



HO Structure Kit **BASCULE BRIDGE** 933-3070

Thanks for purchasing this Cornerstone® kit. Please read these instructions and study the drawings before starting construction. All parts are styrene, so use compatible glue and paint to finish your model. As part of the Cornerstone Engineered Bridge System, walthers.com/bridgesystem, your new model can easily be used with other Cornerstone bridges and accessories to create a custom structure for your railroad. PLEASE NOTE: your new bridge is designed as a working model. The gears in the drive mechanism are made of Delrin® plastic and should be lubricated with a light, plastic-compatible grease before operation.

Rivers have always challenged railroad bridge builders, especially where the waterway is used for commercial shipping. While pleasure boats require very little clearance, ocean-going freighters or large naval vessels must also be able to pass safely. In congested urban areas, the best choice for the job is a Bascule bridge.

Fixed at one end to open and close like a jackknife, the basic idea dates back centuries, a common example being drawbridges over moats protecting medieval castles. For railroads, the design has many advantages. Smaller and simpler, they have fewer moving parts than other movable bridges, so they're cheaper to build and maintain. Their greatest advantage however is that they can be partially raised to quickly clear small vessels, then closed, making them an ideal choice for busy rail lines.

The actual lifting work is done by a large counterweight, with help from a heavy-duty electric motor and gear drive to overcome its inertia. As the balance point is reached, the motor shuts off and gravity takes over, raising the bridge.

Because approaching vessels have the right-of-way, the bridge must be manned 24 hours a day; where a channel is closed during winter months, the bridge is left in the down position. So that the bridge tender has a clear view of the waterway and the railroad, a crow's nest is mounted at the fixed end. Today, he or she is in radio contact with passing trains, as well as approaching vessels since advance notice is required to coordinate safe movements.

Before centralized traffic control, an interlocking tower was an integral part of the bridge, where the operator controlled signals regulating movement of trains across the structure. Railroads preferred to build single-track bridges, and it was easier to funnel a double-track mainline into a single track, with additional turnouts and signals on each side.

For added safety, all signals interlocked with the lifting mechanism so a signal to proceed could only be displayed when the bridge was closed. While the lowered counterweight would effectively stop an approaching train on that side, some roads also installed derails (special track switches that would actually derail the train) or "smash boards" (similar to a semaphore blade that hung over the tracks) if the engineer failed to stop.

While the majority of Bascule bridges were stand-alone installations, if conditions required approaches standard bridges were used. The Bascule Bridge was installed over the deepest part of the channel, where the largest vessels would pass.

Due to their heavy steel construction and regular maintenance, many of these bridges have provided decades of service and remain in daily operation. In some areas where shipping traffic was diverted or eliminated, moving bridges are no longer needed. But since they are expensive to replace and are in useable condition, the existing Bascule Bridge was simply left in place.

Based on a Northern Pacific bridge crossing the Duwamish River in Seattle, Washington, and still in use by BNSF, similar Bascule Bridges can still be found on all types of railroads today. To prevent derailments or severe damage to the structure, they're fitted with special track and guardrails, which can easily be added to your model with Walthers Code 83 Bridge Track with Separate Approach Ends (#948-886, sold separately). To simplify installation in new or existing scenery, Single-Track Railroad Bridge Concrete Abutments (#933-4551) are available separately. For more ideas and information on the Cornerstone Engineered Bridge System please visit walthers.com/bridgesystem. For additional products to complete your scene, see your participating hobby dealer, check out the latest Walthers Model Railroad Reference Book or visit us online at walthers.com.

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PLEASE NOTE: This model is designed for use with Walther's Code 83 Bridge Track with Separate Approach Ends (#948-886, sold separately), which can be installed during this step for easier construction.

1) With the alignment tab along a straightedge (tabs point to the ends), make two Girders by gluing Short (6) and Long (16) sections lengthwise as shown; set this assembly aside to dry completely. Glue notches in Girder assemblies to openings in Cross Girders (6x 7). Continue assembly by gluing Right End Girder (8) to the pivot (right) end. Note the tab on Left End Girder (#128) is at the bottom: complete assembly by gluing to left end as shown; set aside to dry.

2) Glue Left (3 & 5, 13 & 15) and Right Side Girder Halves (2 & 4, 12 & 14) together. PLEASE NOTE: Glue Splice Plates (2x 20; one per side) to lower edge of each pair of sides as shown, making sure they are all the way up and in the slot so they will not interfere with bottom bracing. Set this assembly aside to dry.

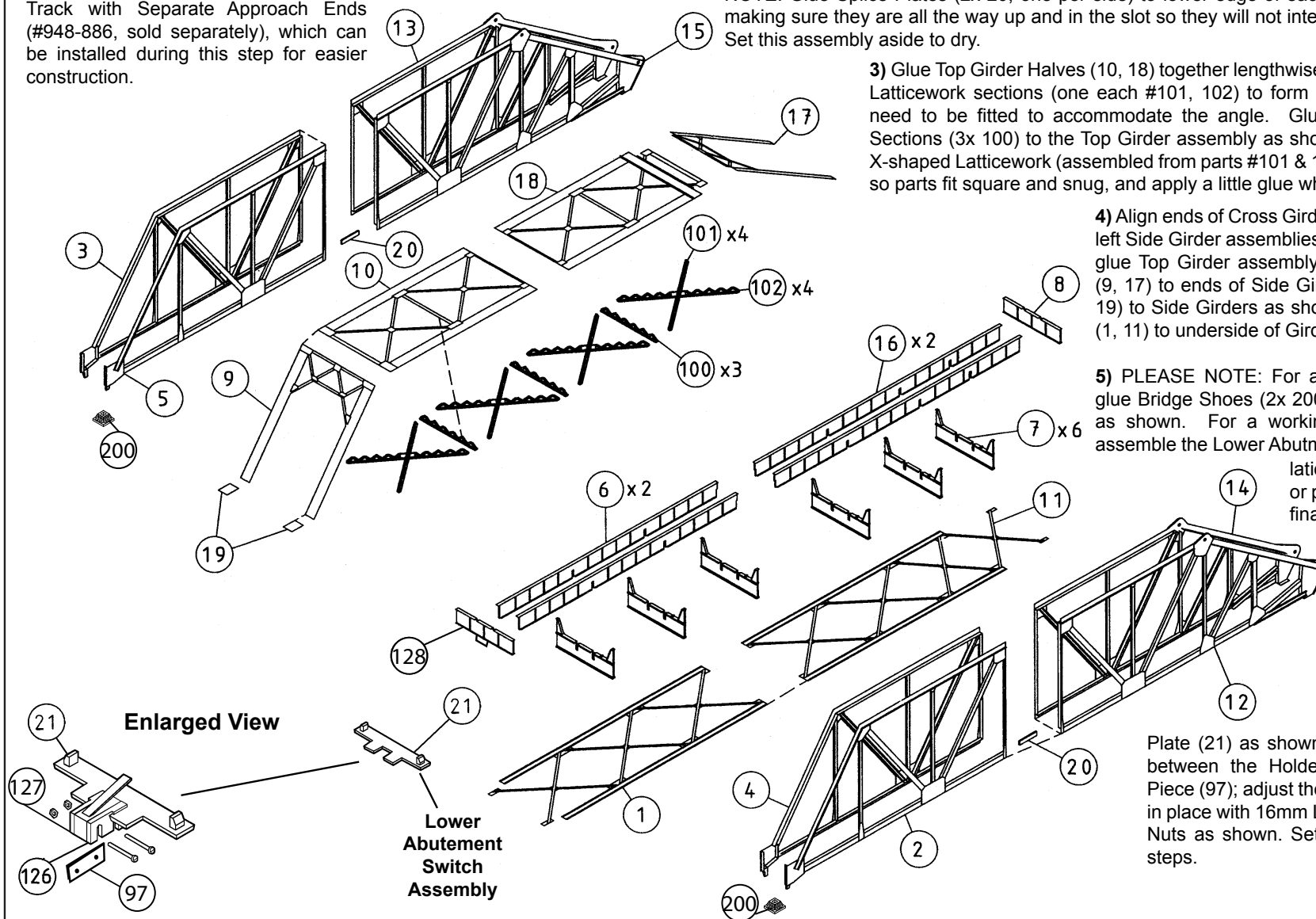
3) Glue Top Girder Halves (10, 18) together lengthwise as shown. Insert the four Latticework sections (one each #101, 102) to form an X-shape; the joint will need to be fitted to accommodate the angle. Glue the Single Latticework Sections (3x 100) to the Top Girder assembly as shown. Align the ends of the X-shaped Latticework (assembled from parts #101 & 102) and adjust as needed so parts fit square and snug, and apply a little glue where parts meet.

4) Align ends of Cross Girder assembly with right and left Side Girder assemblies and glue in place. Fit and glue Top Girder assembly in position. Glue Portals (9, 17) to ends of Side Girders. Glue End Caps (4x 19) to Side Girders as shown. Glue Bottom Bracing (1, 11) to underside of Girder assembly.

5) PLEASE NOTE: For a nonworking model only, glue Bridge Shoes (2x 200) to pins on Side Girders as shown. For a working model, you'll need to assemble the Lower Abutment Switch for later installation atop a bridge abutment or pier (both sold separately):

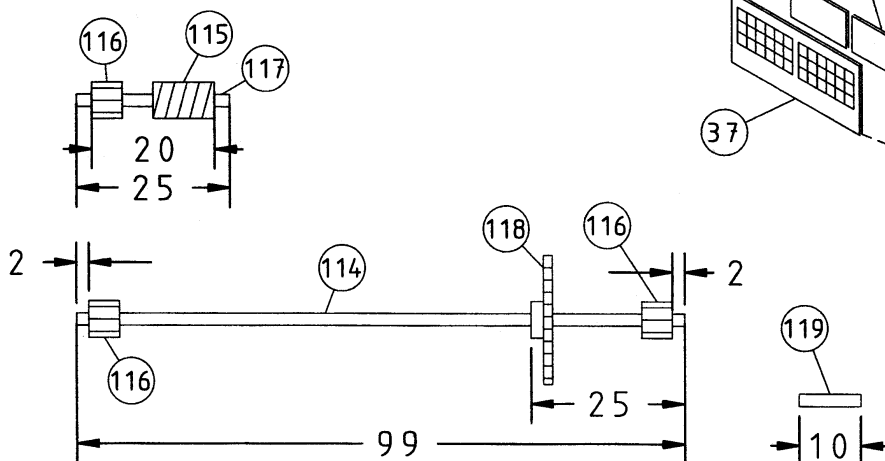
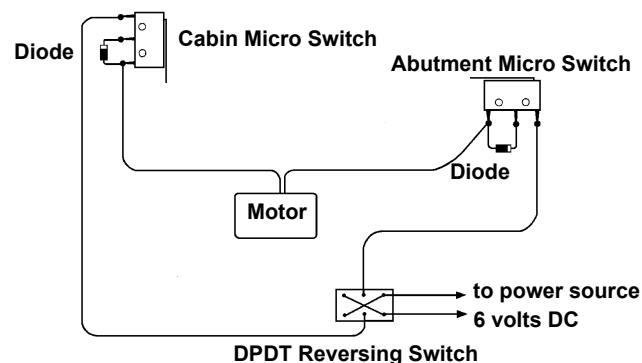
final installation and alignment are covered in Walking Beam Support Assembly step 9. The Switch Holders (Right 126 and Left 127) are mirror images; be sure the extended "wings" are glued to the top of the Abutment

Plate (21) as shown. Insert the Micro Switch between the Holders, along with the Filler Piece (97); adjust the fit as needed and secure in place with 16mm Long Machine Screws and Nuts as shown. Set aside for final assembly steps.



Cabin & Drive Subassembly Drive and Wiring Assembly Diagram

6) Note the correct placement of all components on the motor wiring diagram below; the light colored area on each diode indicates its proper orientation. We suggest using a double-pole, double-throw reversing switch (sold separately) to turn the motor on and off. Use a DC power supply (sold separately) that can be adjusted to about 6 volts.



7) Using the metal rod provided, cut drive shafts to these lengths and lightly bevel the ends:

2x #114: 3.8" (99mm) each

1x #117: 0.9" (25mm)

6x #119: 0.3" (10mm) each

8) On the end opposite the wires, press a Worm Gear (115) on the Motor (113) shaft. PLEASE NOTE: Cut the other end of the shaft so it's about 1mm long; if using a power tool and cutting disk, wear proper safety gear and work carefully; do not overheat the shaft!

9) With the Cabin Micro Switch all the way at the ends of the slots, attach the Switch to the Platform (125) with the 16mm Long Screws and Nuts. Cut two pieces of wire about 4" (10.1cm) long and a single piece 2" (5cm) long to prewire the Cabin; solder wires to Motor, and solder wires and diodes to Cabin Micro Switch as shown on the wiring diagram.

10) Assemble Short Drive Shaft (117) as shown with Large (115) and Small (116) Gears inset 0.09" (2.5mm) from each end.

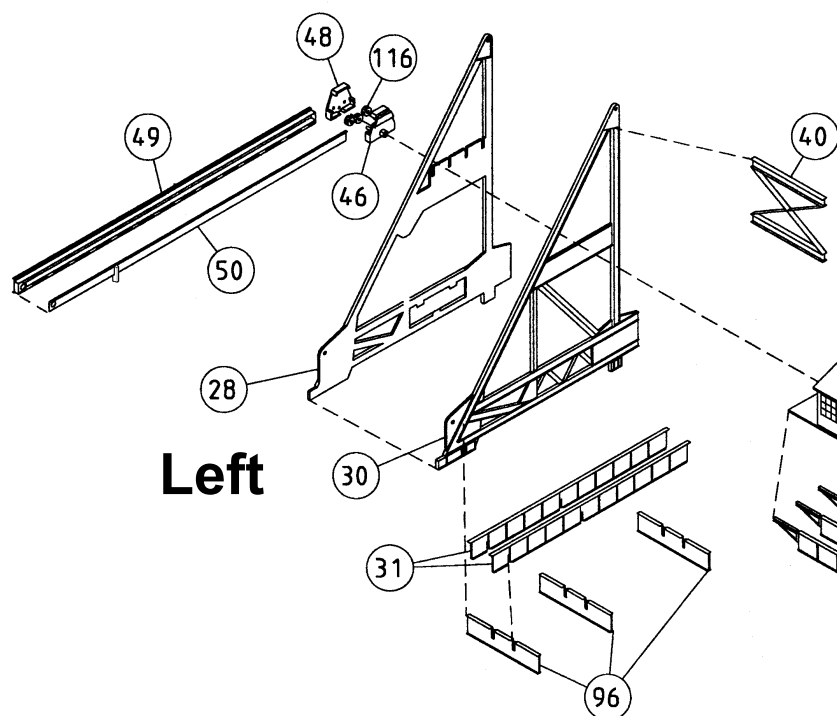
11) PLEASE NOTE: Small Gears (2x 116) as shown are installed in a later step. Press Large Gear (118) on to Shaft (114), 0.9" (25mm) from the end; Slide Shaft through small holes in Right (91) and Left (92) Motor Mounts and End Wall (35); the Large Gear will rest near the Right Motor Mount. Slide Shaft through small holes on opposite End Wall (91).

12) Slide Left (93) and Right (94) Short Shaft Supports onto ends of Short Shaft assembly as shown. Using the pins to align parts, glue Shaft Supports into openings on Right Motor Mount (91). Note the raised ridge on the Floor; align slots on inside of Right Cabin Wall (34) with edges of Short Shaft Supports and raised ridge on Floor and glue in place.

13) Glue Glass (2x 38) to inside of Front Cabin Wall (37). Using raised ridges on Floor (33) to align parts, glue Front, Left (35) and Rear (36) Cabin Walls to raised ridge on Floor and at inside edges where parts meet. Roof Halves (2x 39) may be glued together where parts meet in the center or left as separate parts. PLEASE NOTE: We suggest you set aside the front and back Cabin Walls and Roof for later assembly after your Bridge is in place and the moveable span is adjusted on your layout.

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14) Slide Right Gearbox Half (47) over Motor shaft extending from right side of Cabin. Press Small Gear (116) on the shaft, 0.07" (2mm) from the end. Slide Left (46) and Right Gearbox Halves (47) over motor shafts extending from Cabin. Press a Small Gear (2x 116; one on each end) on the shaft, 0.07" (2mm) from each end.



Left

15) Note the openings in the Girders (2x 31); glue Cross Girders (3x 96) to openings and end as shown. Glue edges of Cross Girders to openings in Inner Left and Right A-Frame, make sure parts are aligned and level, and set aside to dry.

16) Before gluing the Outer Right (27) to Inner Right A-Frame (29), you may wish to insert a length of wire or string to assist in pulling the motor wires through this assembly in a later step. Glue parts together and set aside to dry.

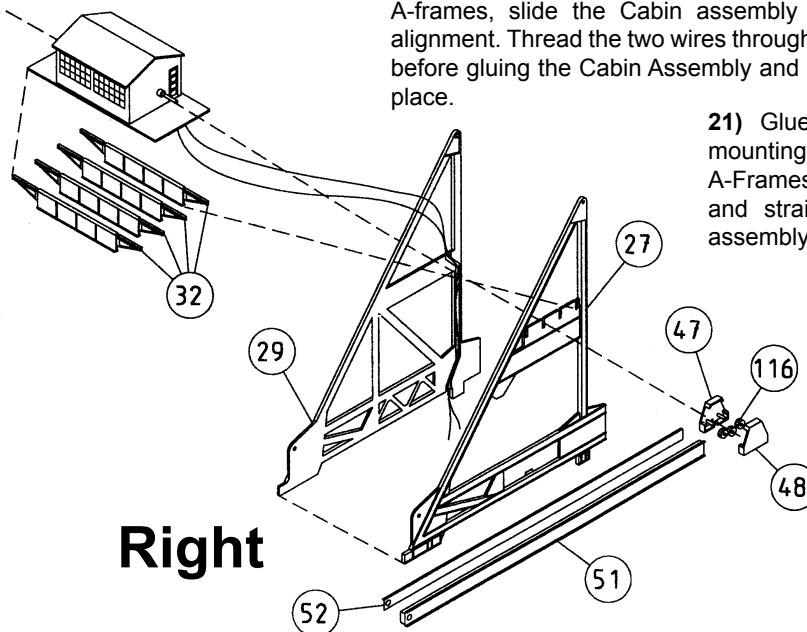
17) Glue Outer Left (28) to Inner Left A-Frame (30) as shown and set aside to dry.

18) Glue Left and Right A-Frame assemblies to Cross Girders and allow to dry.

19) Note the slots in Outer Right (27) and Outer Left A-Frame (28); place - do not glue - Cabin Supports (4x 32) in these slots.

20) With the Cabin Supports loosely in place, spread the A-frames, slide the Cabin assembly in place and check for alignment. Thread the two wires through the Right Hand A-Frame before gluing the Cabin Assembly and Bottom Braces (4x 32) in place.

21) Glue Back Bracing (40) to mounting points on Inner A-Frames. Make sure they're flat and straight; set aside for later assembly.



Right

22) Glue Left (49, 50) and Right (51, 52) Racks together; make sure parts are flat and straight and set aside for later assembly.

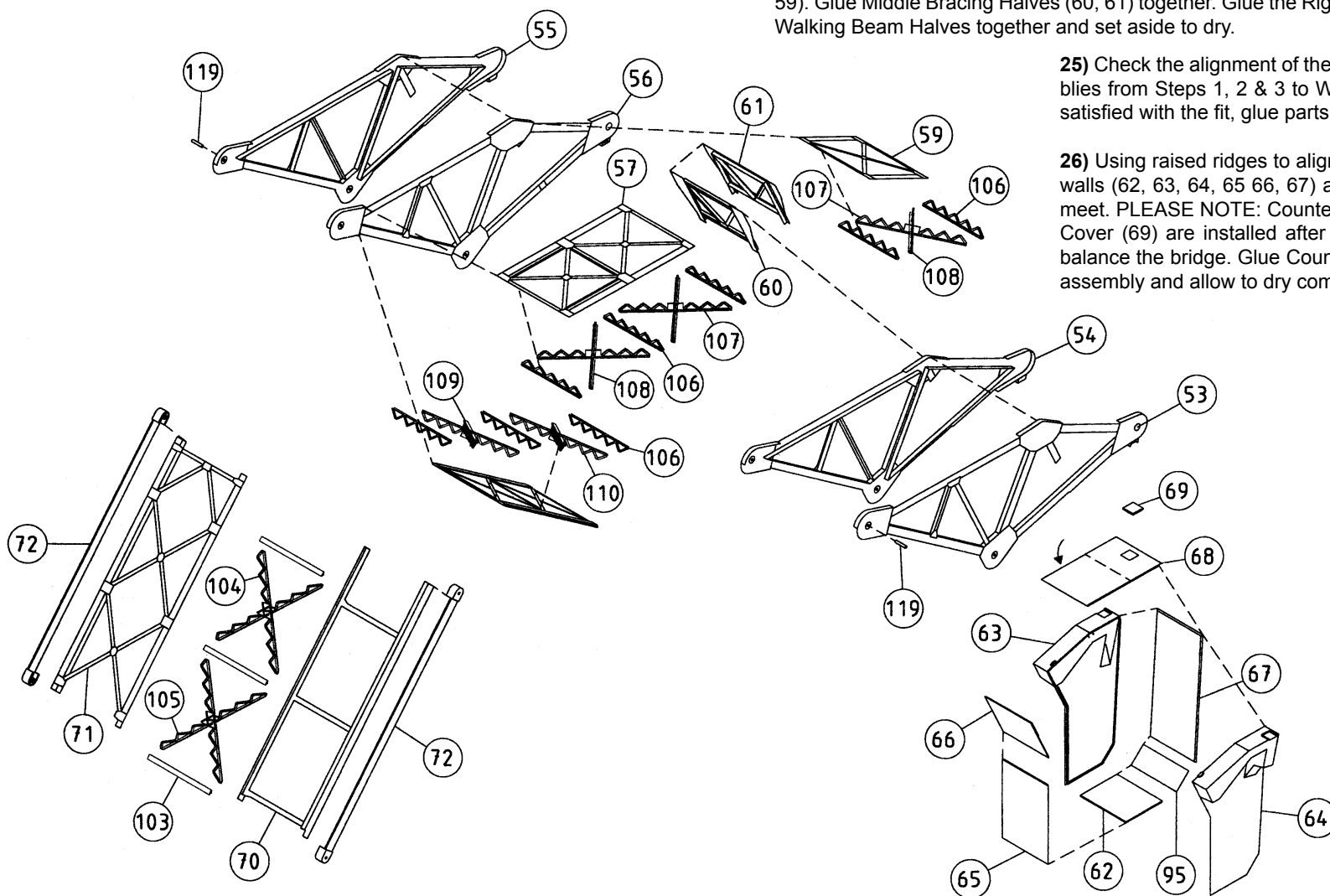
Walking Beam & Weight Assembly

23) Using the pins to align parts, fit and glue Crisscross Latticework (104, 105) to bracing on Upper Walking Beam Support (71). Using the pins to align parts, fit and glue Straight Lattice (3x 103) to cross braces on Lower Walking Beam Support (70). Fit and glue Upper and Lower Supports to each other, and glue to beam Sides (2x 72). Set assembly aside to dry.

24) Fit and glue Latticework (106, 107, 108, 109, 110) to back of Bracing pieces (57, 58, 59). Glue Middle Bracing Halves (60, 61) together. Glue the Right (53, 54) and Left (55, 56) Walking Beam Halves together and set aside to dry.

25) Check the alignment of the completed Bracing assemblies from Steps 1, 2 & 3 to Walking Beam Halves; when satisfied with the fit, glue parts together as shown.

26) Using raised ridges to align parts, glue Counterweight walls (62, 63, 64, 65, 66, 67) at inside edges where parts meet. PLEASE NOTE: Counterweight Top (68) and Hatch Cover (69) are installed after you have added weight to balance the bridge. Glue Counterweight to Walking Beam assembly and allow to dry completely before proceeding.



22) PLEASE NOTE: To improve the fit of the metal pins (2x #119 cut in step 2), we suggest drilling a #48 hole in each Walking Beam Support mounting point and a #47 hole at each of the four Walking Beam openings.

PLEASE NOTE: Before attaching the gear racks for final assembly, place the entire bridge on a flat, level surface so that all gears and gear racks will be in alignment.

25) Note the correct placement of the Gear Racks assembled in step 17 (right side shown); the open connection points face forward while the stops (raised round areas molded on the rack sides) are at the rear towards the counterweight. Be sure the tab on the Left Gear Rack aligns with the Cabin Micro Switch arm. Place the Right and Left Gear Rack assemblies on the gearboxes.

27) Place the completed Rack assemblies with the teeth facing down on the gears; confirm that all gears on the gearboxes and racks align and fit freely. Carefully glue the edges of the Outside Gear Box Halves (2x 48) to the edges of the Inside Gear Box Halves and let dry completely.

29) Apply a small amount of plastic-compatible grease (sold separately) to the Worm Gear on the motor shaft, and a drop of plastic-compatible oil (sold separately) to the other rotating parts.

31) Install the Lower Abutment Switch assembly on top of an abutment or pier (both sold separately), making sure it aligns with the “feet” at the end of the side girders when the bridge is in the down position. Adjust the switch to turn off the motor just as the movable span touches down – be careful not to force the span too far and stall the motor. Test the operation; PLEASE NOTE: the motor must shut off completely when the bridge reaches the up or down positions to prevent damage to the mechanism. Tighten the contact screws on both switches once you’re satisfied with the bridge operation. The Cabin Sides (36, 37, 38) can be glued in place; the Shed Roof should be set in place so you can remove it to make adjustments or perform future maintenance.

32) Glue Windows (79) and Doors (81) to Walls (74, 75, 76, 77). Using the raised ridge on the Base (73) to align parts, glue Walls to Base and at inside corners where parts meet.

34) PLEASE NOTE: Glue Outside Railings (2x 89) to the outside of the Platforms; Glue Railings 87 and 87A to the top of Platforms and to the Wall. Glue Inside Railing (88) to Wall and to Long Handrail (90).

in parts, glue

5) as shown.
the doors. To
Glue Small

This diagram shows the assembly of the main structure and the doors. The main structure is a large, complex frame made of various beams and supports. The doors are shown being attached to the structure. The diagram includes the following parts and quantities:

- 114: A long horizontal beam.
- 95: A vertical support beam.
- 119: Multiple small rectangular components used as spacers or supports.
- 86 x 2: Two small rectangular components.
- 87: A small rectangular component.
- 88: A small rectangular component.
- 89: A small rectangular component.
- 2 x 83: Two small rectangular components.
- 84: A small rectangular component.
- 85 x 2: Two small rectangular components.
- 90: A small rectangular component.
- 77: A large rectangular panel.
- 78: A small rectangular component.
- 80 x 9: Nine small rectangular components.
- 79 x 9: Nine small rectangular components.
- 81: A small rectangular component.
- 75: A small rectangular component.
- 73: A small rectangular component.
- 76: A large rectangular panel.
- 74: A large rectangular panel.

1. After cutting out the decal, dip in water for 10 seconds, remove and let stand for 1 minute. Slide decal onto surface, position and then blot off any excess water.

2. Lightly brush Micro Sol® on top. This will soften the decal allowing it to con-form to irregular surfaces. **DO NOT TOUCH DECAL** while wet!

3. When the decal is thoroughly dry, check for any trapped air bubbles. Prick them with the point of a small pin or hobby knife blade and apply more Micro Sol®.