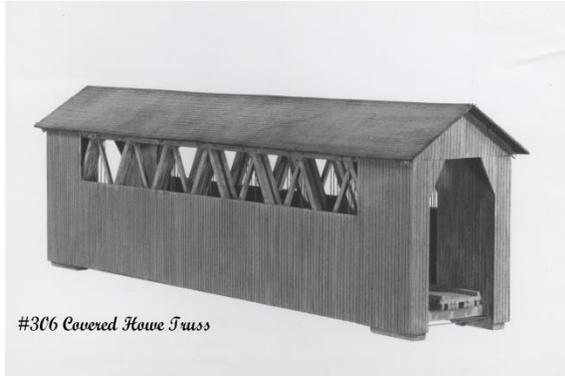


Covered Bridge

Kit #306



#306 Covered Howe Truss

The first patent issued in America for a housed truss bridge was in 1797 although the first span to be actually designed and built as a covered-bridge did not appear until 1804. This was across the Hudson River and was in existence for 105 years.

The majority of these bridges were built in New England and the far west. Over one thousand covered spans were built west of the Rockies.

From the beginning covered bridges were prominent landmarks. Aside from serving as the largest bulletin boards of their times they became a part of the life of the community, serving as a gathering place for many types of functions. Weddings, rallies, christenings and funerals were only a part of the many civic events that were held in the combination of bridge-community meeting hall. They were also well-suited to some less pleasant uses. The vigilantes found these bridges were ideal for their activities. They were used as meeting halls, court rooms and even ready-made gallows for meting out quick justice whether it is right or wrong.

Assembly Instructions

NOTE: In using the Templates in the Instruction Sheet, first check the wood parts against the drawings. Sometimes changes in the humidity or temperature will cause the paper and wood to shrink or swell, making the drawings slightly out of scale. If the wood parts do not exactly fit the drawings, work from the center, splitting the difference.

Step #1. Stain all wood parts before starting assembly, as it is very difficult to stain inner surfaces after the bridge is finished. Also, the stain will not "take" over the glue. Maximum realism is achieved by using a thin, pale gray wash. If you use a darker stain, we recommend toning it down with a second coat of gray stain to obtain the weathered look that the prototypes assumed after several years of exposure to the elements. You may also wish to paint the hardware such as the nut and washer castings and the Bolt Plates at this time. We suggest a "rust" color, if

you have weathered the wood parts. Be sure to use a paint that will not attack the plastic.

Step #2. Note that the Top and Bottom Beam material has been grooved to simulate four pieces of wood that have been bolted together which makes it easier for you to assemble this model. Two pieces are supplied to make each Top Beam, and three to make up the Bottom Beam. Notice that the pieces supplied for the Top Beams, End Posts and End Beams, are thinner than the pieces for the Bottom Beams. Butt glue the Beam segments together, end to end to the length shown in Figure 2, using a straight edge as a guide until the glue sets.

Step #3. Assembly of the Side Trusses is the most important part of the construction of this bridge and accurate marking of the Top and Bottom Beam is the most critical step. First, you must determine and accurately mark the exact center of each of the four Beams. This can be done by locating and marking the mid-point of one Beam, and with a square, transferring the mark to the other three Beams. Beginning at the mid-point, carefully mark off sections each way from the center, spaced exactly 12'6" apart (HO scale). Three are to be marked off on each side of the mid-point of the two Top Beams and four on the Bottom Beams. We recommend the use of a pair of dividers to establish these points. If these spaces are not all equal, the "X" braces will not fit properly and will cause the Main Beams to bow. If the spacing is altered from the 12' 6" specified, you will change the height of the trusses. Once these points have been marked, carefully glue the 32 Angle Blocks in place centering them on your marks. As an added check on this phase of the assembly, we recommend that you clamp the four Beams together, side by side, with all four mid-points in precise alignment, and use a small square and your dividers to insure that each Angle Block is properly positioned.

Step #4. You are now ready to build the first of the two Side Trusses. Fasten the template to a piece of smooth, flat, soft wood and cover the template sheet with waxed paper. Position the Top and Bottom Beams on the template. Secure the Beams in position using common pins. Each "X" is made up of three Beams as shown in Figure 4. These are cut to length for you. We have marked the Side View Template showing where the two Outer Beams are in each of the "X" braces. The Outer Beams are 5/32" square; the Center Beams are 3/32" x 1/8". The Center Beams are to be positioned so that they space the Outer Beams 3/32" apart which will bring them out flush with the outer edges of the Top and Bottom Beams. Glue the "X" braces into position. Glue the grooved End Beams, which are the same length as the "X" braces, in place. Cut the grooved End Posts to length and glue into place between the Top and Bottom Beams. Allow time for the glue to dry thoroughly before removing the truss from the template.

Campbell Scale Models

Step #5. While the first truss is drying, construction of the Stringer-Tie Assembly shown in Figure 1 can be started. Begin by pinning a length of masking or drafting tape, sticky side up, over the drawing. A straight edge or straight piece of scrap wood can be tacked along one edge of the Ties to act as a guide. Press each Tie onto the masking tape with the Tie Template as a spacing guide. When all the Ties are placed glue the grooved Stringers, which have first been butt glued, into place. These are centered on the guide lines shown. When the glue has set, remove this portion of the assembly from the Template, peel away the masking tape, turn the assembly over and glue the scale 8" x 8" guard timbers in position along the tops of the Ties as indicated.

Step #6. By now, the first Side Truss will be dry. Remove the pins and carefully lift it from the Template. Put it to one side and assemble another Side Truss identical to the first. When the second Side Truss is dry, remove it from the Template and glue the Filler Blocks to both inside and outside of the Top and Bottom Beams of both Trusses, as shown in the drawing.

Step #7. Using a #74 drill, make a hole through the Top and Bottom Beams, exactly in the center of the Angle Blocks and in line with the grooves in the Beams. Holes are also drilled through the center of each of the Filler Blocks in line with the holes in the Angle Blocks. A drill press is recommended for this operation, but the holes can be drilled by hand with a pin vise. In either case, feed the drill slowly to avoid having the drill drift off on a slant, since this would cause misalignment of the Truss Rods.

Step #8. You are now ready to connect the two Trusses together using the Floor Beams. Two bundles of 25 Floor Beams, 1/8" x 1/4", are provided, pre-cut to proper length. These are to be placed in groups of three, except for a single Floor Beam at each end, which is positioned against the inner side of the End Posts. A space of about 1/64" should be left between each Floor Beam in the groups of three. You may find it desirable to pre-assemble these groups, using small spacers made from scrap wood or cardboard. If so, make sure that they are glued together squarely. Care should also be taken when gluing the Floor Beams into place that the Side Trusses are held truly vertical.

Step #9. Glue the 3/32" x 1/8" Headers into place, 3/64" from each end of the Top Beams. This allows space so that the end Roof Trusses can be glued later, flush with the ends of the Top Beams.

Step #10. Drill holes with a #74 drill for the lateral Tie Rods at the positions indicated by the small crosses on the Top and Bottom Beams, see Figure 2. These holes should be enlarged from the outside to a depth of 3/32", using a #55 drill. This allows for the plastic washer and nut castings to be glued into place. Cut the plastic bolts about 1/16" from the washer. Glue the washer and nut castings in on one side of the bridge. (Note: since the nut and bolt castings on the Bottom Beam are hidden on the finished bridge by the sheathing, these may be omitted if you choose). Cut sixteen Tie Rods to a length of 2-3/4" from the steel wire supplied and install them. Glue the washer

and nuts onto the other side of the bridge. (If you omitted the nuts and washers from the Bottom Beams, just a touch of glue in the enlarged holes will hold the Tie Rods in place until the sheathing is installed).

Step #11. The Top and Bottom "X" Braces should now be angle cut and fitted between the Tie Rods as shown in Figure 3. Notch each "X" Brace as in Figure 5 and install individually to insure proper alignment. (Note: there is one section on both the Top and Bottom that require longer "X" Braces). The two top end sections do not require "X" Braces. Bevel the corners of the Filler Blocks as needed.

Step #12. Angle the corners of the four Sills as shown in Figure 2 and glue them into place, flush with the ends of the Bottom Beams.

Step #13. Glue the Bottom Bolt Plates into position over the Truss Rod holes drilled in Step #7. Install the 46 Truss Rods and glue the Top Bolt Plates into place.

Step #14. With a #74 drill, make holes in the Tension Plates for the Tension Bolts as shown in Figure 2. Glue the Tension Plates into place in pairs on the inside, over the joints of the Bottom Beams. We have drawn them on the outside so that you see their proper placing, but they must be installed on the inside of the Beams or they will interfere with the sheathing when it is applied. Cut off eight sets of nuts and washers flush with the back of the washers. Glue one set over the hole on the outside of each pair of Tension Plates. Then insert a piece of the left over wire through the holes in both halves of each pair as far as possible and cut off flush with the outside edge of the Tension Plate that has no nut and washer. Glue another nut and washer casting into place over the cut end of the wire which will complete the Tension Plate assemblies.

Step #15. Make 9 Roof Trusses from the 3/64" x 1/8" x 3-1/2" material furnished using Figure 9 as a template. Glue the Roof Trusses into position beside the Bolt Plates as shown in Figure 2, making sure that each Truss is vertical and the Trusses at the ends are flush with the ends of the Top Beams.

Step #16. 1/8" x 1/8" material is provided for the Ridge Pole pieces. These must be carefully cut and fitted between the Roof Trusses. We suggest that the material be laid along the Top Beam and marked to the length needed, in order to keep the rafters square.

Step #17. Using the nine pieces of 1/16" x 3/32" x 7-9/32" glue a Filler Strip the full length of the bridge, even with the top edge of the Bottom Beams and flush with the ends. Hold a piece of the short Gang Planking so the bottom is even with the lower edge of the Bottom Beam and mark the position along the "X" bracing for another Filler Strip. This strip should also extend the full length of the bridge. Cut four 1-3/4" lengths of the same material, and glue into place along the sides of the Top Beams flush with the ends.

Step #18. Sort the 1-3/4" wide Gang Planking for length. Three lengths are supplied to serve as the protective sheathing for the bridge. Select the four middle length pieces and glue them into place on the inside of the Trusses

Campbell Scale Models

at each end as shown in Figure 3. The edges should be flush with the outside edge of the End Posts and with the bottom edge resting against the Floor Beams.

Step #19. The six pieces of narrow Gang Planking are used for sheathing on the ends of the bridge. Hold a piece of this wood flush with the outer edges of the Filler Strips which were glued to the "X" Braces and the Top and Bottom Braces. The bottom edge of the Sheathing material should be even with the bottom of the Side Truss and not the bottom of the Sill, see Figure 7. Mark and cut the top edge to match the angle of the Roof Truss and glue into place. The remainder of sheathing for the gable will be filled in later.

Step #20. Now is the time to paint the "hardware" such as the Bolt Plates, Tension Plates, nut and washer castings and the Tie Rods if you did not do so before. If you have weathered the wood parts we suggest you use a "rust" color on these parts.

Step #21. Glue the long pieces of Gang Planking into place at each end on the outside of the Trusses, flush with the face of the end sheathing.

Step #22. The short lengths of 1-3/4" wide Gang Planking are now glued into place, starting at each side of the pieces just glued in and working toward the center. The final piece must be trimmed to fit.

Step #23. To complete the sheathing of the gable ends, cut four pieces from the narrow Gang Planking. These pieces are to be cut at an angle at both ends. The top edge is cut to match the angle of the Roof Truss, the bottom edge can be cut using Figure 7 as a template. You should now have one short piece of 1-3/4" wide Gang Planking left. Cut and trim the two pieces required to finish the gable ends from it, using Figure 6 as a guide.

Step #24. Trim the Roof Cards to correct length, taking care to cut them square. Splice two of the cards together, keeping the shingle guide lines in correct alignment. (*Note: if you cover the underside of the Roof Card completely with Kraft tape, it helps to keep the Card from warping when the shingles are applied*). Two of these double Roof Cards are required. When the Kraft backing is thoroughly dry, trim the tops and bottoms to size.

Step #25. We have supplied you a roll of "Profile Shingles" for completion of the roof. Cut the roll of shingles into strips just slightly longer than the roof. Now, using a small paint brush, moisten the un-notched edge of the gummed shingle strip with water, and then apply the strip to the bottom of the Roof Card with the plain, un-notched edge on the guide line, allowing the first course to overhang the card slightly. Apply a course of shingles on every line. (*Note: by moistening only the un-notched edge, individual shingles can later be bent up slightly here and there to achieve the appearance of a roof whose shingles have weathered and warped. It also helps to burnish the un-notched edge onto the Roof Card using a dull knife blade or the butt end of your tweezers. This will raise the cut edge slightly*). When you reach the last row at the top of the roof card, moisten the shingles themselves and apply the strip allowing the un-notched edge to extend above the card. When all the shingles have been applied, allow the Roof Cards to dry thoroughly under pressure to eliminate warping. When dry, trim the ends allowing a slight overhang like the first row. The top row must be trimmed flush with the card. Scotch tape the two Roof Cards together at the top and glue the roof to the Roof Trusses. Finish off the peak by gluing the 3/64" square strips of wood into the groove where the Roof Cards join. Stain and weather the shingles to compliment the finish you have applied to the bridge itself.

Step #26. Rail should be laid on the Tie Assembly before it is glued into place on the Floor Beams. If you use spikes, small holes should be drilled in Ties where you plan to spike. Allow several inches of rail to extend beyond the Tie Assembly at each end, to help when installing the bridge on your layout. If you are using the Kadee Spiker, pre-drilling the Ties will not be necessary. Be sure, however, that you have the Tie Assembly on a flat, solid surface before spiking the rails into place. If you lay Guard Rails make certain that the ends of these do not touch, causing a short circuit in the electrical system.

Step #27 Before installing piers or abutments that will carry the load of the bridge we suggest that you first place the bridge in position so that the rails rest upon the roadbed on each side, and spike them down. You may then position the piers or abutments so that they just bear the load, insuring a smooth, trouble-free operation on your bridge.