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#143 JUNE 2022

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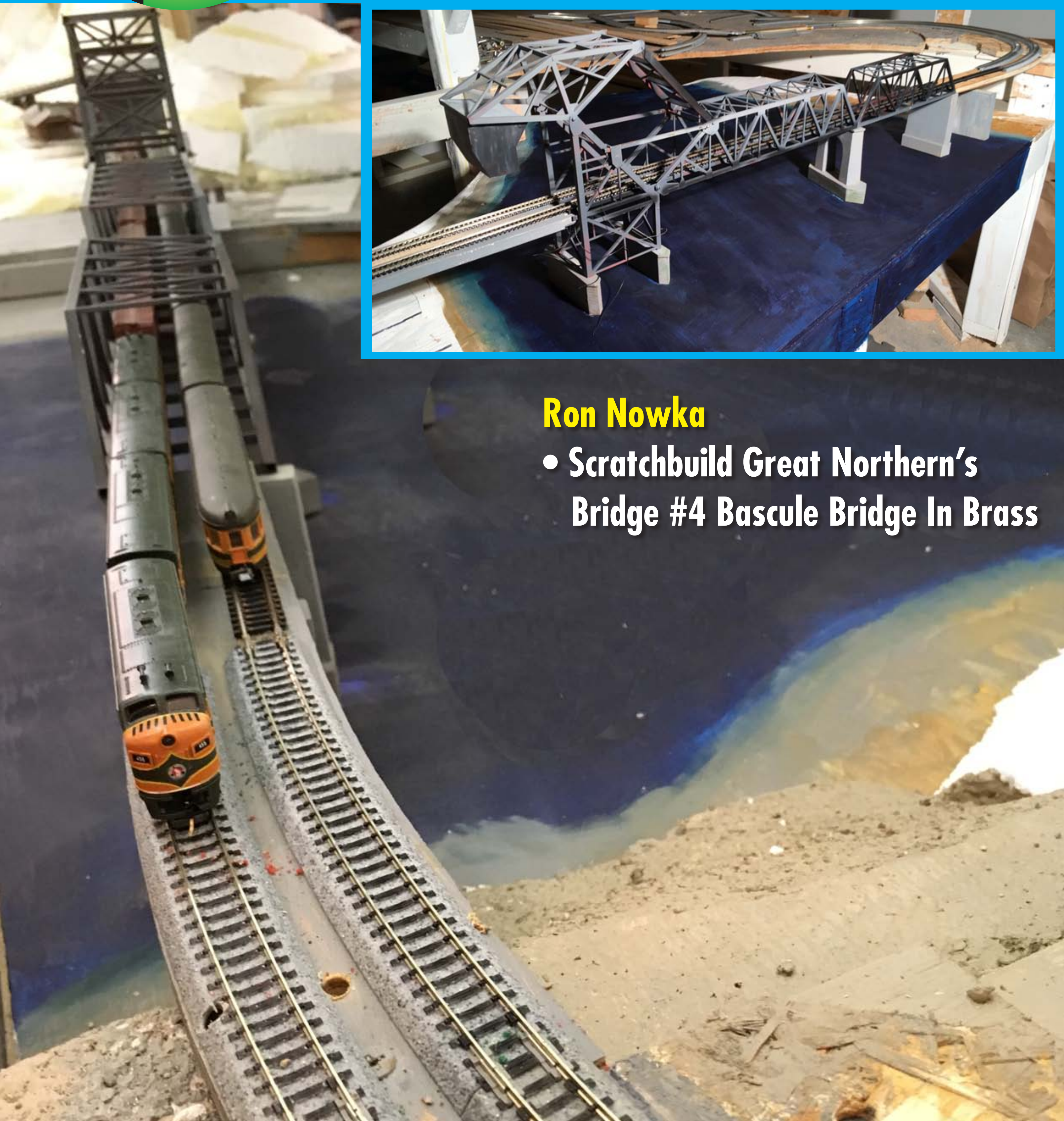

Ron Nowka

- **Scratchbuild Great Northern's Bridge #4 Bascule Bridge In Brass**

WELCOME!

Great Northern's eastbound *Empire Builder* passes a southbound freight on Bridge 4 (four miles north of Seattle) built by Ron Nowka. Ron's techniques can be used on many bridges, such as those with heavy coal traffic.

Calculus Clubs Help N go to ∞ and see what happens!

Great Beach! Start Your Surfing Here!

Ad Index

Welcome to ***N Scale Railroading*** #143, the June, 2022 issue.

Page 04. The free digital download model let's us go deeper into articles on layouts and projects without going into multiple parts. **Ron Nowka** has scratch-built a number of bridges in N scale.

There are a fair number of decent plastic bridges that can be kitbashed into nice models. But a signature bridge such as the Great Northern's double track Bascule bridge #4 and similar bridges won't really look right unless they are scale

Would you like to see Ron's bridge raise and lower? **Click here to go to Burr Stewart's video on Youtube** and go to 1 minute 40 seconds to watch it raise and lower.

Page 50. **NCalendar.** ◗

N SCALE RAILROADING
JUNE
2022
ISSUE 143

PUBLISHER & EDITOR
Kirk Reddie
nscalerailroadn@aol.com
Mr. Answering Machine
206•364•1295

ADVERTISING SALES MANAGER
(ADVERTISING ONLY)
Denny Hamilton
262•347•1068
nsrdennyads@aol.com

PREVENTOR OF GARBALANCHES
Elaine R. R.

SUBSCRIBER #143
Frederick Peer

***** Talent Emeritus *****
ISSUES 001-117
ART DIRECTOR
Bill Edgar

PHILOSOPHER KING OF HUE
Spencer Rossman

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The “City of Los Angeles” - with its three vista domes (named “Domeliners”), including the first dedicated dome dining car, was the Union Pacific’s premier entry into the world of Classic named Trains. Now you can add this historic train to your collection with the 11-Car UP “City of Los Angeles” named train set from Kato USA, available now at your favorite hobby retailer!

Kato USA will be re-releasing this Classic Named Train set this May, with all-new road numbers and car names along with its signature E8 + E9 locomotives! The locomotives releasing with this train will also be offered with available DCC or ESU LokSound, while the 11 car set will be available with pre-installed Interior lighting!

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GREAT NORTHERN BRIDGE NO 4

by Ron Nowka/ Construction images by author

When the Northern Pacific chose Tacoma, Washington and later the Great Northern chose Everett, Washington for their western terminus; Seattle was a significant deep water port roughly halfway between the ~60 miles between the "company" towns of Tacoma and Everett.

The geography north and south of Seattle are significantly different. South of Seattle the shore line is bordered by 200+ ft cliffs, 3 points of land, and 2 major river outlets. Over the hill to the east just a few miles there is a long gently sloping valley system to Tacoma. From Seattle northward the coastline forms a more direct waterline route to Everett.

Seattle's water features were changed dramatically around the turn of the 19th century. Besides washing down various hills, the flow of water in Lake Washington was changed. Instead of Lake Washington emptying southward through Renton via the Black River a new channel was created splitting Seattle by forming a series of waterways and lakes that empty into Shilshole Bay on Ballard's west side. To control the new water level of Lake Washington, Hiram Chittenden designed a series of locks to regulate the water level and allow ships and other water traffic to access the inner lakes and waterways.

Before the locks were constructed the GN crossed Salmon Bay into Ballard by a trestle and continued northwest through Ballard to Everett on a water level line. To cross the new waterway GN constructed a two track bascule bridge to the west of the locks completed in 1913. The bridge is known by several names. Ballard Great Northern Bridge, Salmon bay Bridge. Bridge #4 is the best known by the railroad because it is located at milepost 4, 4 miles east of Seattle which is milepost 0.
Recently the BNSF was ready to replace this bridge but they were turned down during the permit process.

Image 01: . Early Ballard Bridges between Interbay and Ballard Across the waterway is the site of Seattle Cedar lumber mill.


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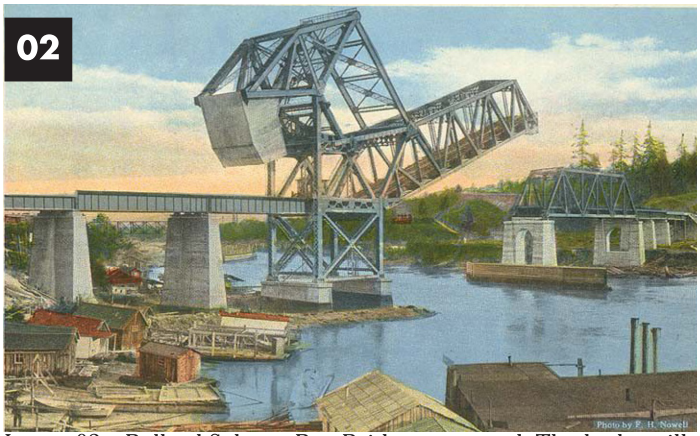


Image 02: . Ballard Salmon Bay Bridge post card. The locks still appear to be under construction.

Image 03: Bridge closed looking northwest.

The Model
When we got an invite to look at the railroad, the benchwork was almost complete from Puget Sound to Roland, Idaho. Which was the Milwaukee Road east and west, the Northern Pacific between Seattle and Portland, and the Union Pacific between Black River Junction and Seattle. Several of us wondered about adding several Great Northern lines starting with the helix Kirk built for staging under Seattle Union Station. It wasn't too long before a lower level was built with benchwork for GN to Stevens Pass and Vancouver, BC with additional GN, NP, and Milwaukee branchlines that will be easy to build.

At first glance it appears we have enough room to do what we want, but no matter how much space on has– it won't be enough. North of King Street Station we have the tunnel (that is a single turn, double track helix that drops the benchwork 3 1/2 inches), a reasonably large Interbay Yard, Bridge #4 (Salmon Bay), Ballard, Richmond Beach, Edmonds, and Everett. We invested ~50' and wish we had a lot more… on the other hand this is all 'free space' that was going to be used for storage. There is a 90 degree turn halfway though this with Interbay on the south side and Bridge #4 on the north side. Neither end parallel to the fascia. North of the bridge the double track line twists along the shore of Puget Sound.

While working on Skykomish I overheard conversation about Bridge #4. An N scale model of that bridge does not exist. It turned out Bill Weed had a drawing of the bridge. Kirk had it blown up at FedEx Office printed to nearly N scale size. It turned out the drawing is 6% under size. To overcome that little snag you can measure then multiply by 1.06. At that time the bench work would not allow the bridge to fully raise and still have adequate height above the water. I wrestled with just building the bridge less than N scale and maybe constructing it of styrene or using an existing bridge. I felt that styrene would be too fragile. I also considered using brazing rod as the late Bill Gray did for his 4 foot long 3 track NTRAK module bridge, but round stock wasn't right for this bridge. After looking at the N scale drawing and comparing the drawing to N scale equipment I finally realized full size 1:160 was the only practical size for construction. After studying the drawing for awhile I thought it could be constructed of K&S square and rectangular brass tubing. I knew it could be soldered together but regular solder could melt while soldering other parts nearby. My dad use to silver solder pneumatic tubing and refrigeration tubing with silver solder so I thought I would give it a try and it worked well.

The bridge is actually two bridges. The north section raises and the south bridge is stationary. The bridge may appear skewed where the two parts join but instead each is at an angle. Since the bridge is not symmetrical: It is a bit more complicated than a bridge with symmetrical or skewed sides.

The prototype bridge is constructed of X braced riveted lattice work. I felt this would be beyond my current capabilities and budget so I used decreasing sizes of square tubing to represent the different components.

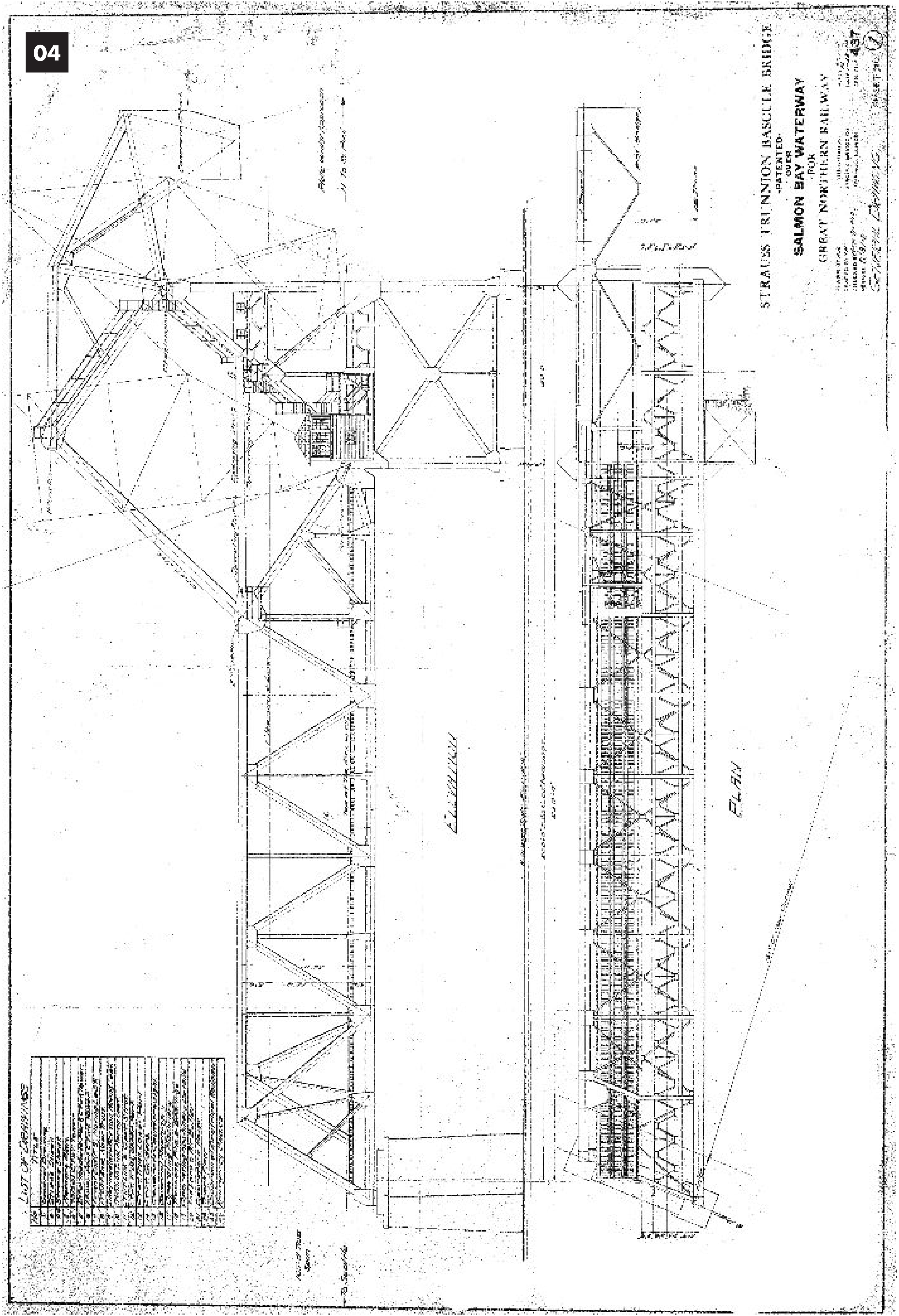
On the layout the bridge is at the corner of an aisle. Rather than have the tracks follow the edge of the table and have the bridge parallel with the isle we turned the bridge about 5 degrees or so and it looks more like the natural setting. This leaves more room for Shilshole Bay and protects the bridge from damage. The original bench work was 4 legged 2 x 4 rack construction. We thought the legs were too restrictive so we experimented with some cantilever construction to hold the railroad above which is Black River and Renton. One of the reasons we dropped the benchwork 3 1/2 inches was so the bridge could rise higher before hitting the upper level.

Some of my relatives lived in Ballard near the bridge so I have been looking at the bridge since I was very little but it was always stationary and I never fully understood how it worked. Having a good drawing let me see where the pivots points are and which components are rigid. The bridge always looks different no matter the position partly because it is angled at the south end (top when it's open). The north end of south fixed bridge is also angled to match. The south fixed span is also a little smaller in height than the main span.

First the articulated north span of the bridge pivots on a tower at the furthest north end. This tower does most of the work. It gives the north truss span a stable place to rest and it holds the track. The tower supports the counterweight to balance the weight of the articulated span. The tower also supports the motor and lifting rack gears. At the top it supports the counterweight, which has two parts. The diamond shaped arm which pivots at the center from the top of the tower and the weight itself, which is mostly cement, to balance the truss span. The tension panel connects the counterweight arm to the truss span to form a parallelogram.

The operating arms are a rack and pinion system which pulls across the parallelogram to lift the truss span. The model llooks about the same as the real bridge but operates by hid

04


STRAUSS TRUNNION BASCULE BRIDGE
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FOR
GREAT NORTHERN RAILWAY
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ELEVATION
PLAN
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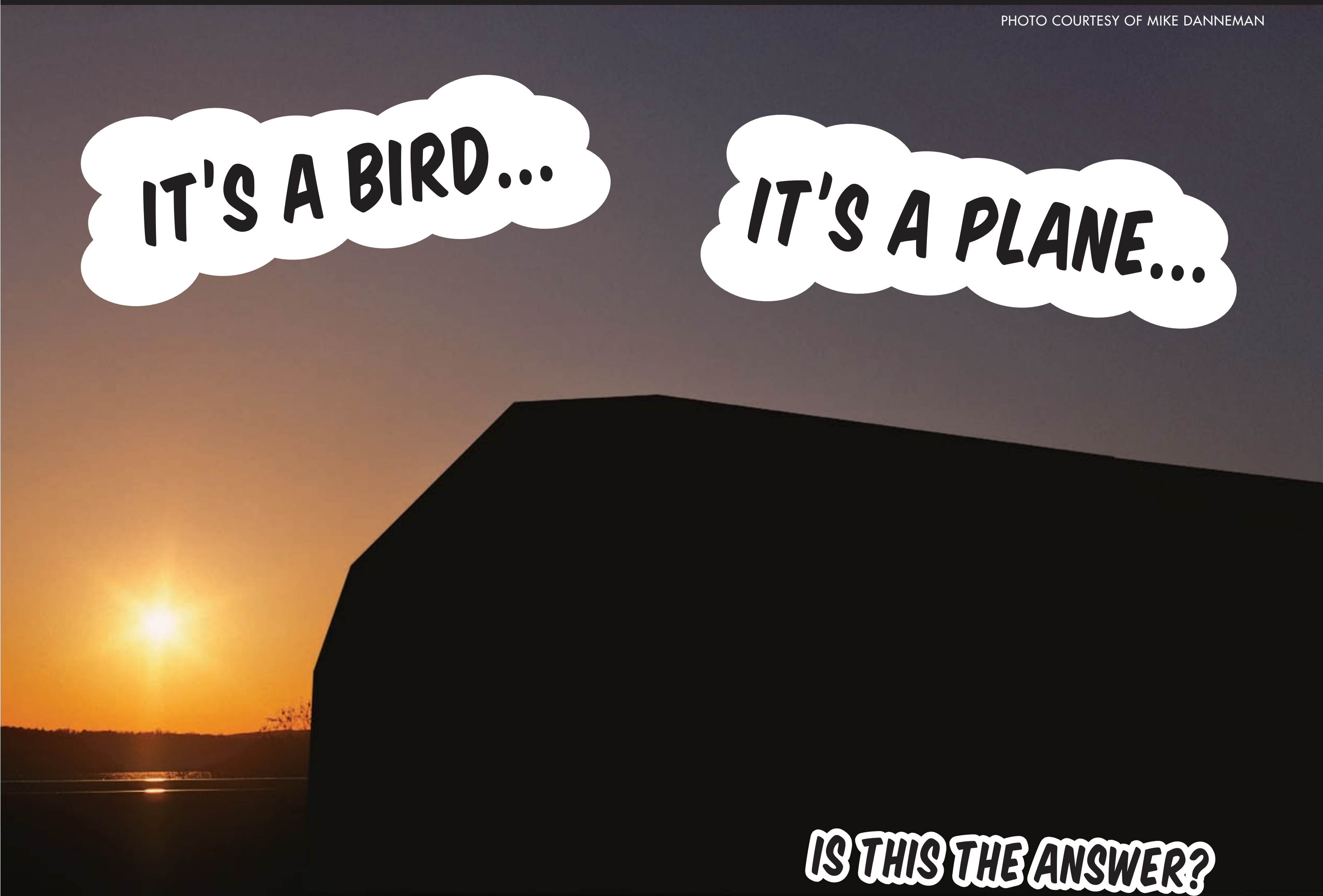

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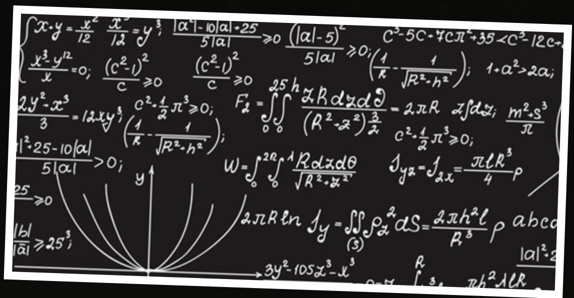

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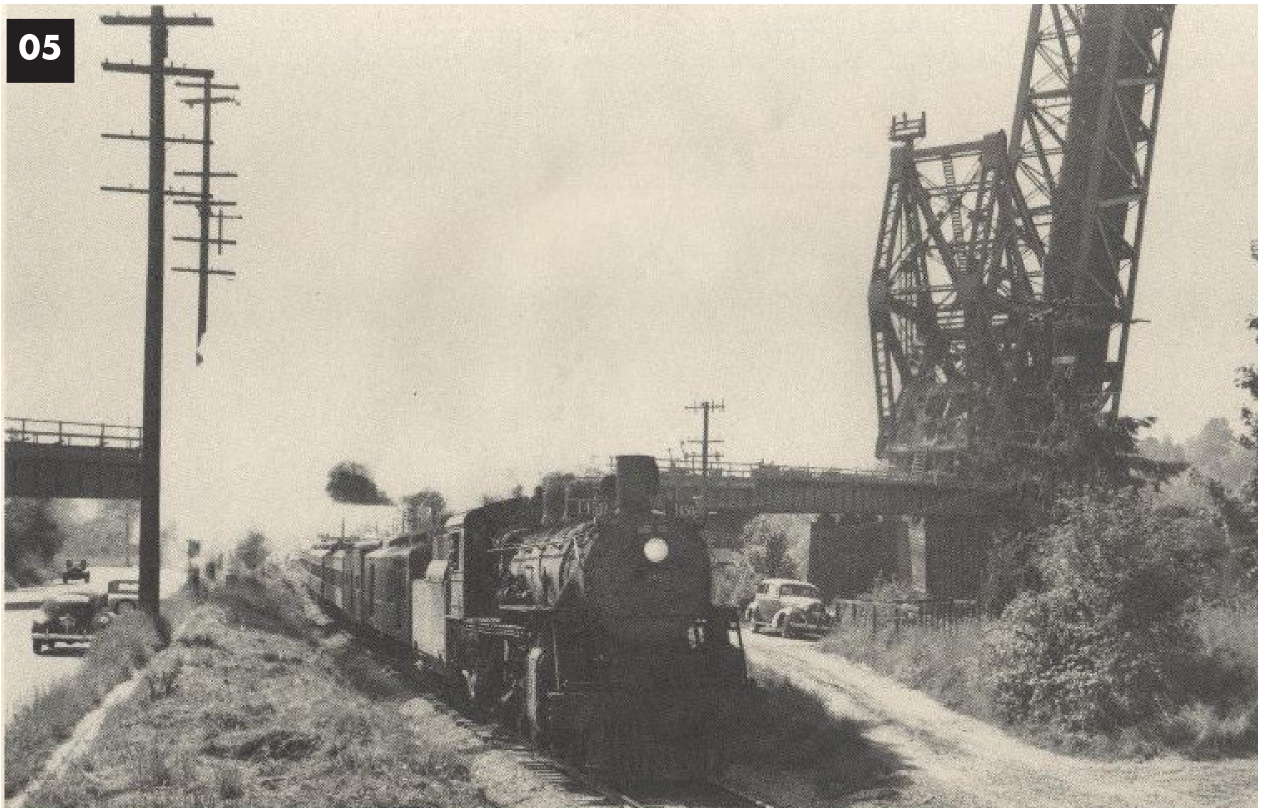

Image 05: During bridge maintenance a GN passenger train runs on NP tracks under the bridge's tracks.

den pulleys and cables in the operating arms. The cables pull down from under the bridge lifting the truss span. I used nylon covered stainless steel cable (Toothy Critter Wire). The cables have loops at either end for attachment.
All of the moving joints pivot on 1/16th brass rods attached with snap rings except the main trunnions at track level. These were machined from 4-40 brass screws which thread into brass nuts.

Back to the bench work at King Street, the track level at King Street is 33 inches above the floor with 11 1/2 inches of headroom. The Ballard Bridge has an opening span of 200 feet or 15 inches. The north structure where the bridge pivots is 3.25 inches (43' 3") tall at track level and is supported on concrete footings which are 6' 8"(.5") above the highest tide of 18 feet (1.35") 24' 8"(1.85") or 67' above 0' low tide. I built the supports to represent a tide level of (0 ft). Further, the track rises ½ inch before the south end of the bridge and (1/2") inch north of the bridge. All these measurements determined that the Interbay yard had to be lowered an additional 3 ½ inches below the King Street level. Bill and Don lowered the yard area and designed and built a double track helix which represents the two track tunnel under Seattle. This worked out well to hide trains while they traverse under the city and gives an additional 3 1/2 inches of head room for the 26 track Interbay yard as well as the additional space for the bridge.

K&S tubing is sold in 12 inch sections. The material can be cut with a Dremel disk, jewelers saw, or band saw with a fine tooth blade. A very useful accessory for the band saw is a Magnafence II magnetic fence. This makes easy work of cutting multiple pieces of the same size.

Taking dimensions from the drawing, I started with the bridge bases. 1/8 x 1/4 rectangular stock seemed most suitable to create the cross beams and the longitudinal beams which will hold the track. I thought it was essential to have a feature that could hold the track in place and allow it to be replaced should something happen to it. The system I came up with was to have two 1/8 x 1/4 rectangles on edge soldered 1/4 inch apart for each track then a .1 x .250 styrene strip glued to the bottom of each section of track each track can then be held in place from below with 00-90 screws. Square brass plate washers span the rectangular beams on the underside. The three sections of the bridge have this construction and all three sections of two tracks have to line up with each other. A complicating factor is that the main span is 200 ft or 15 inches long and the brass stock is 12 inches long so four sections of rectangular tubing have to be lengthened. The south span is 165 ft or 12.375 inches long so its base pieces have to be lengthened too. The upper beams are all shorter than 12 inches. Luckily the next size down of rectangular tubing just fits inside the larger size. A short section, about 3/4 inch long, is used for each to stiffen the joint. The sections are cleaned, assembled and secured to a wood 2 x 6 about 2 feet long with a ¾ x 1-3/4 strip secured to one edge. This makes a good square base to secure all components for soldering. First the longitudinal pieces are made then the cross braces are cut and secured to the board with spacing that will match the side panels. The diagonals are prepared, secured then silver soldered in place. Since different components are of succeeding smaller square tubing, cardboard or sometimes brass shims are placed between the smaller tubing and the wood base. I just used the packaging from the tubing and brass stock.

Track spacing or the space between the tracks plus side clearance determines bridge width. The double track on the layout is 1 1/4 inches center to center. In a practical sense passing trains need a minimum clearance of say 1/8 inch on each side. N scale equipment is roughly ¾ + inch wide. A UP Big Boy is 11 ft (.825) wide so add 1/8 on either side X two tracks and you have 2.15 inches. The drawing measures out to 2.2 inches on

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At the close of the 1930s, American railroads were steaming forward with a wave of improvements to the passenger experience. Lightweight coaches, streamlined designs, and new forms of locomotive propulsion were fast revolutionizing the industry. In some cases, legacy steam locomotives were also upgraded to meet these new design standards. Between 1940 and 1941, four Pennsylvania Railroad K4 Pacifics received modern streamlined shrouding developed by acclaimed Art Deco designer, Raymond Loewy. The locomotives would spend the following decade wearing this striking appearance as they traversed the PRR system in express passenger service. The Bachmann Streamlined PRR K4 comes equipped with *Econami*™ Sound Value DCC, featuring the *Soundtraxx*® steam package, a die-cast boiler, and a precision motor. Factory set for realism, the *Soundtraxx*® steam package offers a choice of 16 whistles, 6 bell types, 4 prototypical chuffs, 5 air pumps, and 5 dynamos, plus cylinder cocks, grade crossing quill, blowdown, brake squeal/release, coupling/uncoupling, water stop, and "all aboard" announcements with coach door operation effects - all in 16-bit polyphonic sound. Give this Art Deco late steam masterpiece the recognition it deserves on your N scale layout!

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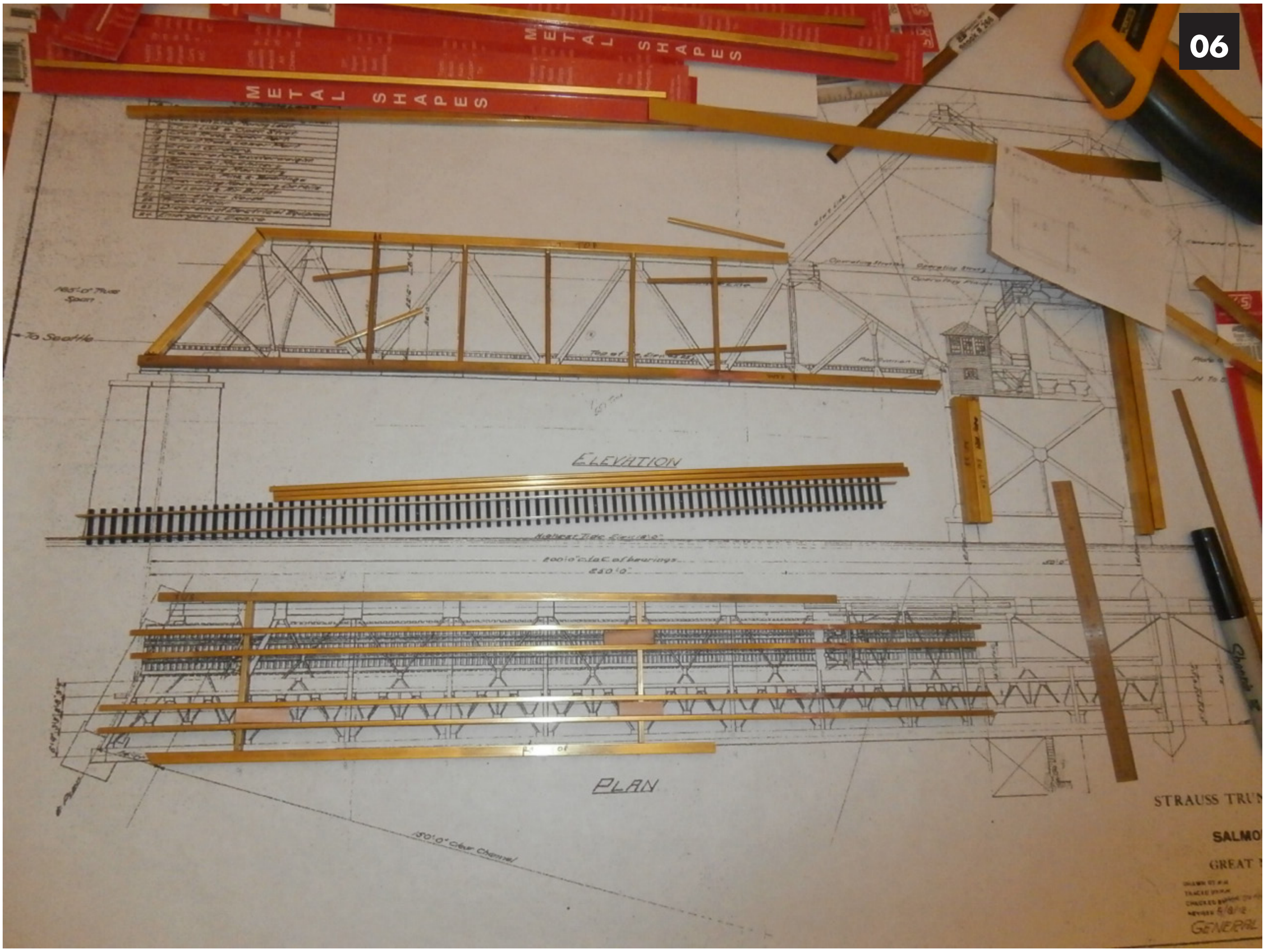

Image 06 Laying out the bridge's east side. Above are the Horizontal beams and vertical beams laid in place prior to being placed on fixture for silver soldering. Notice the location of the west side three diagonals to the right of the east side three diagonals. Also notice the different arrangement of the diagonals for each side. This is a good time to look at the gusset plates on the sides. Each is different from the others. Below, the bridge deck pieces are laid out in a similar fashion. The longitudinal beams are separated with 1/2 inch wood spacers.
In the upper right corner is a technical drawing (sketch) with some basic shapes and dimensions
The section of track is for reference and figuring out the best way to secure the track to the bridge.

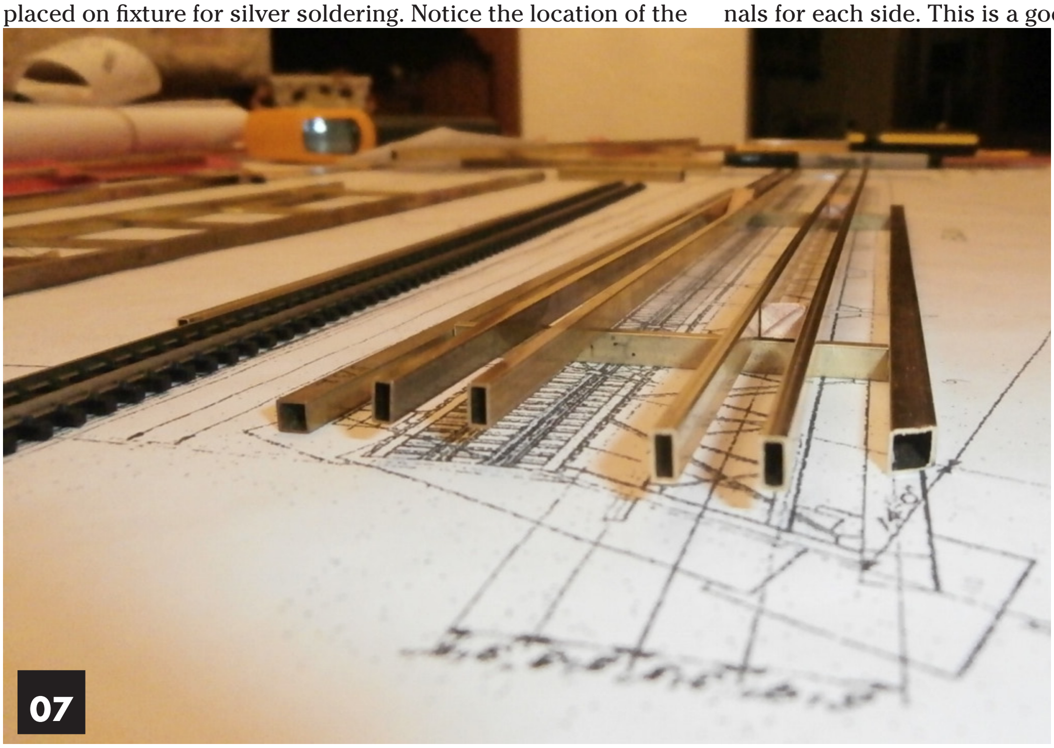

Image 07: Looking at the bridge deck pieces from the end.

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the inside of the structure. I chose 1 3/16ths spacing centered with an inside bridge width of 29' 4"or 2.2 inches.

When I started this process I thought I would have to have a drawing or pattern for every assembly but as I went along I realized I could just mark locations on one component and then set the others in place, secure them in place and solder them together. The components are secured to the 2 x 6 board using #6 sheet metal screws and brass washer plates that will span one section or two adjacent parts. A little tension is required but too much tension will cause the assemblies to warp. Each assembly of the bridge spans is different so I first cut the pieces that were the same then the ones that were different. Once all the pieces of one assembly are made they are silver soldered together using Clean Strip tinning acid. For this project I used a Prestolite acetylene torch. For a later project I used a butane torch for the silver soldering with equally good results.

The drawing only shows the main bridge but not the south fixed span. The drawing shows only a dimension for the length of the south span at 165 ft. So going back and searching the photos you can see some of the important features. First there is the number of triangular panels (3). Then the south span is not as tall as the main span by about 2 ½ feet or 3/16 inch. The last big feature is, that like the main span, the end nearest the opening is angled. The south span is of course angled in the opposite direction to complement the main span. The drawing shows the main span in great detail. Widths of the spans are the same as is the track spacing. The truss features are similar to the drawing just on opposite sides.

Connecting the major bridge pieces together was done by securing them to a block of wood that fits inside the bridge then silver soldering them together then removing the block of wood. The block is undersize so it can be shimmed. After soldering the shims are removed and the block can be easily removed. Diagonal cross bracing is put in one piece at a time. First the end of 1/16th stock is prepared by beveling two corners at roughly 45 degrees one side more an one side less. Then laying it in place and marking the opposite corners for cutting. This needs to be a snug fit. Another long piece of stock is prepared as before but laying the new piece across the previous one, this will find the center point of the first then the short piece of stock is cut off at the intersection and secured in place. The opposite piece is prepared the same way, marked, cut and secured making sure the two short pieces line up at the center point. Then they can be silver soldered in place.

Construction of the north tower had to accommodate the main trunnions and places to hide a pulley in each operating arm for the lifting cables. The tower also gives the counterweight a pivot point. The counterweight itself is constructed from .030 flat brass. The drawing shows the counterweight in good detail from the side but the bottom front and rear are not shown. I had to refer to some photos and make a best guess at the width. After the counterweight shell was added to the frame it could be used to balance the bridge. On the real bridge the counterweight weighs 1,000,000 lbs on the model it weighs about a pound. The model counterweight turned out to be pretty small so to make it weigh a pound I made a wooden form and filled it with a little over a pound of molten lead. After it cooled I trimmed it to the right weight on the band saw. A wood cover was made to cover the top of the weight.

The drawing only shows the lifting frame from the side. Google Maps gives a great view of this part. I just sketched it out and dimensioned it to fit the model then built the parts to the dimensions and soldered it together. Each corner has a tab cut from .062 flat brass stock then soldered in place. After constructing all these parts I found that they all have to be really square for the bridge to operate without binding.

The metal bridge structures rest on two concrete pedestals and abutments. The bridge tower rests on two footings. The fixed south bridge rests on two concrete arched pedestals and one abutment. I cut these from a 2 x 6 board. The arched pedestals each have three components which were cut out, adjusted for height and glued together.

Railroad north of the bridge the tracks cross over Seaview Ave NW over a steel trestle to meet the Ballard hill. The trestle pieces are made of square brass tubing under a ½ inch plywood base with strip styrene sides. The trestle deck is 1/2 inch plywood which has machined notches to receive the track beams which extend from the north tower.

The order of construction was as follows:
Bridge bases, bridge sides, tower sides, tower base, gusset plates, counterweight frame sides, counterweight, lifting mechanism, abutments.

The bridge as a special feature, which disconnects the power to the tracks when the bridge is raised. The power is disconnected from a 30 inch section of track at each end of the bridge. This is accomplished by using a pair of micro switches operated with a single pushrod located in the north abutment arch. These switches are mechanically connected together to operate from the same arm. This keeps trains from running into the bay if the bridge is up when the trains pass.

The bridge operates from a motorized gear box which turns a spool which wraps the cable and pulls an equalizing bar which pulls the two cables in the operating arms. I originally used a Tamaya gearbox kit(s) which worked but was very noisy. A year later I found a 1 rpm motor / gearbox that is compact and quiet. The motor is dc, powered by three D cell batteries and controlled with a DPDT center off switch.

Painting the bridge was done with four colors of Floquil, light gray, dark gray, black and red primer. If you look at hundreds of photos of the bridge then ask what color the bridge is you would say black, brown, gray, orange and different areas are different colors too and it depends on the weather and time of day and which part of the bridge you're looking at. I did a quick sketch and designated some basic areas of color starting with flat black on all the underneath sides then some areas of red primer for rusty areas and then different shades of gray for different areas. The concrete arches are painted with Liquitex medium gray acrylic with some black, white and burnt umber to simulate aged concrete.

The control cabin or Operator's Shack is made of styrene with Grandt Line windows. It is a two story building that is dwarfed by the massive bridge. The scale drawing shows most of the detail needed to construct the components for the model. Dimensions for the walls can nearly be taken off the drawing the gabled roof is done by starting with a gable template which is a styrene triangle with the slope of the roof on both sides. I start with the long side first. The edges that meet an adjacent gable need to be beveled to close the gaps on the top surface. Then a measurement can be taken on the long (lower) side of the triangle. The base of the isosceles triangle will be the same as the long side roof. Taper the mating edges and glue it together.

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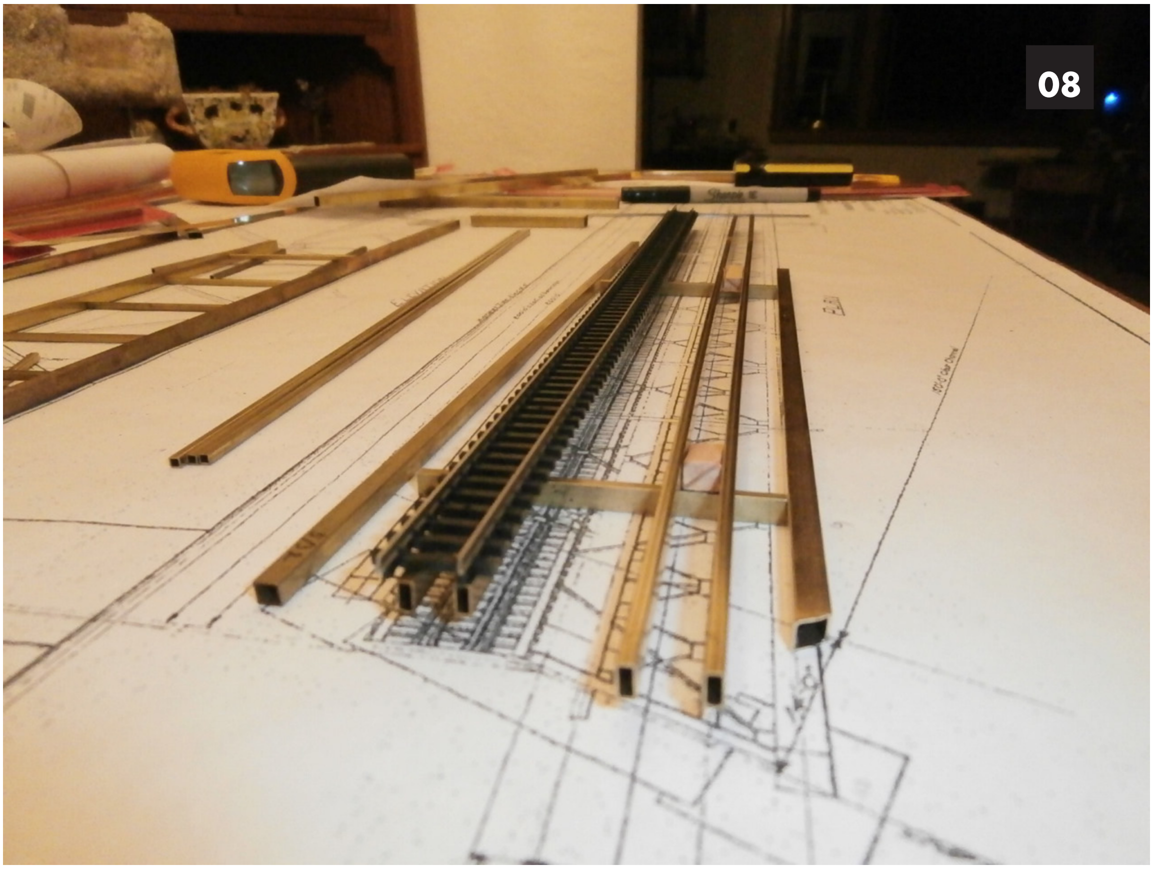

Image 08: Looking at the bridge deck pieces from the end with a section of atlas flex track running full length.

Image 09: East side of the bridge secured to the 2 x 6 the 1 x 2 board forms a straight edge for securing the parts. 1/2 x .062 plates to secure the components 1/16th square stock is used to space up the diagonals and verticals.

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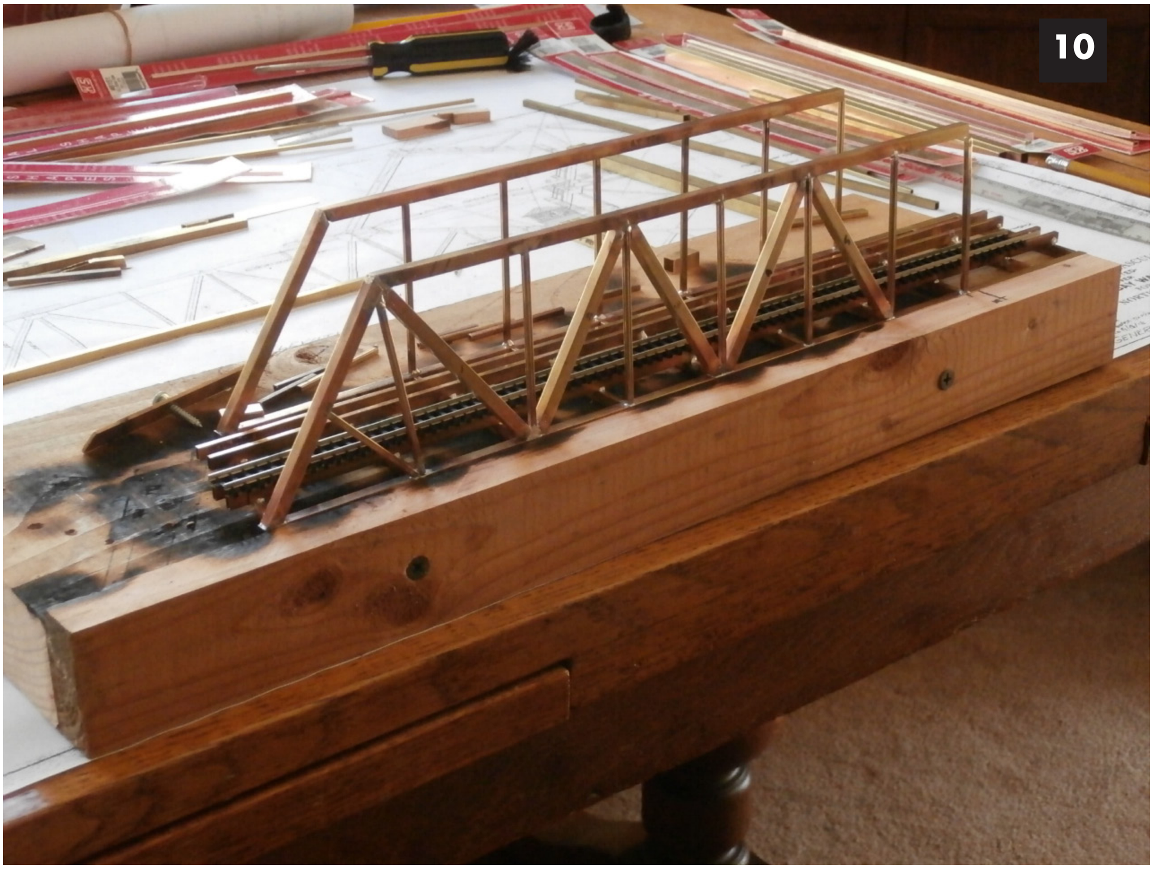

Image 10: East side and west side set up with base

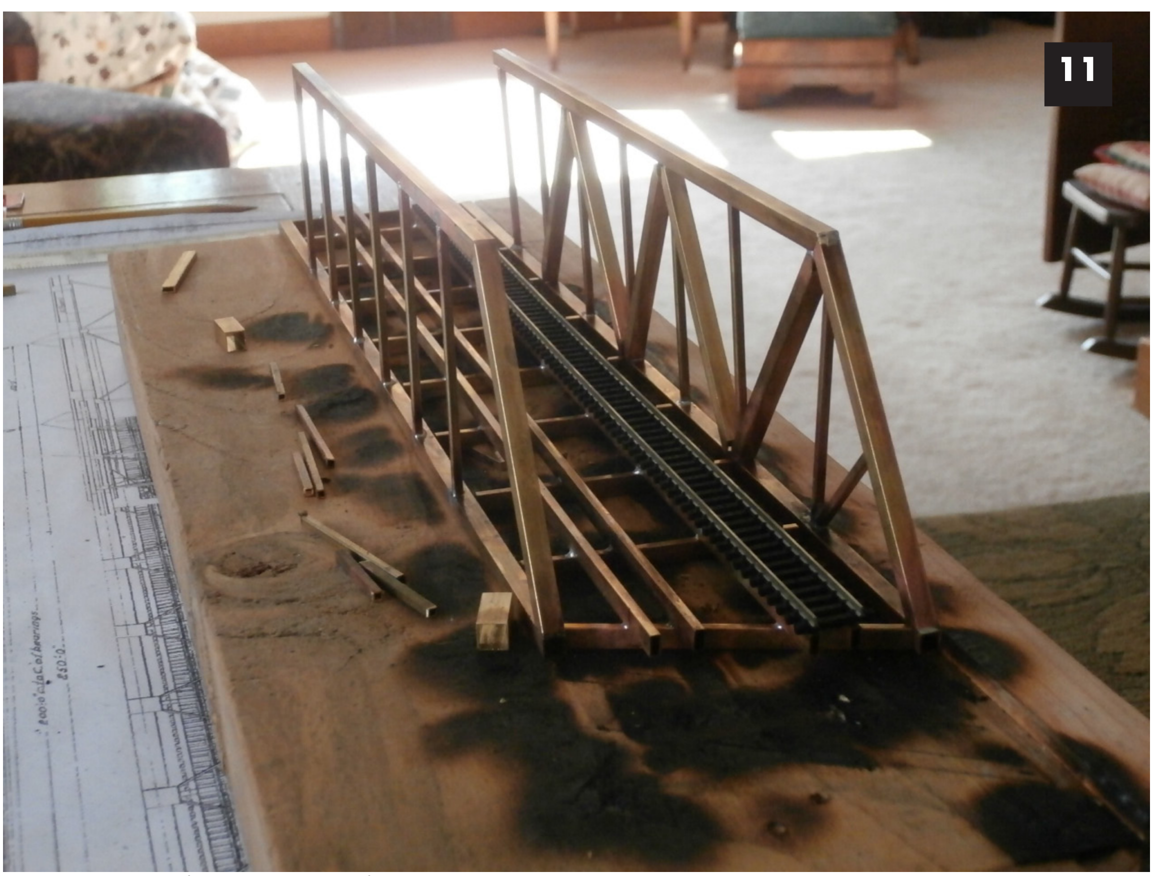

Image 11: View of sides and base from the end with diagonal end in place.

Image 12: North end truss detail pieces prior to silver soldering. These parts were cut with a 409 Dremel cut off disk.

Image 13: Base of south fixed bridge. End nearest the camera is square. The far end is diagonal matching the lifting span.

Image 14: Side of fixed span secured for silver soldering.

Image 15: Fixed span diagonals prior to silver soldering. Notice the beveled ends of each component and reference marks at adjoining locations. Also notice the left diagonal with a double bevel at the lower end.

Image 16: Fixed span side after silver soldering.

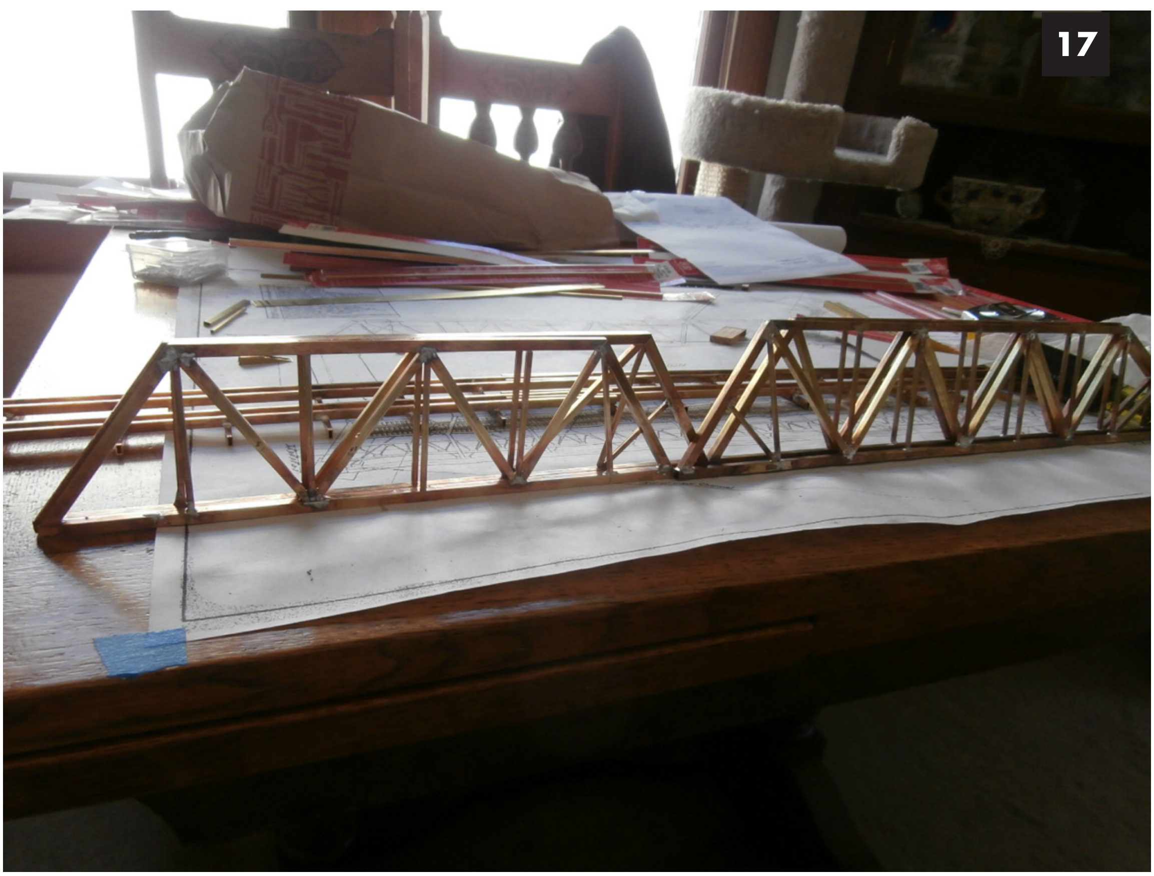

Image 17: All four sides set up together

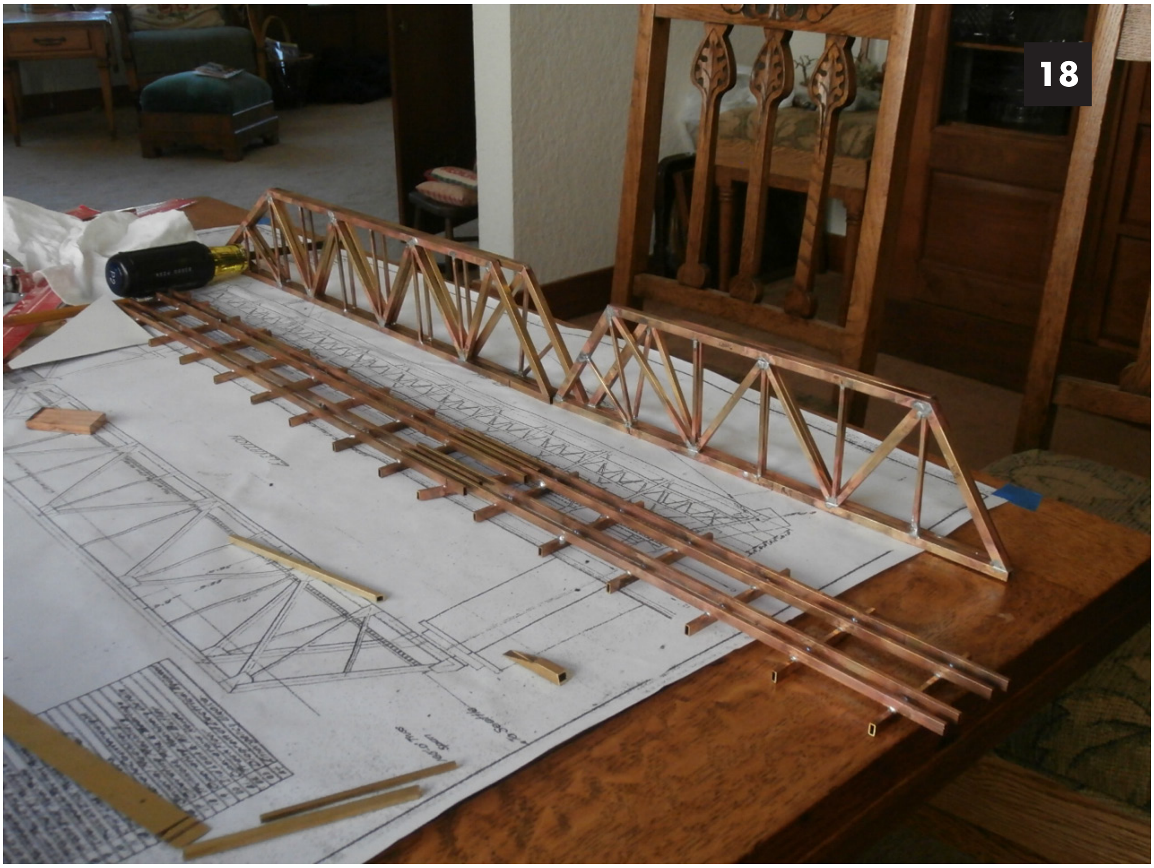

Image 18: All four sides and both bases set up to establish the fixed span base diagonal.

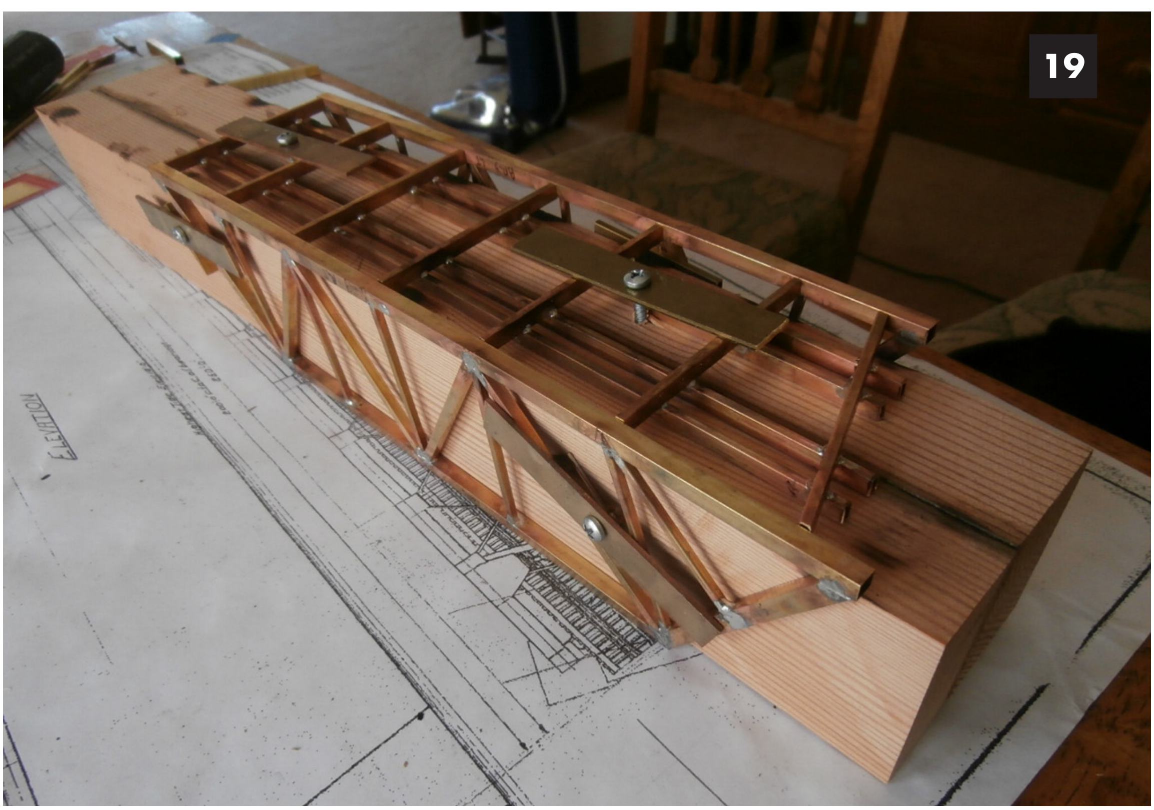

Image 19: Sides of fixed span being secured to a dimensioned block with the base to hold everything square for silver soldering. The lifting span was done the same way.

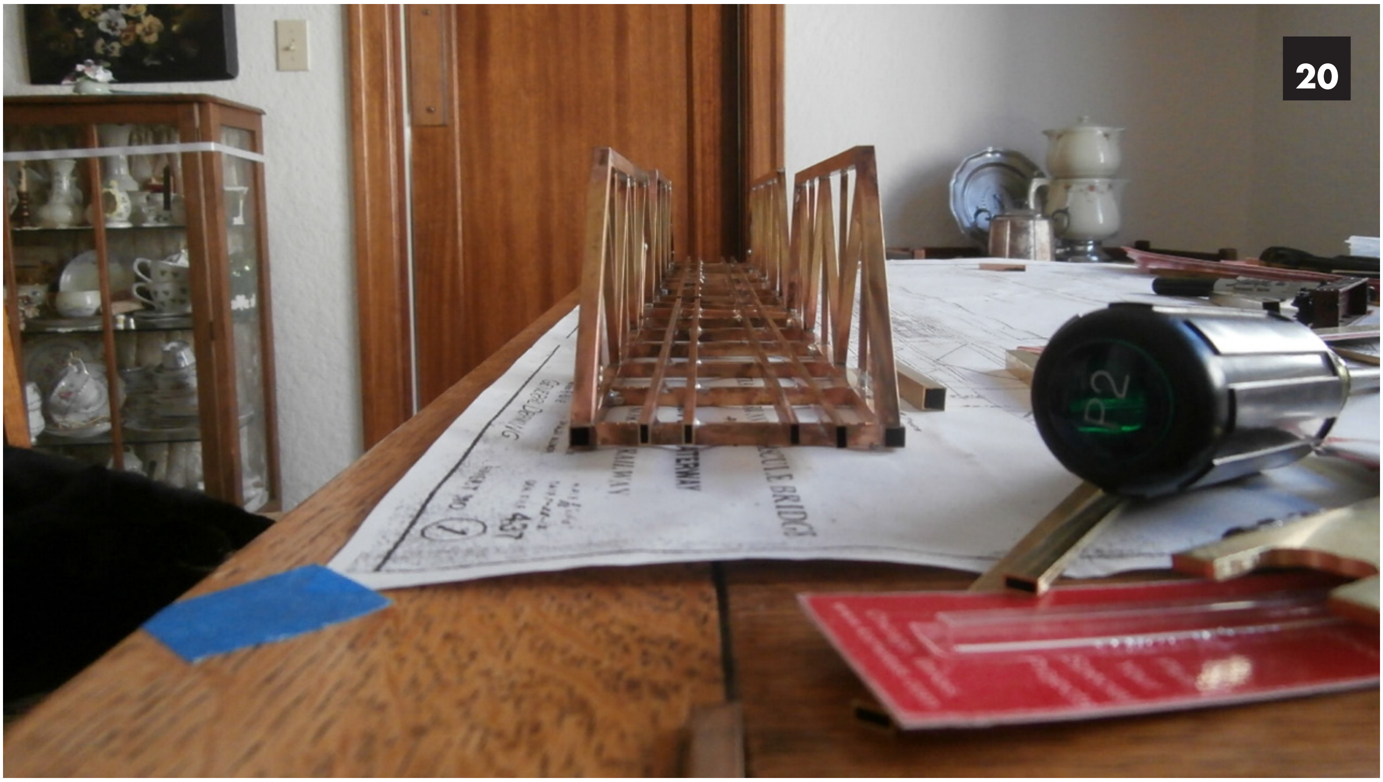

Image 20: It's hard to see but both spans have their sides silver soldered on and being checked for alignment.

Image 21: North tower side components being located on 2 x 6 board.

Image 22: Setting up the north tower sides and base. Care is taken to make sure that the sides sit flat and the track frame is level both ways. This view also shows the spacers used to locate the beams that hold the track. At the rear of the tower (far north end) the beam stick out ¼ inch beyond the frame so they can mesh into slots in the 1/2 inch plywood sub roadbed leading to the Ballard hill.

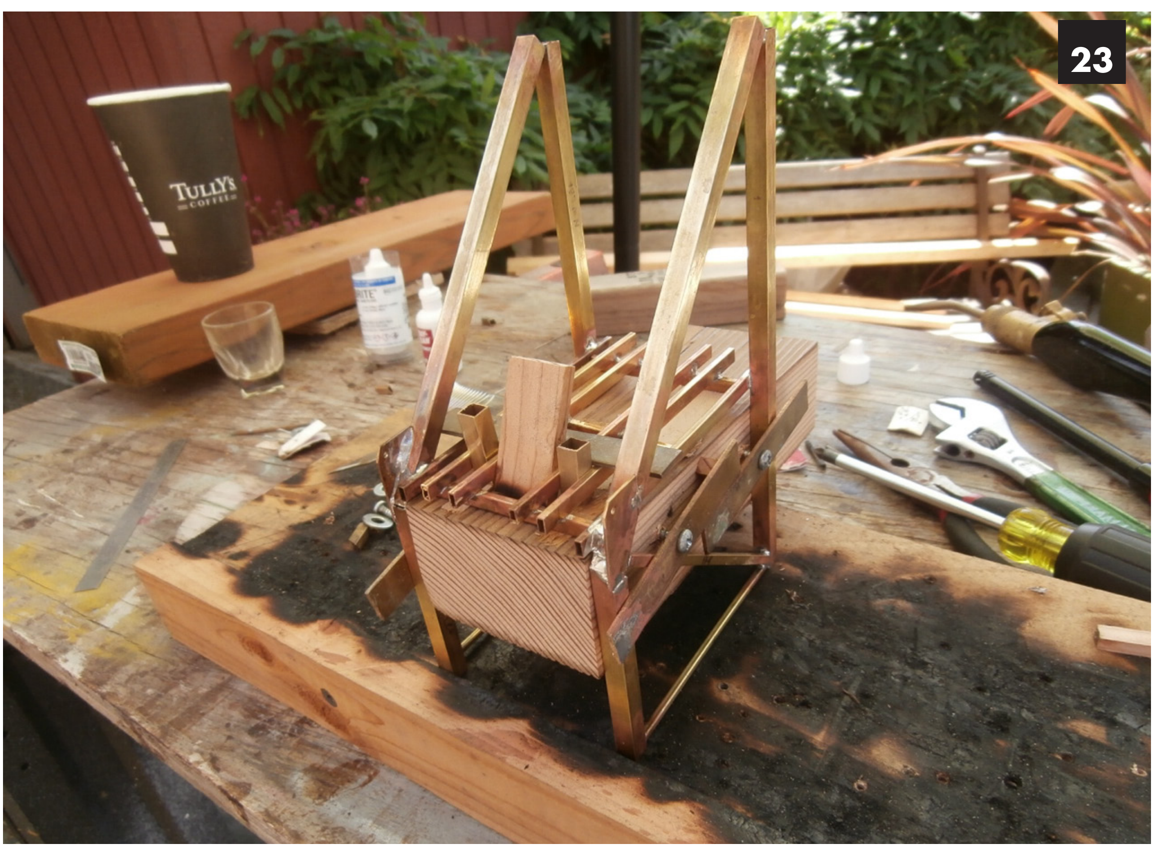

Image 23: A slightly different angle

Image 24: Tower side X bracing is being silver soldered in place. At the center of the diagonal you can see the reference marks for the opposing braces which will be put in place next.

Image 25: The same process is done to the opposite (west) side

Image 26: Notice a small shallow wooden wedge which helps to accurately locate the assemblies.

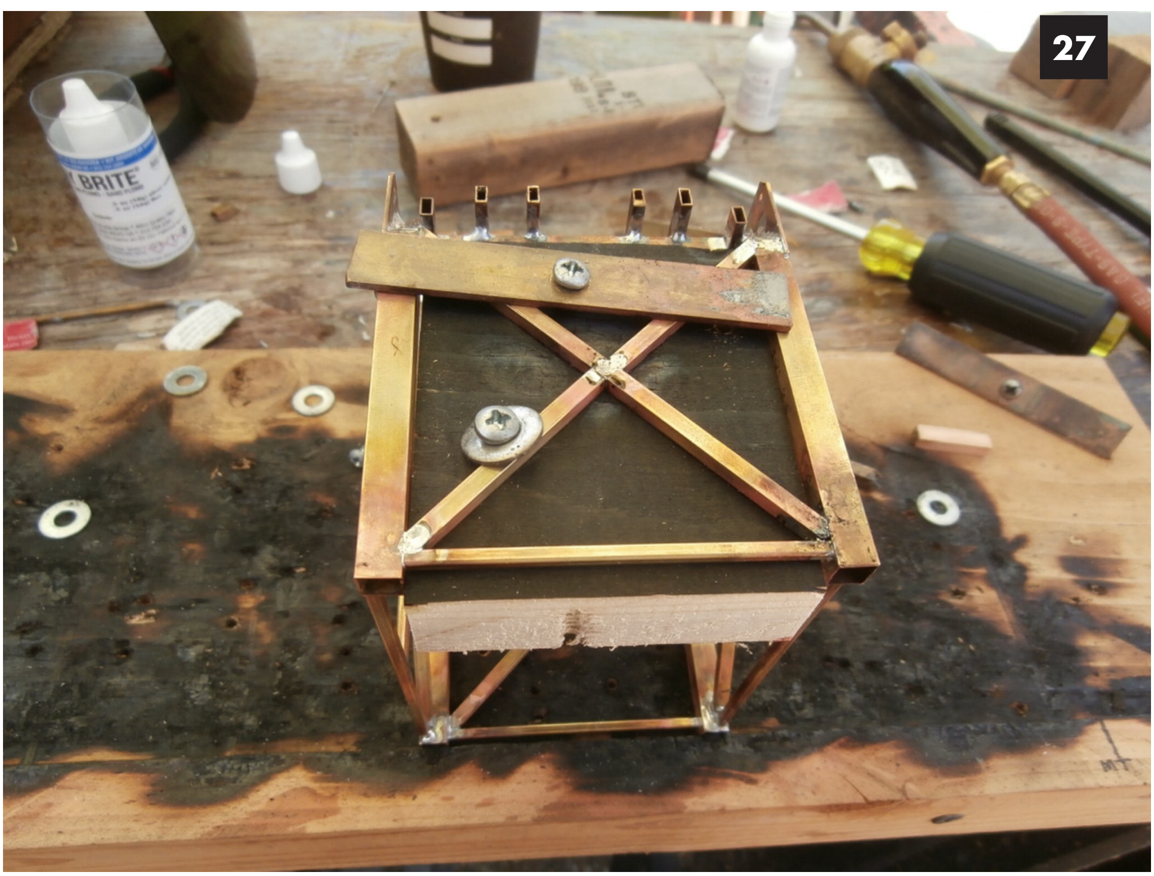

Image 27: A 3/4 inch thick block is used here for stability while putting in the bracing.

Image 28: Putting in two different sizes of bracing using straight pins instead if screws.

Image 29: The crossbracing on the counter balance arm is being installed.

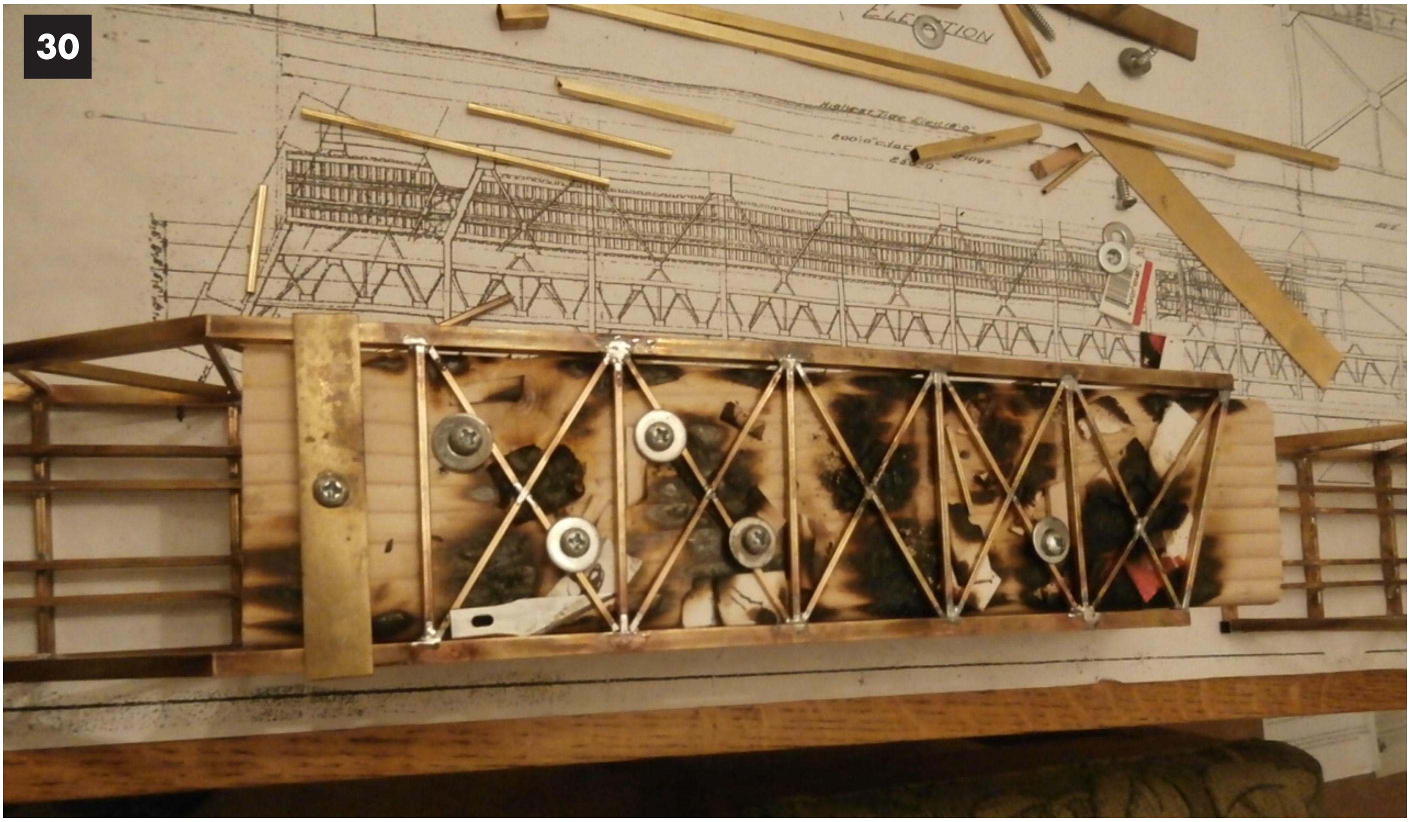

Image 30: Lifting span cross struts and X bracing being put in. Notice south end X bracing is not symmetrical. Also X bracing is 1/16th square tubing and cross bracing is 3/32nd square tubing.

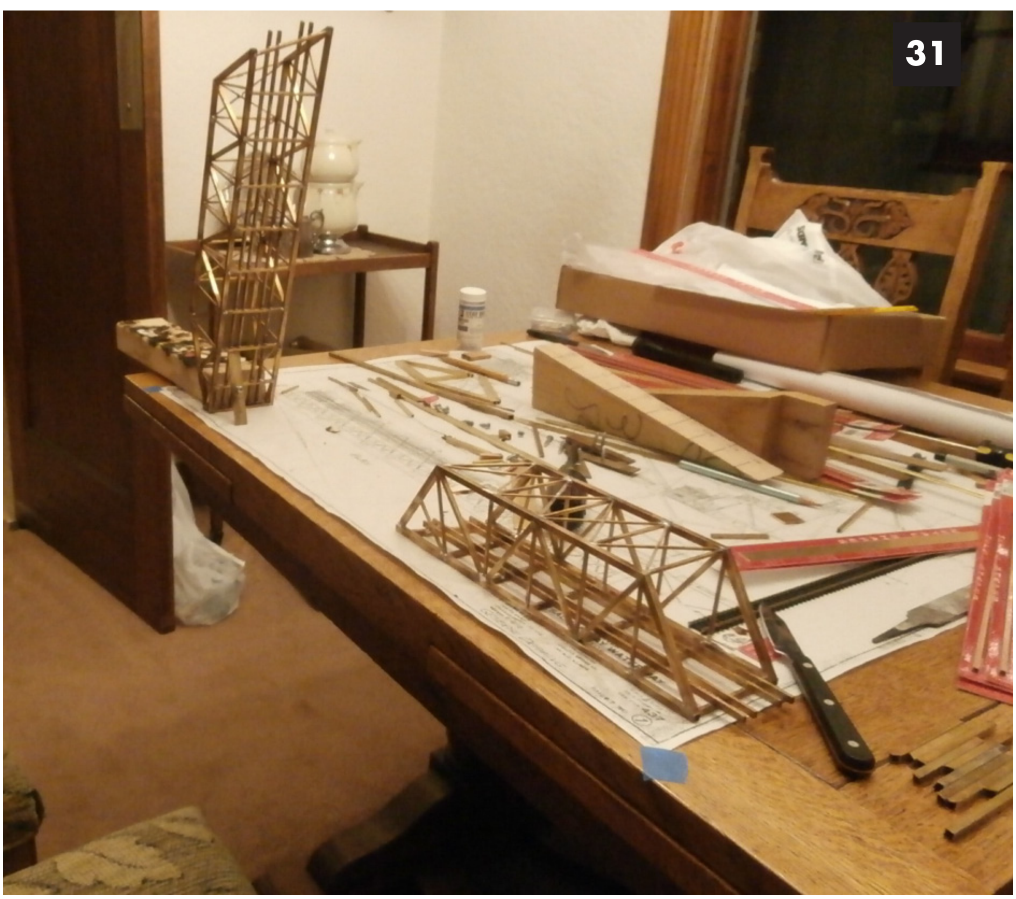

Image 31: Both spans set up together.

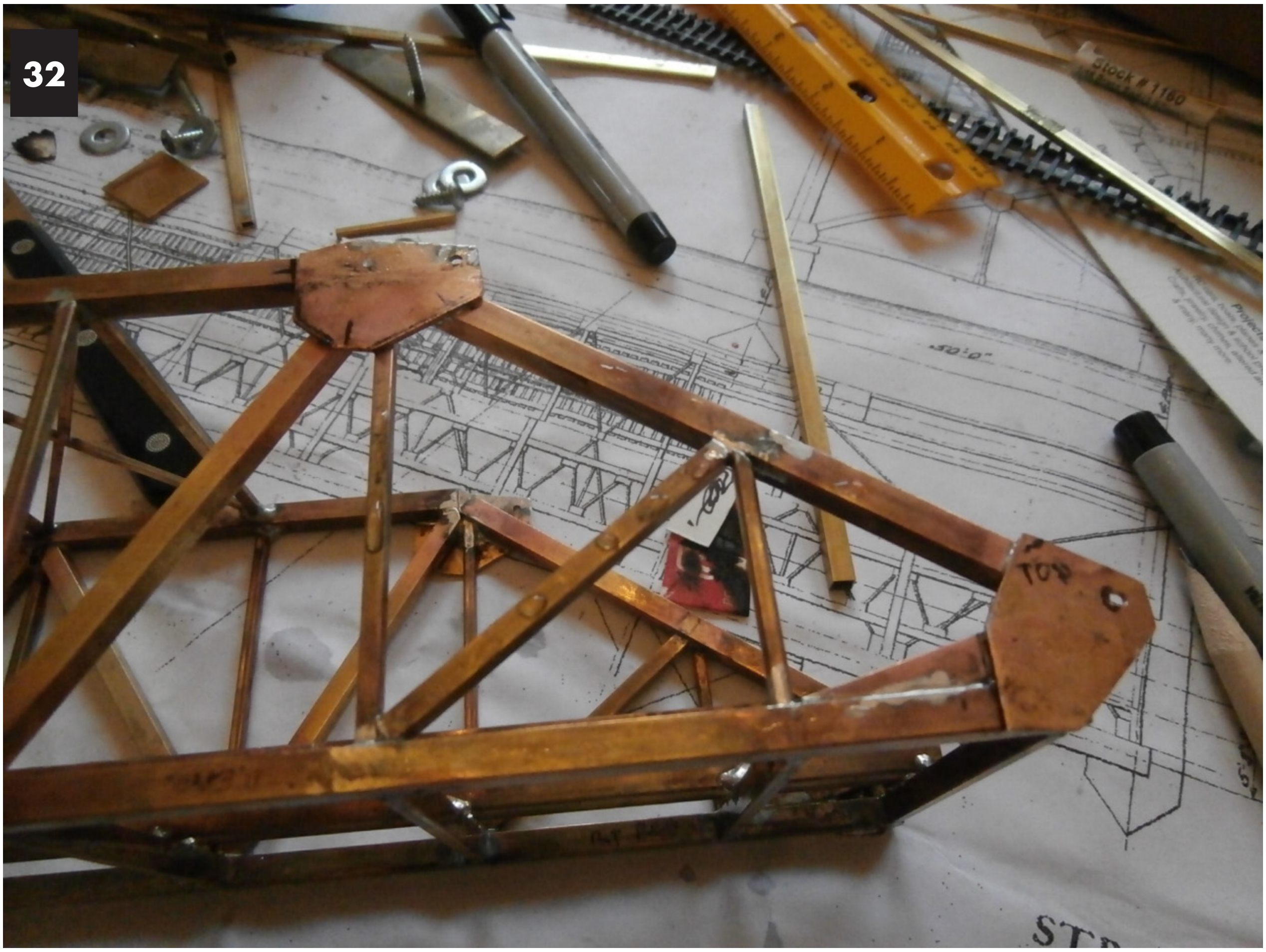

Image 32: Gusset plates being located on lifting span. These are important because the major components pivot on rods and trunnion pins located by these plates.

Image 33: Both north tower sides with gusset plates..

Image 34: Cutouts for the North tower gusset plates.

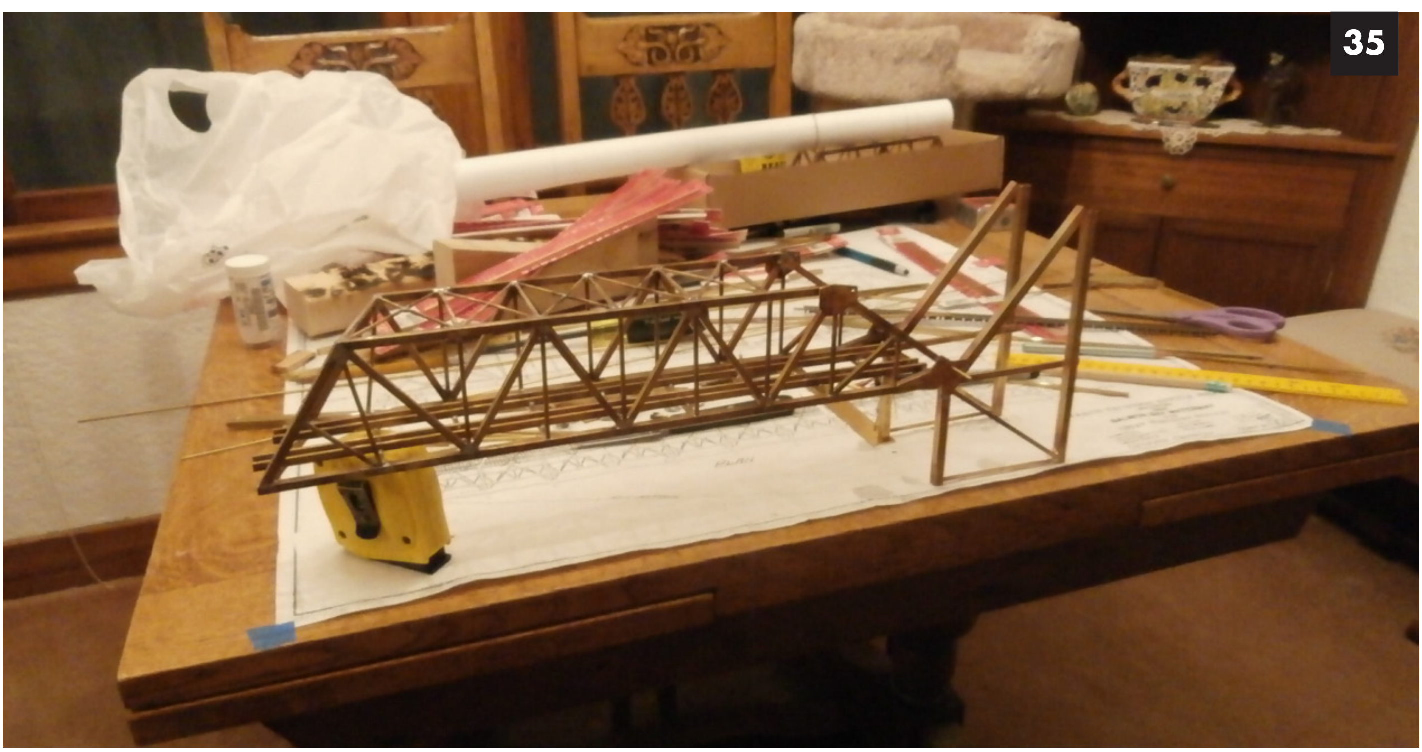

Image 35: Lifting span and north tower together. This step is important to get the right geometry for the trunnion pins and track separation points.

Image 36: This view shows a single rod crossing the tracks at rail level. This has to be replaced by separate pins so the tracks are not obstructed.

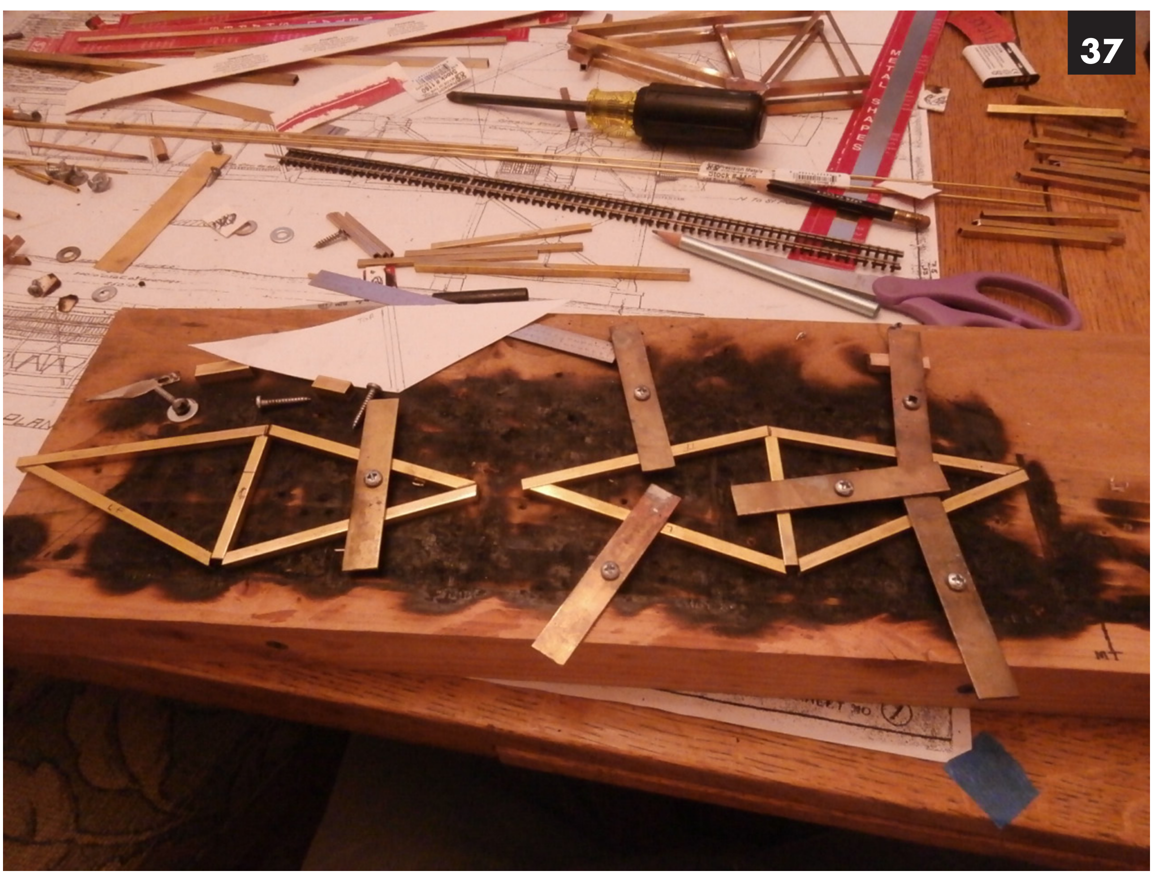

Image 37: Counterweight frame sides secured in place. The components of each side will be silver soldered together and have the side diagonal bracing added.

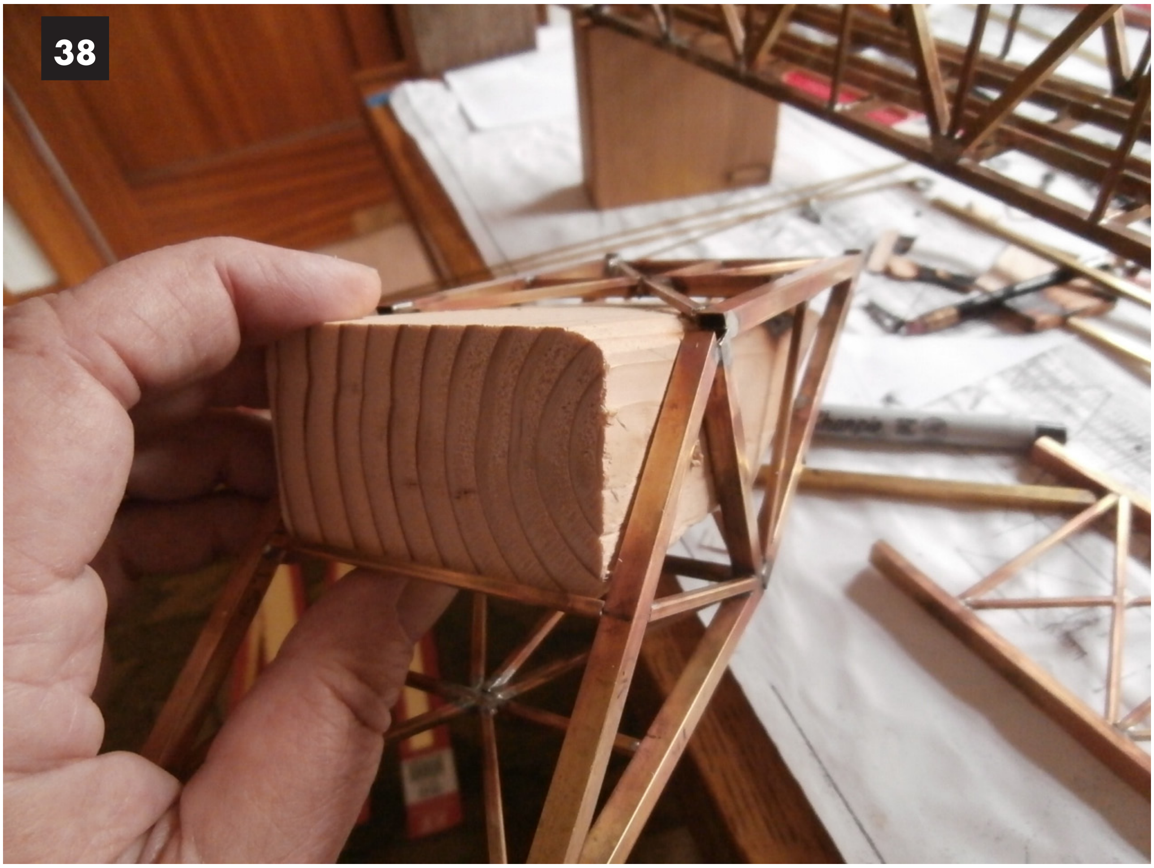

Image 38: The counterweight side frames are secured to a smaller section of 2 x 4 wedge cut to hold the frames at the proper width to operate at the top of the north tower. This attempt ended when the block was built into the completed frame.

Image 39: Adjusting the block within the counterweight frame. One brace was removed so the block could be extracted then the brace was replaced without using the block.

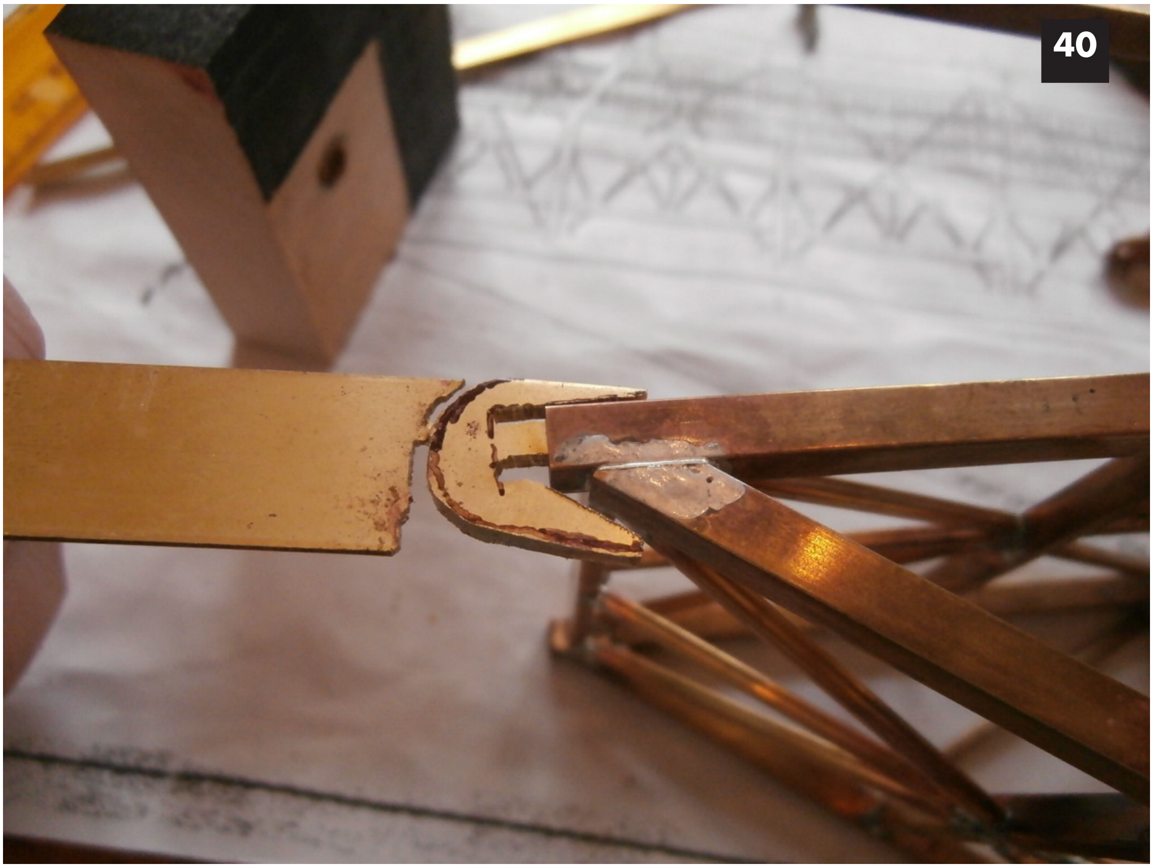

Image 40: Counter weight arm connection. The part was cut out on the band saw on a piece of brass stock then when it fits the part is used as a pattern for the one on the other side.

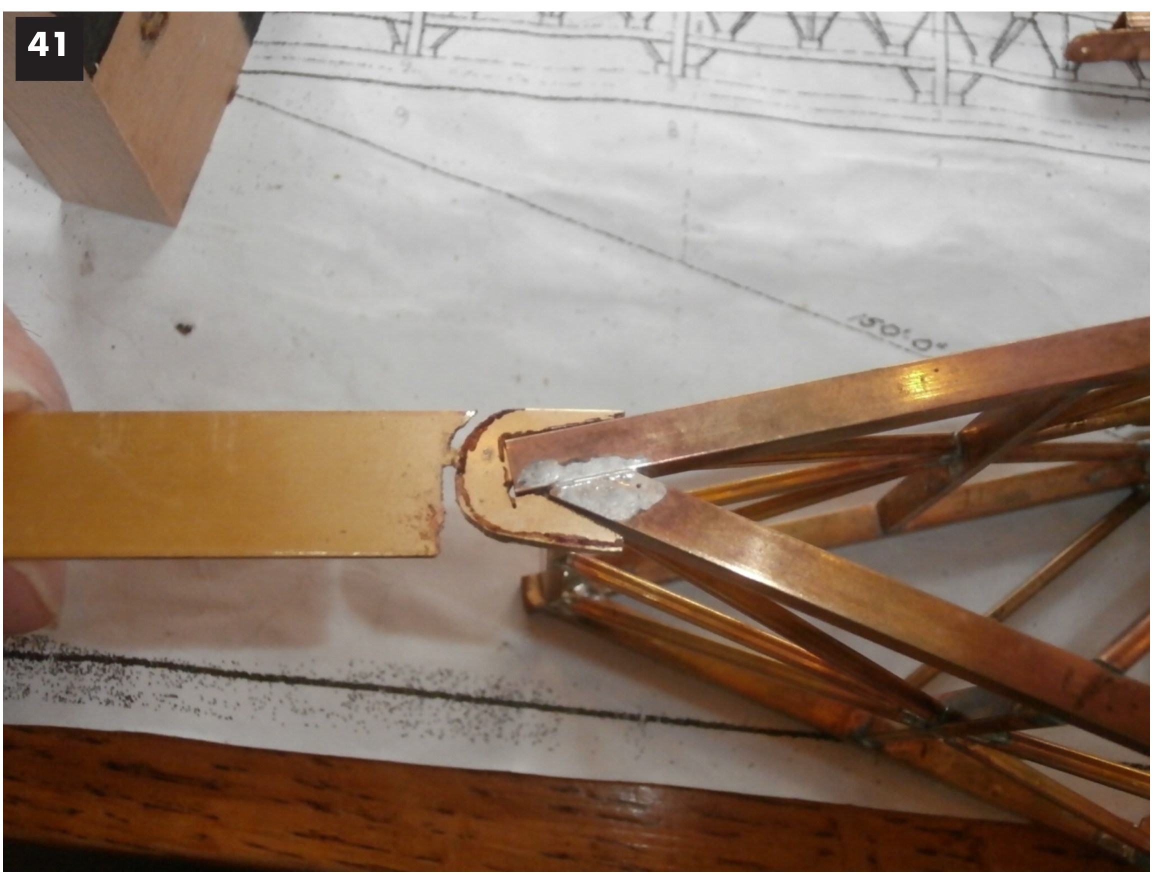

Image 41: The parts can be held in place while being silver soldered to the structure then they can be removed from the stock.

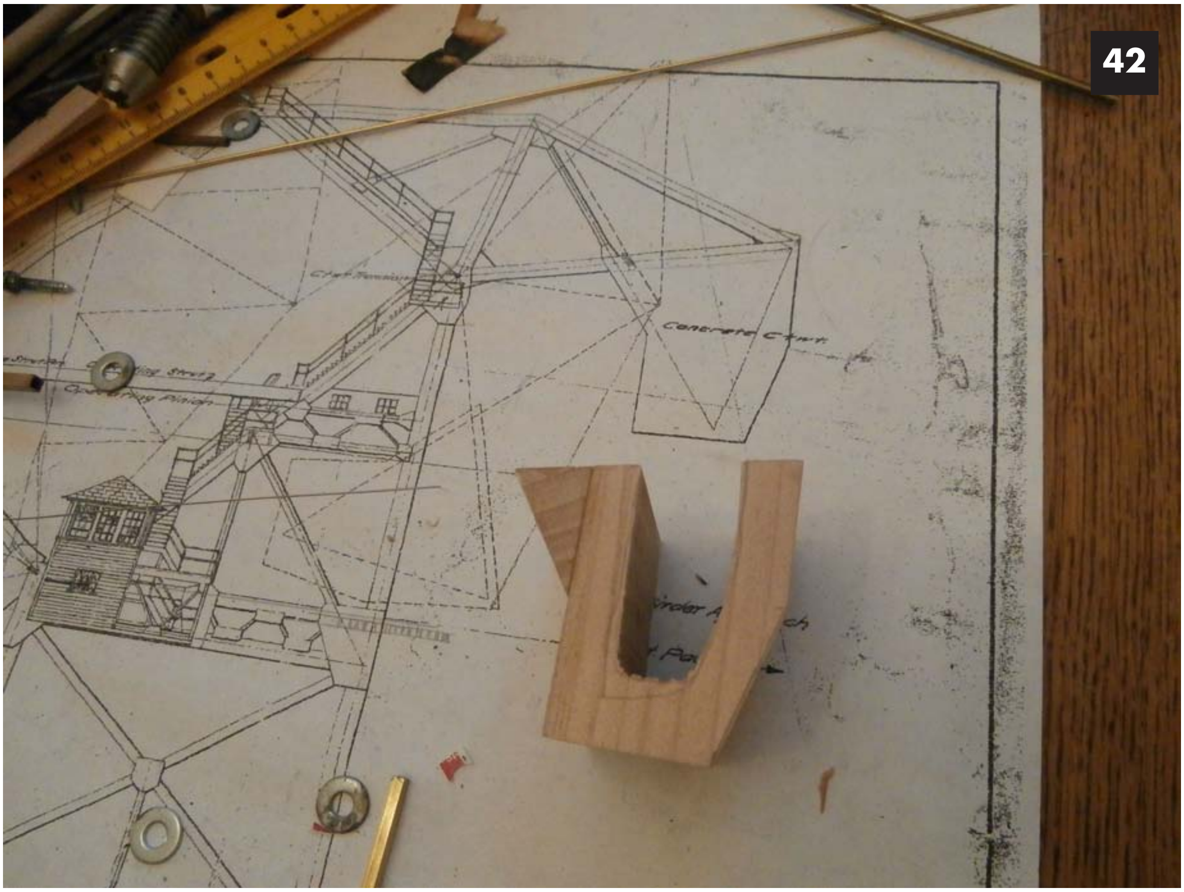

Image 42: Counter weight form

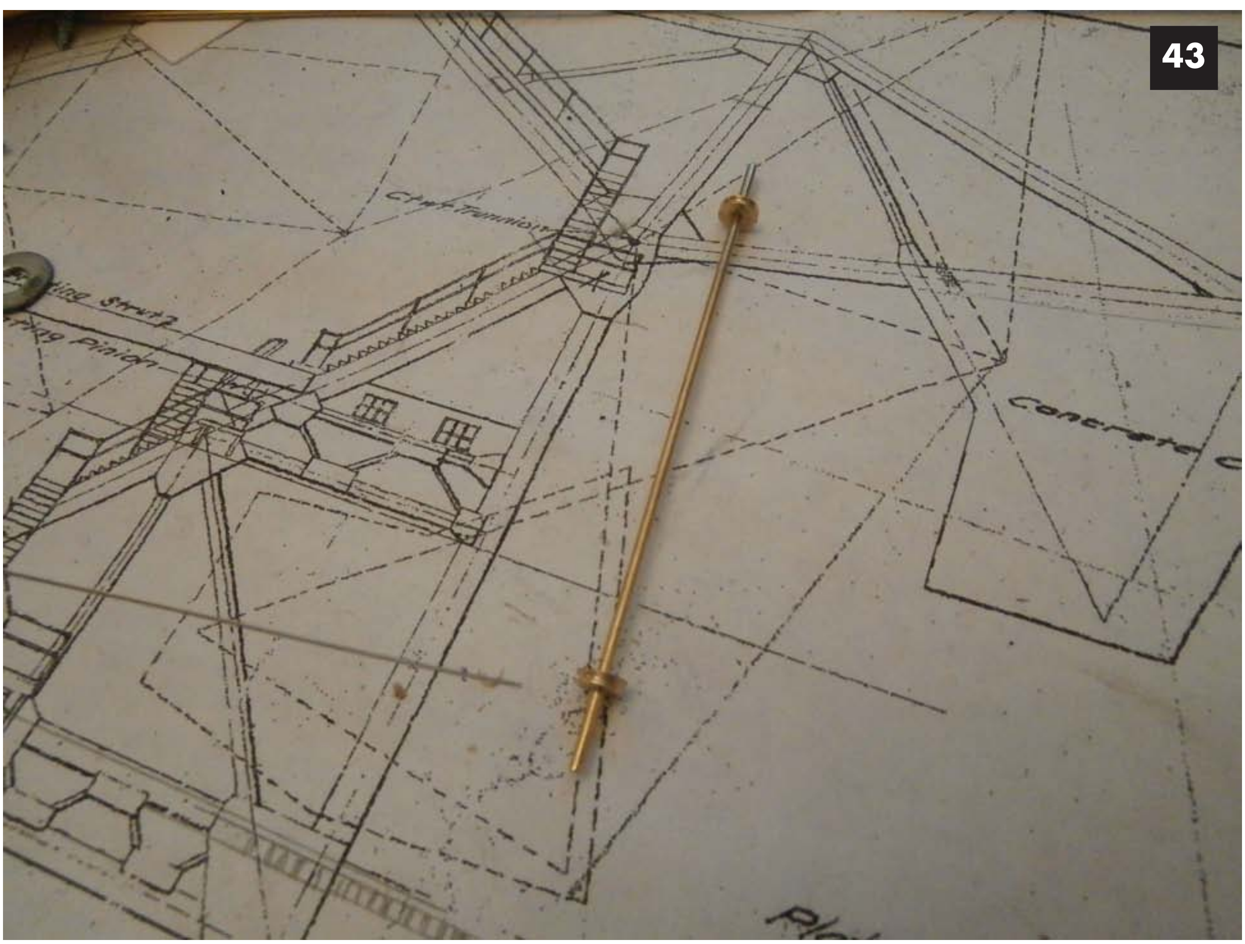

Image 43: Shaft and pulleys for operating arms

Image 44: North tower base showing special 4-40 trunnion screw which allows the lifting span to pivot. The toothy critter wire can be seen extending down to the water. Below is the motor and spool and micro switches which allow the bridge to raise. (not shown)

Image 45: Nearly the same view shows the north tower and the complete counterbalance.

Image 46: The north trestle crossing Seaview Ave NW and the Northern Pacific track below. Ballard is to the right and Shilshole Bay is to the left.

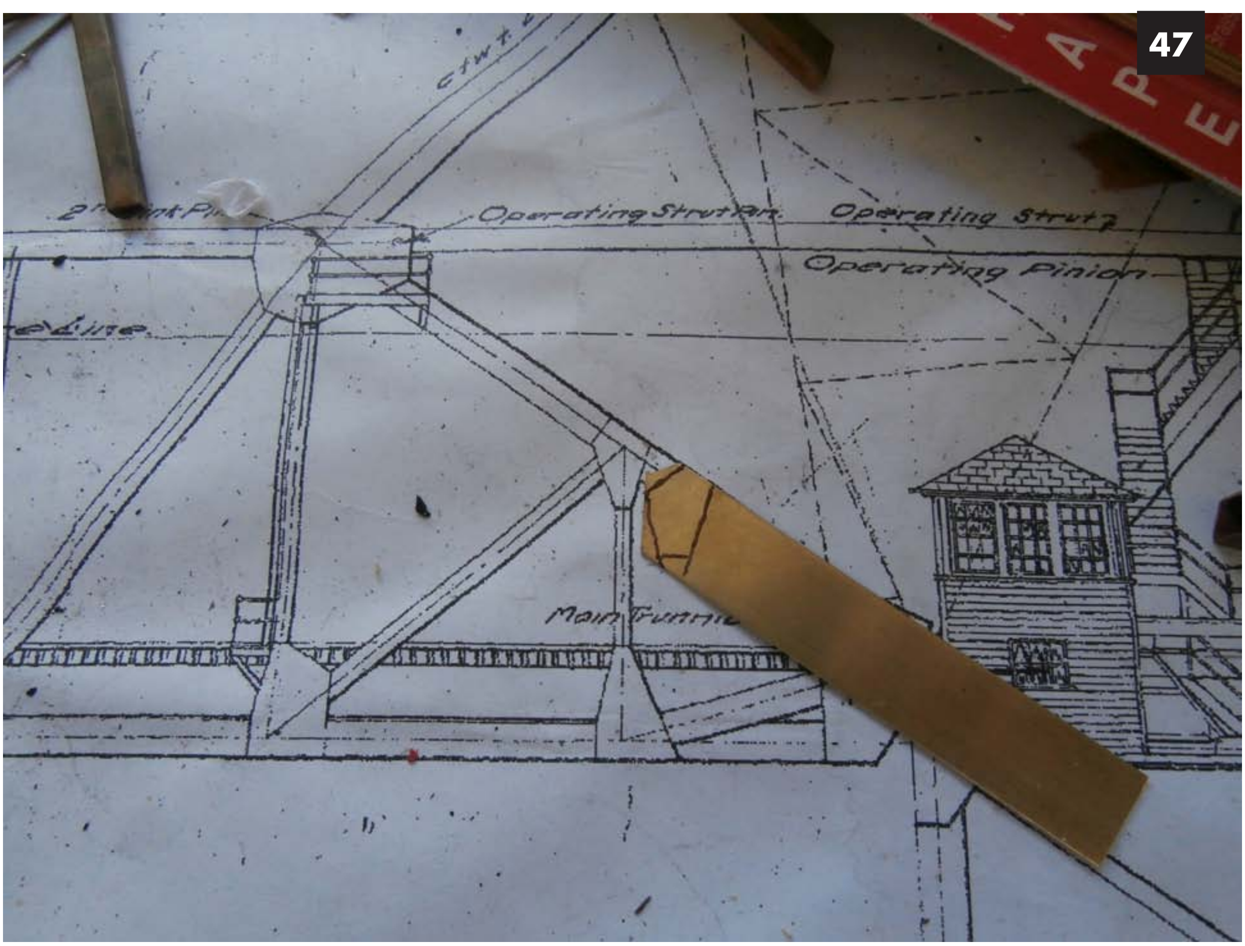

Image 47: Typical gusset layout.

Image 48: Typical gusset layout.

Image 49: Gussets silver soldered in place.

Image 50: Gussets silver soldered in place.

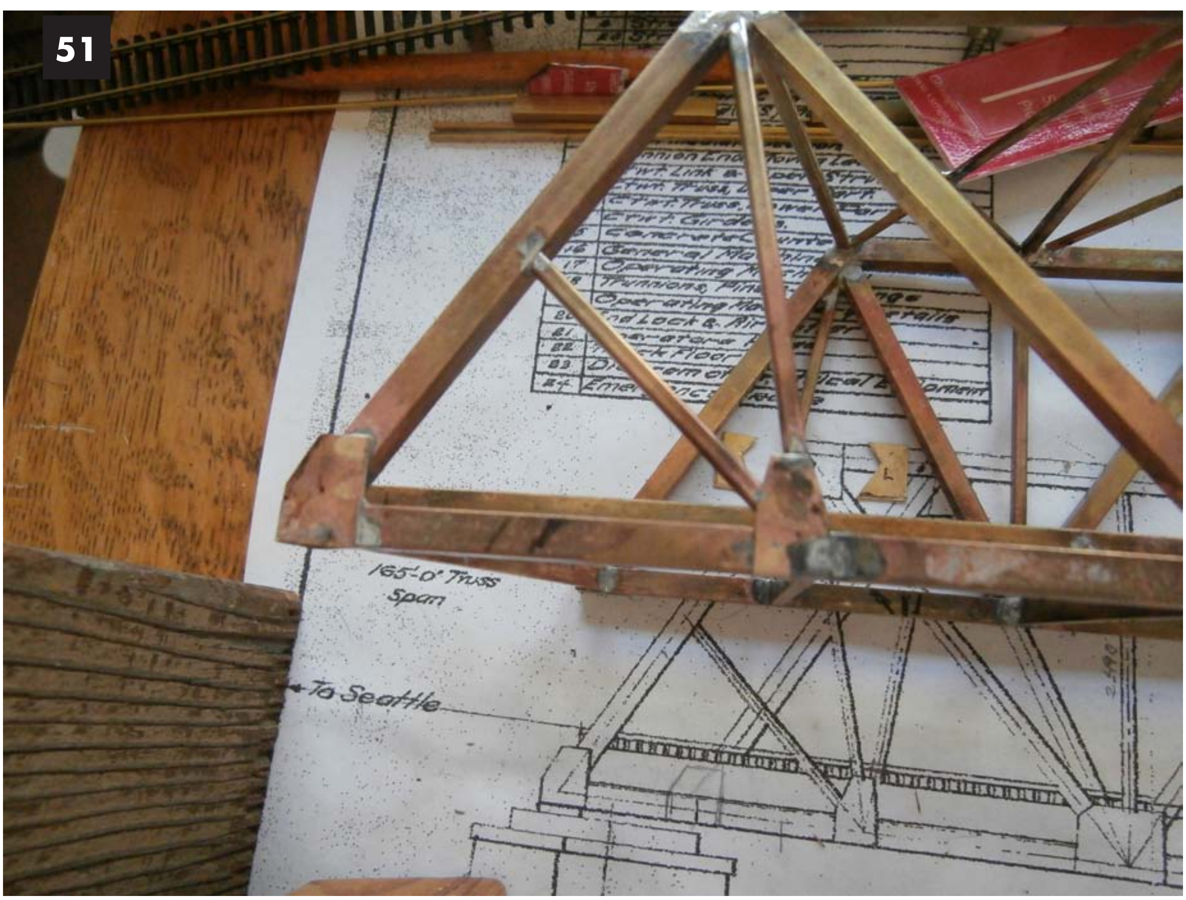

Image 51: Gussets silver soldered in place.


Image 52: The Hiram Chittenden locks are in the background to the right.


Image 53: Waterway northeast of the bridge

Image 54: A closer look at the operator's shack from June, 2017. At this date the exterior has been updated and the window arrangement changed from the 1950s configuration.

Image 55: The bridge is lowered. Looking southwest the fixed span is on the far side of the bay. The lifting span is to the right.

Image 56: Looking at the lifting mechanism shack on the north tower from the east side. The two horizontal bars are the operating arms. Trains pass directly under the lifting mechanism shack.

Image 57: The lifting span looking south.

Image 58: A closer look at the operating arm.

Image 59: The counterweight weighs 1,000,000 pounds to balance the lifting span.


Image 60: View of the counterbalance looking south from Seaview Ave NW.


Image 61: View of the counterbalance looking south from Seaview Ave NW.

Image 62: View of the counterbalance looking south from Seaview Ave NW.

Image 63: View of the counterbalance looking south from Seaview Ave NW.

Image 64: View of the lifting span looking south from Seaview Ave NW. The bridge was raised while I was walking under the tracks.

Image 65: View of the concrete piers supporting the south fixed span.

Image 66: Trestle support pier on the north side of the north tower.

Image 67: Looking south through the trestle

Image 68: Looking up at the trestle and the counterbalance arm above.

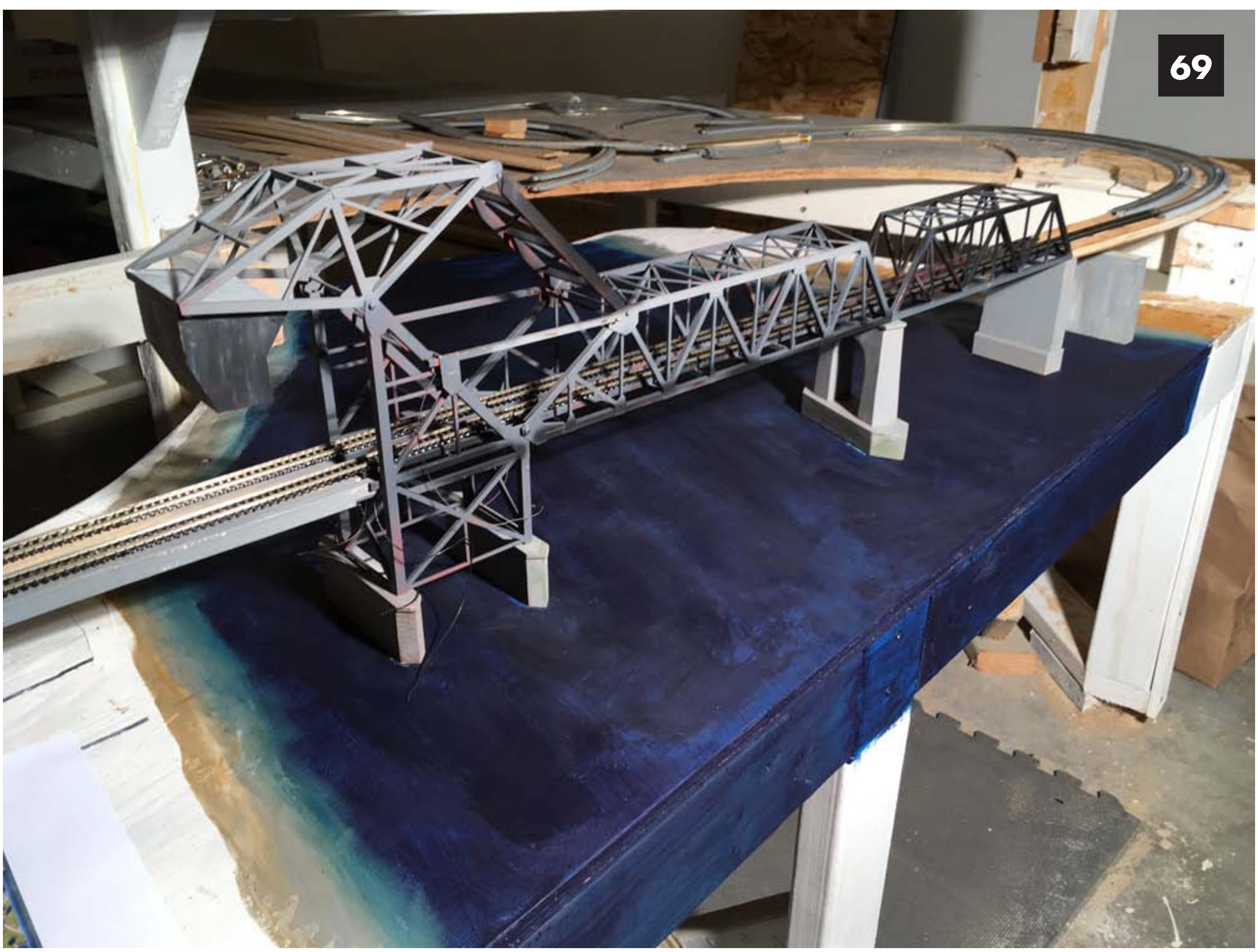

Image 69: GN Bridge 4 installed. Ballard is to the right (north, Interbay Yard is around the curve on the right (south), and “The Locks” will be constructed east of the bridge.

Image 70: A pair of E7s pull #8 the eastbound Empire Builder across Bridge 4 through Ballard and will soon be winding along the Puget Sound coast through Richmond Beach, Edmonds, to Everett. The upper deck will be the Milwaukee Road's street running through downtown Renton. ◗

TRAVEL GUIDE N EVENTS

2022 JUN 14-19 TN Nashville.
28th Annual National N Scale Convention
Registration opens December 06.
https://www.nationalnscaleconvention.com

2022 SEP 10-11 UK Altoona
2022 International N Gauge Show at Warwickshire Event Centre, Nr Leamington Spa
Visit: www.ngaugeshow.co.uk

2022 SEP 16-18 PA Altoona
The 2022 N-Scale Weekend™ at the Blair County Convention Center. Visit: HTTPS://WWW.N-SCALEWEEKEND.COM/ABOUT-THE-SHOW

2023 FEB 25-26 WA Monroe. The United NorthWest Model Railroad Club's 2023 Washington State Model Railroad Show and Marketplace in Monroe, Washington Fairgrounds.

2023 JUN ??-?? NV Sparks/ Reno area.
29th Annual National N Scale Convention. ◗

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