

## PARTS IDENTIFICATION

[1] 9 each (8 required)
[2] $\circ \circ \leftarrow$ Splice / Joiner 15 each (14 required)
[3] 6 each (4 required)
[4] \%. $) \leftarrow$ Portal splice / gusset 8 each (4 HEX-outside +4 NO-HEX-inside)
[5]

$\leftarrow$ Portal 2 each
[6]

[7]
 $\leftarrow$ Stringer 16 each
[8]

$\leftarrow$ CVT 25' Bridge tie 8 each
[9]

$\leftarrow$ Bottom Lace LH 8 each
[10]

$\leftarrow$ Bottom Lace RH 8 each
[11] $\rightleftharpoons \rightleftharpoons$ Center Diagonals 16 each
[12] $\qquad$

[13] $\qquad$
[14]
 $4 R \leftarrow$ Bottom Lace gusset 4 left +4 right each
[15] $\square$ Bottom Chord gusset / cover 32 each
[16] $\qquad$ $\leftarrow$ Locating strap 8 each

$\square$ Center Chord Splice / gusset 18 each (8 required)
[18]


Outside / Inside top lace 6 each
[19]

[20]


Outside top cross bearer 2 each

[21]

$\leftarrow$ Deck End Cap 2 each
[22]
$\leftarrow$ Deck End Cap 2 each
[23]


Inside top cross bearer 3 each
[24]
O-G $\leftarrow$ Inside Top Splice / gusset 8 each (4 HEX-outside + 4 NO-HEX-inside)
[25]
Bottom Chord Splice / gusset 33 each (24 required, 17 HEX outside + 12 NO HEX-inside)
[26]

$\leftarrow \underline{\text { Top End / Angle LH gusset } 18 \text { each }}$
[27]

[28]

$\leftarrow \underline{\text { Top Center Splice / gusset } 3 \text { each (2 required) }}$
[29]


Heavy Duty A - B Box sirder set 16 each
[30]


Heavy Duty B - B Box sirder set 16 each
[31]


Heavy Duty C - C Box girder set 16 each


1. A wood block cut true and square to measure $1 " \times 41 / 32^{\prime \prime} \times 2 "(25.4 \mathrm{~mm} \times 102.4 \mathrm{~mm} \times 50.8 \mathrm{~mm})$.
2. A Stanley® finishing punch $5 / 64^{\prime \prime}(1.6 \mathrm{~mm})$ diameter, for securing rail to the tie sections.
3. Four lengths of Code 83, and four lengths of Code 70 rail (Micro Engineering®).
4. A workbench or table that can have a straightedge "C" clamped to it.
5. Model paint and painting tools you are accustomed to working with.
6. Styrene cement or professional grade styrene solvents \& brush.
7. A straight edge measuring a minimum of $24 "(61 \mathrm{~cm})$ in length.
8. A good quality razor saw \& adjustable miter box, if possible.
9. A cyanoacrylate type glue ("super glue").
10. A Modelers knife \& \#11 type blades.
11. Medium - Fine sand paper.
12. Fine steel wool
13. Small files.
14. Tweezers.
15. Scissors.

## DECK ASSEMBLY

1) Cross bearer sets
a) Snap the [2] splice joiners inside the [6] cross bearers, then trap the [2] splice joiners into place with the [16] locating strap. Glue only the Locating strap. Do not glue the splice joiners. Leaving the splice joiners free will allow the floor assembly to be squared. Create seven cross bearer sets all alike.

b) On a flat surface snap and shim the stringers [7] into place and glue them only at their locating holes while pressing downward over the shims to the flat working plane / surface. Leaving the splice joiners free (not glued) inside the cross bearers will allow the floor assembly to be squared. The last section (7th cross bearer) will have stringers [7] going off both to the left and right ends.

Create and chain together a string with eight pairs of stringer segments.


## DECK ASSEMBLY

## 2) Deck end caps

a) Build the deck assembly in a jig, or between two straight edges. Use the lines of the assembly diagram to help square and align the bridge deck to insure everything is square as you glue each.
b) Link up all seven [9] "Cross-Bearers" as shown in the diagram, inserting an intermediate [1] brace in each section between the ribs at the center of the girder sections, then lightly glue each link at the locating snap hole. Do not glue the intermediate [1] braces until page 9.
c) Locate the "Deck End Cap" [22]. Remove any flashing. Arrange shims along areas where the stringers are located. Proceed to glue the deck end cap in place as illustrated below on both ends of the deck.

3) Steel Straps \& Intermediate Brace's
a) Locate the 2 steel strips and proceed to make them as straight as you can with bending and checking flatness on your work surface. (This will help during the final squaring / gluing of the deck assembly.)
b) Modify the steel strips on one end with a grinder or file to round off the corners, and remove any sharp burrs. Slide the steel strip through all the intermediate brace's and make any necessary adjustments needed so they slide freely over the steel strip.
[1] Intermediate brace

c) Thread the steel strips through the end cap then through an intermediate brace then through a cross bearer. Alternate between the intermediate brace and cross bearer until the steel strip has passed through the end cap at the other end of the structure.
(Do not glue the Intermediate Braces into place until page 9)
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## DECK ASSEMBLY

4) Squaring the deck assembly
a) Place the deck assembly in a jig, or between two straight edges. Use the lines of the assembly diagram to help square and align the bridge deck to insure everything is square. Steel weights can help hold the deck in place while gluing the "Bottom Lace"
b) Glue half of [9] \& [10] parts equally centered to the [16] "Locating Strap" in a "W" configuration check and adjust the deck alignment to straight-edge \& vertical lines on diagram as you glue. Check the steel strips and intermediate braces for proper fitment as you move along as well.
c) Once the bottom lace sets are all glued to the locating straps, start back at the center of the deck check for the cross-bearer to be square

[7] Stringer Bottom side facing UP.

d) Glue the second half of [9] \& [10] parts equally centered to the [16] "Locating Strap" in an opposite "W" configuration, check and adjust the deck alignment to straight-edge \& vertical lines on diagram as you glue. Check the steel strips and intermediate braces for proper fitment as you move along as well.
e) Once the second bottom lace sets are all glued to the locating straps, glue each lace to the [7] "Stringer" where each [9], \& [10] "Bottom Lace" members intersect the stringers.

## 5) Bottom Gussets

a) Locate the bottom lace and bottom gusset parts, \#14. Place the Gussets alternating Left \& Right at the intersection of each Bottom Laced " $X$ ".

[14] Bottom Gussets RH \& LH

## DECK ASSEMBLY

## 7) Bridge Shoe Detail

a) Locate and assemble the bridge shoe detail parts [3] Shoe / Mount as shown below.
b) Cement top and bottom parts of mounting pads four sets together and cement assemblies to the bottom of four [7] stringer's at the far ends of the bridge. The four extra shoe mount's can be glued on the B-B girder chord at the far ends of the bridge.


## BRIDGE TIES \& RAIL

## The Stanley ${ }^{\circledR}$ \# $113 / 4$ nail set.

Because of the unique size and cupped point, I have designed the all NEW bend over spikes for the 1900 kit \& 2003 tie section with this handy tool in mind. If you cannot find a nail set like the Stanley ${ }^{R}$ \#11 $3 / 4$, simply use a finishing nail inverted so that the head (which is cupped like the punch) as a tool to press the spike heads over the rail foot.


## 1) Installing Rail

a) On a solid working surface lay out the [8] CVT bridge ties and four full 36 " lengths of code 83 rail. Using a straight edge to help support the loose CVT bridge ties, lay a length of code 83 rail in the b) outside tie plate groove.

Using a finishing nail set, proceed to smear the spikes on to the rail foot.
c) At the center line of 4 full lengths of code 70 rail mark the rail head with a durable paint or dye.
d) Lay a length of code 70 rail in the inside tie plate groove.
e) Using a finishing nail set, proceed to smear the spikes on to the rail foot.
f) Repeat this process $(a-f)$ for each of eight lengths of rail.
g) Note: Place a center mark on the 4 guard rails before installation to help align the ends evenly.


Optional: Paint and weather rail, tie plates, \& ties before moving on to the bridge tie/rail assembly.
I usually paint and weather all my CVT and ME rail in large batches weeks or months before I actually put the rail / CVT to use on my layout. When building bridges many times I would jump to this section of the assembly first because the painted track gives me a preview of what the bridge will look like all weathered.

## BRIDGE TIES \& DECK ASSEMBLY

## 1) Installing ties / rails to the floor

a) On a solid working surface set the floor section down along side a straight edge or two straight edge's trapping the floor to the work surface.
b) Apply spots of glue on the top of the [7] stringer sets, then place the tie / rail assembly centered over the steel strip locking with the tabs on the Cross-Bearer and the end Guard timbers on the ties.

Note: You may want to omit gluing the outermost section of ties to insure ease of alignment to the connecting track-work.


Note: For an accurate / prototypical appearance configure the guard rails outside the bridge extending a scale distance of approximately 25 scale feet $31 / 2^{\prime \prime}(87.6 \mathrm{~mm})$. The actual prototype length for a prototype double track bridge guard rail is 90 feet in length against traffic and 20 feet in length with the traffic.
So like most HO scale model railroads, mine included, is artistically modified to something more moderate. Your actual length becomes very subjective. Below is a simple 1-1 diagram of what I feel looks good enough without taking up too much real-estate on the layout.


## BOX GIRDERS

Box girder assemblies should be assembled so that a small overlapping flange occurs along both sides. A fixture can be fashioned by clamping two parallel straight edges set to the height of a completed girder assembly. Then by arranging two girder halves side - by - side, (flange edges down) hold the girder flat downward and glue along the mating surfaces together.
The ("B-B") \& ("C-C") girder assemblies should be arranged so when viewed through the detailed side, the detail \& rivets should appear to be aligned to look like " $X$ 's".

a) Cement all sixteen [29] type "A" (solid) girder members to sixteen of the [30] type "B" laced girder members. This will create sixteen box girders with the type "A" (solid) surfaces opposite the type "B" (laced) surface. ( [29] "A-B" Box Girders).
b) Cement all remaining [30] type "B" (laced) girder members to each other creating sixteen box girders with the laced detail on two opposite sides ([30] "B-B" Box Girders).
c) Cement all type "C" girder members to each other forming type ( [31] "C-C" Box Girders) with the lacing on opposite sides.


Set all box girders aside to dry.
When dry, polish sides with fine steel wool or a fine wire brush to eliminate any defects caused from cementing.

## BOX GIRDERS

## 2) Box Girder Cutting

a) Using a straightedge and the Truss Diagram use a pencil to mark and match all the [29] A - B and [30] B - B girders at their splice locations as illustrated on the diagram.
b) After verifying the cutting locations proceed to rough cut all 16 of the [30] B - B girders about $1 / 4$ " $1 / 2^{\prime \prime}(6.35 \mathrm{~mm}-12.7 \mathrm{~mm})$ longer than the actual size on the diagram / template.
c) Proceed to finish cut all the [30] B - B girders at their splice locations as illustrated making matched sets as described on the diagram / template.

Now that your all practiced up, attempting to make the most important \& difficult cuts first will pay off (steps "d - e" below). There are 12 out of 16 honest attempts to produce 4 matched [29] A - B girders to complete the portal facing A - B members "longest girders on the bridge". The ones that didn't make the cut will all be cut several more times before they are finished.
d) After verifying the cutting locations proceed to rough cut the remaining 12 [29] A - B girders about $1 / 4^{\prime \prime}-1 / 2^{\prime \prime}(6.35 \mathrm{~mm}-12.7 \mathrm{~mm})$ longer than the actual size on the diagram / template.
e) Proceed to finish cut all the [29] A - B girders at their splice locations making matched sets of four as described on the diagram / template.
f) If necessary, remove a short segment of the flange on the [31] C - C girders so they fit inside the [29] A - B \& [30] B - B girders with a slight amount of friction / drag.
g) Remove all the " $X$ "s required to fit the [31] C-C girders vertically as on the diagram / template. At this point clean and prep all the matched girder sections for paint marking them for ideal location.

3) Box Girder Cutting, B - B \& A - B girder prep
a) Using the [15] bottom chord gusset / covers, remove " $X$ 's" on the ends of the [30] B - B girders, as suggested in step $\mathbf{g}$ above, and apply the [15] bottom chord gusset / covers as close as possible to the Diagram Template.
b) Unless your bridge kit is up above eye level there is no need to cover the $X$ laced areas under the top [29] A - B girders because typically they would never be visible. Use the assembled [31] C - C girder to gauge the proper amount of $X$ lace removal required remembering that the top [29] A - B girders you need room for the [11], [12], and [13] diagonals to fit alongside the vertical [31] C - C girders.

It is important you study and understand the Diagram template for proper truss alignment.
The reason Central Valley only gives you half a truss in the diagram, is to lessen the effect of accumulated errors inherent to building a structure of this nature.
The Diagram template can be used for all the truss squaring operations as long as the straightedge used is lined up straight and parallel with the printed information directly above the arrow markers at each bottom chord splice location. I also added registration markers $(\oplus)$ at each truss span to help align additional straightedge's for holding girders in place while glue is applied and parts are left to cure. These registration markers will also be handy if you are customizing or kit bashing a truss structure of any kind using CVT Bridge ties or Central Valley truss kits.

## TRUSS ASSEMBLY

1) Truss Bottom chord Assembly
a) Using the [25] bottom chord splice / gussets, splice the [30] B - B box girders end to end creating 4 matched lengths as the one on the diagram. Apply these gussets to both sides of the splice line directly in line with the vertical [31] C - C girder center lines.
b) Align the the pairs of B-B girder chords oriented with the detail and rivets to the Truss Diagram mark and match the sides you want to show on the outside.
c) Using the [17] center splice / gussets, splice the ends of each pair matched to the center line of the truss creating 2 matched chords about $281 / 2$ " ( 72.4 cm ) length. Apply gussets to both sides of the splice line with the bolt detail centered with the C-C girder vertical line printed on the diagram.

## 2) Truss Top chord Assembly

On my first kit I had to trim these slightly. Depending on the quality of your construction here, dictates weather or not you will have to trim the [23], and [20] top cross bearers slightly to make them fit flush / in-line to the A - B girder chord assembly.
a) Using the [4] Portal splice / gussets, splice the Portal Facing A - B box girders with the matched angles to the diagram creating 4 matched "Portal Facing" sets exactly as shown on the diagram / template. Apply gussets to both sides of the angled splice line in a manner where the bolt detail lines up with the vertical [31] C - C center line. If you're not in a hurry make a jig for this.
b) Using the [21], and [24] splice / gussets, position the "Portal facing" section from step "a" above to the the finished cut $A$ - $B$ angle sections cut on page 11, and splice all the angles matched to the vertical C-C centerlines on the diagram / template creating 4 matched A-B chords spliced up to the center line of the structure. Apply these gussets to both sides of the joint aligned with the vertical girder center lines and let cure.
c) Using the [17] Center splice / gussets, position 2 of the 4 matched A - B girder chords with the top surface against the straight edge. Apply [17] Center splice / gussets on both sides aligned to any of the C-C verticals creating one complete half of the upper A - B chord assembly. Repeat this step with the remaining 2 matched chords.
d) Test fit 7 of 14 C - C Box girders down inside the bottom B - B Box girder chord assembly, making sure each is straight and square to the center lines on the diagram / template. Trial fit the top $A-B$ Box girder chord over the test assembled bottom chord and C-C Box girders then glue each C - C girder to the B-B chord. Use a square and magnets, pins, or tape to hold the C-C members true when gluing the pre-fitted C-C members.
e) Only glue the C - C Box girders inside the A - B chord when both truss sides line up and match as close as possible to the diagram / template (nothing is perfect) checking all-the-while the alignment and squareness to the diagram / template.
Make sure everything lines up as close to the diagram template possible here.


## TRUSS ASSEMBLY

3) Truss Assembly Top Cross Bearer (Swey Brace)
a) Temporarily set the two truss assemblies up to the deck assembly on a work surface. Carefully secure / clamp the truss assemblies to the deck assembly with the [6] cross bearer (swey brace) interlocked to the [31] C-C girders.
b) Start at the center of the structure, glue [23] Inside top cross bearer (swey brace), and [20] Outside top cross bearer (swey brace) sections to the [31] C - C girders. Center the vertical edge of the top cross bearer (swey brace) in centered in the [31] C - C girder.

c) Repeat installing [20] (center), and [23] (outer) top cross bearer (swey brace).
d) Shave / scrape away interfering rivet detail on the end "Portal Facing" [29] A - B girder upright. Install the [5] Portal section on each end using the locating rib on the back-side as glue points.

The Portals have locating ribs and glue tabs on the back-side.


## TRUSS ASSEMBLY

4) Truss Assembly Top Gussets
a) Working from the outside / portal toward the center of the truss structure. Install / glue the [26], [27], and [28] top end and center gussets as illustrated, by shaving / scraping away interfering rivet detail on the remaining top arched [29] A - B girder assembly.

[26] Top End / Angle LH gusset

[27] Top End /Angle RH gusset

[28] Top Center gusset


The two top lace sets at the center of the structure, are shorter than the four outer sets. For this reason, all the top laced sections are made too long, allowing adjustment to the high amount of accumulated dimensional variations in cutting, and modeler skill level with a kit of this nature.

Imagine you've actually fabricated this bridge rather than simply put a kit together.
a) Test fit [19] inside [18] and adjust the opening of [18] by scraping / shaving the inside surface(s) with a sharp modeling knife until the two slip together with no visible distortion.


## TRUSS ASSEMBLY

b) Working from the center of the structure install [18] outer top cross lace sections as illustrated below. Cut, fit, and glue the flat surface of [18] aligned under the rivet detail on [26], [27], and [28]. The top laced sections on the portal ends will need the least amount of trim - be careful, take small bites

c) Working from the center of the structure install [19] Inside top cross lace sections. Fit, cut, and glue the ends of [19] equally, so they align to the rivet detail on [26], [27], and [28].
Hint: (Install flat to reduce amount of bending and then rotate to an up-right position.)
The brace's that fit inside will require the same amount of trimming as the first group.


## 6) Truss Assembly Diagonal Braces'

Locate and prep the three different length diagonal braces \#'s [11], [12], and [13].
You can chop up the spare bottom strap and several other spare / optional parts to create small spacer sandwiches, and glue them in the mid-sections between these diagonals causing them to be more ridged and reliable in appearance.

## TRUSS ASSEMBLY

6) Truss Assembly Diagonal Braces'
a) Glue all 32 of the diagonal braces together as shown with the pin and hole detail face - to - face.

Remember,
four of the eight [11] center diagonals must be open to allow their twins to pass through.

Use a tool to press and hold the two mating surfaces parallel to each other.

b) In the two center spans of the bridge, insert the long [11] Center Diagonal assemblies into the cut away " $X$ " segments so that the diagonals run at angles making four " $X$ ' $s$ " at the center of the bridge. If you have installed the [15] Bottom chord gusset / covers properly to the diagram / template, you can rest the diagonals against the edge of the [15] bottom chord gusset covers and glue these diagonals right to the gussets.
If necessary, use a file to modify the length of the diagonal braces until they rest straight with no distortion. Then you can glue one end to hold in place leaving the opposite end loose for temperature changes.


## TRUSS ASSEMBLY

c) Between the two spans of the bridge directly outside the two center sections, insert the [12] Inside Diagonal assemblies into the cut away " $X$ " segments so that the diagonals run at an angle pointing down toward the center of the bridge. If you have installed the [15] Bottom chord gusset / covers properly to the diagram / template, you can rest the diagonals against the edge of the [15] bottom chord gusset covers and glue these diagonals right to the gussets.

d) Between the two spans of the bridge Inside the two portal facing sections, insert the [13] Outside Diagonal assemblies into the cut away " $X$ " segments so that the diagonals run at an angle pointing down toward the center of the bridge. If you have installed the [15] Bottom chord gusset / covers properly to the diagram / template, you can rest the diagonals against the edge of the [15] bottom chord gusset covers and glue these diagonals right to the gussets.


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## FINISHING UP

I designed this kit to have the Floor Assembly serve as a standalone unit which can be installed on your layout and operational during the assembly of the Truss Unit. The Truss Unit is not designed to use like a prototype / real truss and should never be used to support the model trains. Use the Floor Assembly installed and shimmed on your bridge abutments. The Floor Assembly should become a permanent or removable part of your existing road bed. With some clever thinking the floor can be installed as a swing up / out unit on a hinge(s) as well.
To remove and install the Truss Assembly from the Floor Assembly with both hands 11 inches (28 cm ) apart use several fingers reaching over the bottom chord, curl your fingers toward your thumbs pivoting the back of your fingers near your second knuckles against the tie sections as you pull upward, the C -C uprights on the Truss Assembly will slip off the Cross Bearers and Floor Assembly, as the bottom chord on the far side of the Floor Assembly can be pushed away from you slightly enabling the entire Truss Assembly to be lifted away from the Floor Assembly.
In \#6 of the truss assembly "Diagonal Braces"' on page 16 of this book, you may prefer to build your bridge to have the very typically used version of a "Warren Truss" - "A" frame as my bridge builder buddy David in New York, calls them, where there are "K" braces which create "A's" along with \& in place of some of the [11], [12], \& [13] diagonal braces. Furthermore, some C - C's go parallel / straight in the center on many Truss bridges similar to this kit. I recommend you purchase the Central Valley \#1902-5 Steel Box Girder package or the 1905-5 Standard 24" Gusseted pack. In these packages the C-C type girders can be cut and fitted exactly like the photos you have of the bridge you are trying to replicate.
Extra gussets and more new girder styles will become available from Central Valley in the near future. Meanwhile, if you need some gussets like the \# [26], [27], \& [28] to build that "Warren Truss" I will be more than happy to send you a package along with the other parts in that section set for $\$ 8.95$ per shot + a minimal S\&H charge, until I build a few more accessory bridge parts molds as well.

Hopefully you have been prepping and painting your bridge along the way during construction. The bridge can be painted any way you like with any method you are comfortable with. The kit on the box cover, I painted with a custom mix of red $66 \%$ and black $34 \%(2-1)$.
You can use this kit's diagram template to build a single track version with the parts from two 1902, 1905, or 1906 kits. Or you may want to build a single or double track using the \#1901-5 Heavy Duty Windowed girder package as well. Mix and match the parts and kits to endless combinations to construct almost any bridge your heart desires! Keep a look out on our Face Book page for additional information, new parts, and CVT as I build lots of new tooling. We are located on the interweb / Internet @ www.facebook.com/Central.Valley.Model.Works.
Thank you for reading through this Instruction book and I hope you will enjoy the pride and satisfaction of building this work of art as your friends and fellow Model Railroaders DROOL at this beautiful structure from the past. It was with pride our fore fathers created these structures and entire city's across the world.


