CORNERSTONE®

HO Structure Kit
BRIDGE CRANE
933-2906

Thanks for purchasing this Cornerstone Series® kit. Please take a few minutes to read these instructions and study the drawings before starting construction. All parts are made of styrene plastic, so use compatible glue and paint to assemble your model. NOTE: This kit includes optional parts to build a model 22, 24, 28 or 31" (55, 60, 70 or 77.5cm) long.

As America's heavy industry grew during the 19th century, so did its appetite for raw materials. As the distances between factories and sources of critical supplies such as coal and iron ore increased, the need for reliable transportation systems that could handle bulk materials became increasingly important.

For centuries, ships had been the primary means of moving people and goods over long distances. Much of the technology was adapted to the thousands of miles of inland rivers and other waterways across America, and tiny settlements soon blossomed into major urban centers. Other cities, seeing the success of their neighbors, built canals to connect with natural waterways. Miners, farmers and others found a ready market for their goods and affordable bulk shipments were soon feeding the industries of the east.

Many of these manufacturing operations had been built alongside rivers, where the current was harnessed to drive waterwheels that powered machinery. As water transport became increasingly important, factories on rivers and in harbors were in an ideal position to ship or receive materials by boat.

In an era when labor was cheap and vessels were small, loading and unloading cargo by hand was acceptable. But as demand began to outpace delivery, the door was opened for an entirely new type of vessel. In 1869 the first true bulk freighter arrived, measuring a whopping 211' long and 32' wide. Within a few years, even larger vessels were in regular service.

While huge amounts of material could be delivered, getting it in and out of these big vessels was another problem. With an army of men shoveling and pushing wheelbarrows, it took days to unload. And while the vessel was in port, it wasn't making any money.

During the 1880s, the steel industry began adopting the Bessemer process, which demanded still larger supplies of raw materials. This paved the way for the first mechanical devices, including various types of cable and bucket unloaders. While the cables allowed the use of larger buckets and made lifting them in and out of the holds much easier, the buckets still had to be filled by hand. The next step in this evolution was a machine that could do both chores — the bridge crane.

Here at last was a machine that could quickly and economically unload coal, ore and other materials, making it popular with many different industries. Its main advantage was the self-filling grab bucket, which allowed a single operator to move substantial amounts of material. In order to reach into a vessel's hold, a longer boom that extended out over the water was used. The entire crane could be moved from side to side in order to unload from any hold as needed. This allowed the vessel to remain moored in one spot and kept it balanced as the weight shifted during unloading.

Because it was a mobile structure that did heavy lifting all day long and was constantly exposed to the wind and weather, bridge cranes had to be built tough to withstand a lot of stress. The main portion of the structure was essentially a steel bridge, constructed as a rigid truss span. Its bottom chord provided the runway for the trolley platform, carrying the electric motors and cable winches for the bucket, with the operator's cab mounted below to provide a clear field of vision. The span was supported by a V-shaped "pier leg" at one end, and a smaller "shear leg" at the other. Both were designed to move slightly in various directions to compensate for the load placed on the structure during operation. A series of stairways and landings running up the legs provided access to the cab and to the span for maintenance. At the bottom of each leg were the heavy-duty power trucks, which allowed the entire unit to move from side to side. The trucks were equipped with flanged wheels, powered by electric motors, and rode on their own set of rails. The area directly below and between these rails was left open for use as a stockpile, where loads being delivered were kept until needed. In operation, the bucket was lowered into the hold, the jaws were then closed and the bucket was lifted clear of the ship. The entire trolley was then backed into place, and the load was dropped onto the pile.

For decades, bridge cranes were fixtures along the nation's waterfronts. Industries such as gas works or power plants that consumed huge volumes of coal every day used them to stockpile fuel alongside the docks. Steel works were also users of these big cranes (typically known as "ore bridges"), to move iron ore and later taconite pellets, coal and fluxing stone from ship to shore. Bridge cranes were also used by large coal dealers who purchased various sizes of coal in bulk for resale to local industry, commercial and residential customers.

But the days of the big cranes were numbered. As demand for coal dropped in the 1950s and 60s, many bridge cranes soon found themselves out of work. New belt-type unloading systems carried aboard bulk freighters drastically cut unloading time and eliminated the need for a separate crane.

ON YOUR LAYOUT

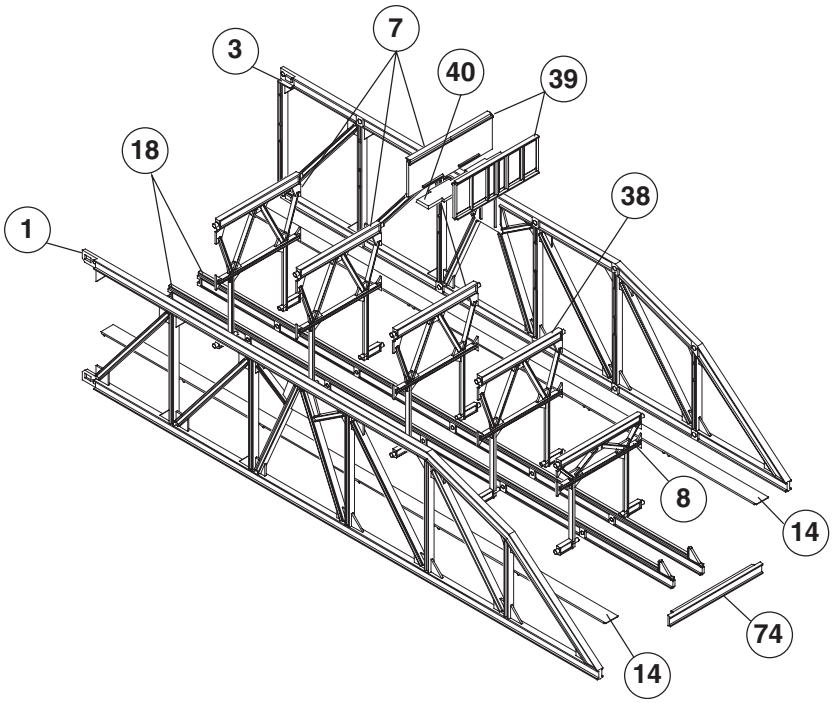
With its intricate skeleton of steel trusses, your new Bridge Crane is sure to be an eye-catching addition to any industrial scene. The finished model includes all of the features found on a typical bridge crane, so it can easily be adapted to any kind of waterfront industry.

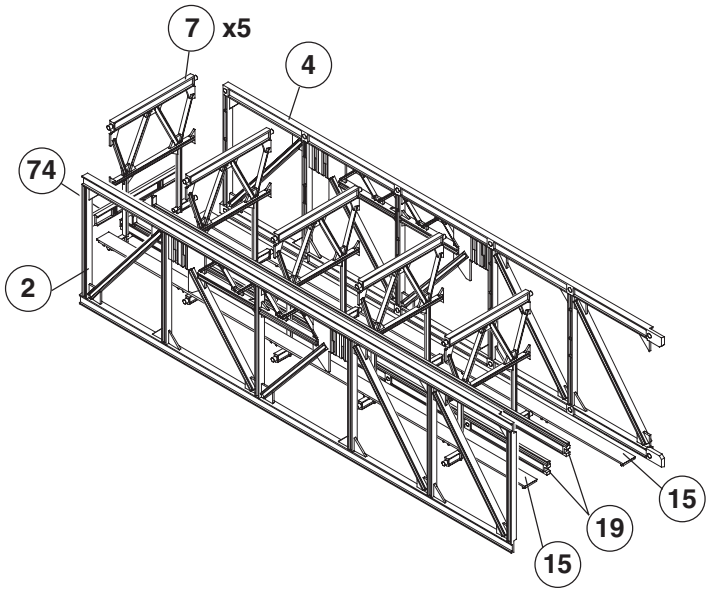
Among the many users of these types of cranes were gas works that consumed huge amounts of coal around the clock. A complete facility can be modeled with the Empire Gas Works collection that includes the Gas Plant (#933-2905), Gas Storage Tank (#933-2907), and Coke Retort (#933-2910).

Cranes of this type were frequently used at steel works, which can be modeled with the Blast Furnace (#933-3054), Rolling Mill (#933-3052) and Coke Oven & Quencher (#933-3053).

For more ideas on detailing your scene, ask your dealer, visit waltherscornerstone.com or see the latest Walthers HO Scale Model Railroad Reference Book.

1. Glue the front crossmember (8), second crossmember (38) and standard crossmembers (7) into the holes on the inside of the right front truss (1). Note: Make sure that the slanted top of #38 is facing the front. Glue the front trolley rails (18) to the pegs on the insides of #7, 8, and 38. Then glue the front walkway sections (14) on both sides of the crossmembers. Next glue on the left front truss (3). Glue on the end truss beam (74). Set aside. Glue the shear leg box (39, 40) together and in between trusses #1 and #3.

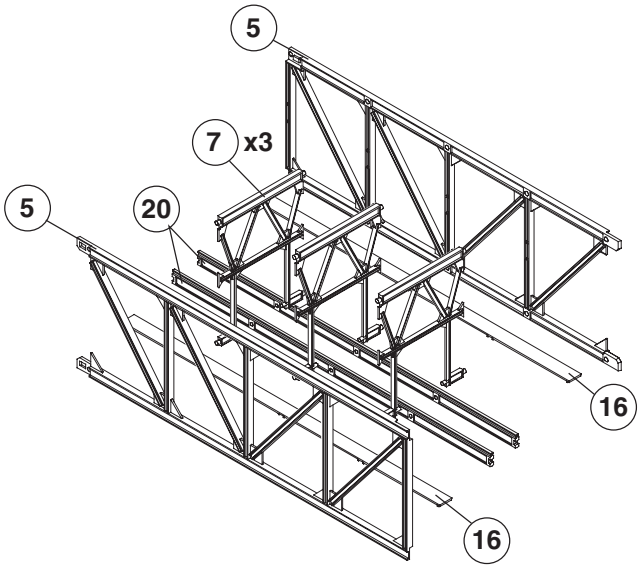




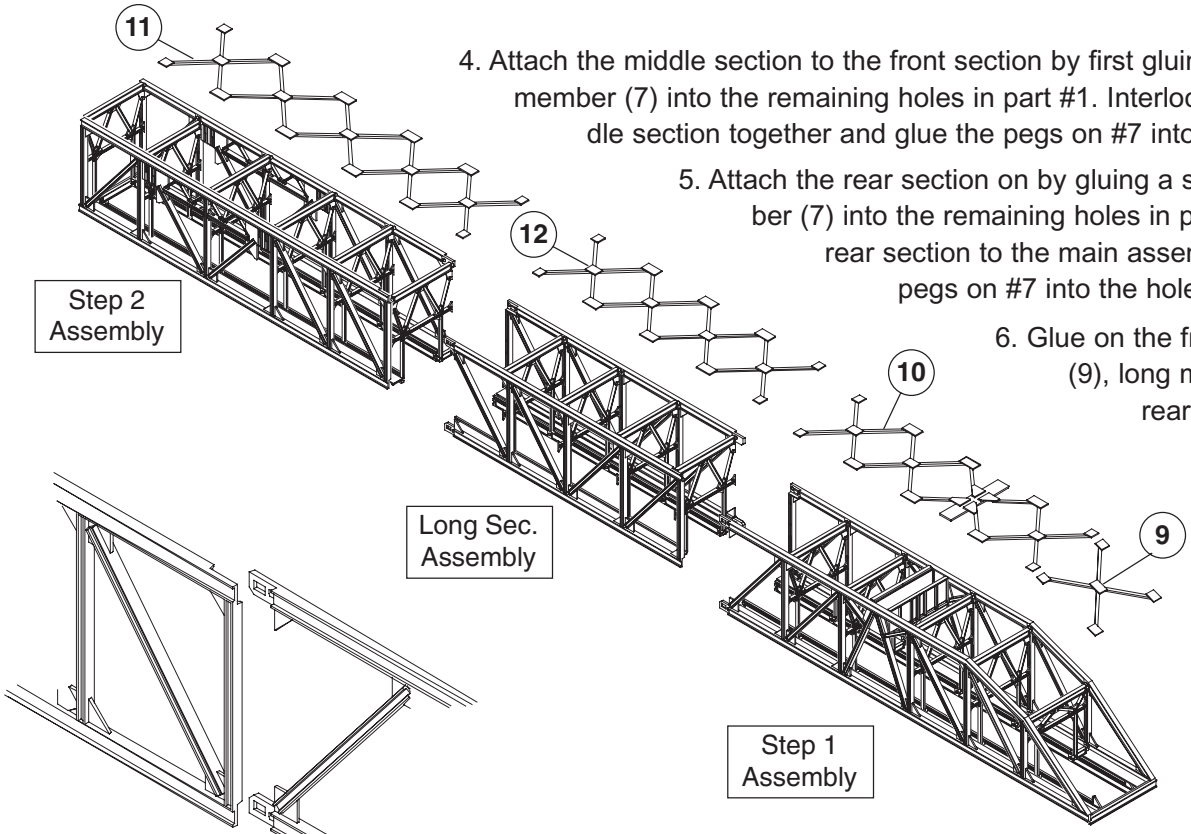
2. Glue the standard crossmembers (7) into the holes on the inside of the right rear truss (2). Glue the rear trolley rails (19) to the pegs on the inside of #7. Then glue the rear walkway sections (15) on both sides of the crossmembers. Next glue on the left rear truss (4). Glue on the end truss beam (74). Set aside.

Determine the length of the crane you would like to build. You have four options listed below:
A. Short – Combine front and rear sections
B. Medium – Use the short middle sections (6) with the front and rear
C. Long – Use the long middle sections (5) with the front and rear
D. Longest – Use both the short and long middle sections (5, 6) with the front and rear

NOTE: Illustrations shown are for constructing the long section (C)



3. Glue the standard crossmembers (7) into the holes on the inside of the long middle truss (5). Note: For the medium option (B), use part #6. Glue the long middle trolley rails (20) to the pegs on the inside of #7 (for medium option, use part #21). Then glue the long middle walkways (16) on both sides of the crossmembers (use #17 for the medium option). Glue on the other long middle truss (5) (#6 for the medium option).

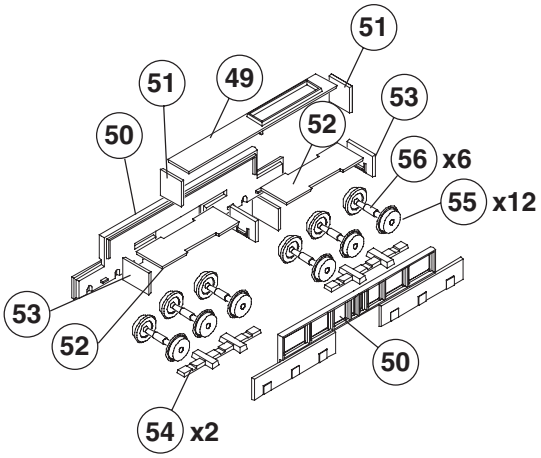


4. Attach the middle section to the front section by first gluing a standard crossmember (7) into the remaining holes in part #1. Interlock the front and middle section together and glue the pegs on #7 into the holes in part #3.

5. Attach the rear section on by gluing a standard crossmember (7) into the remaining holes in part #4. Interlock the rear section to the main assembly and glue the pegs on #7 into the holes in part #5.

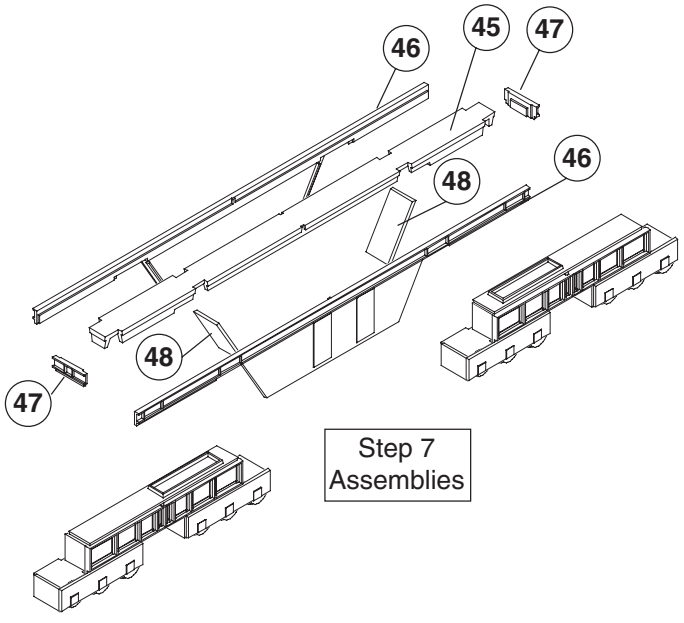
6. Glue on the front (10), sloping (9), long middle (12) and rear top braces (11).

Interlocking Pegs and Holes

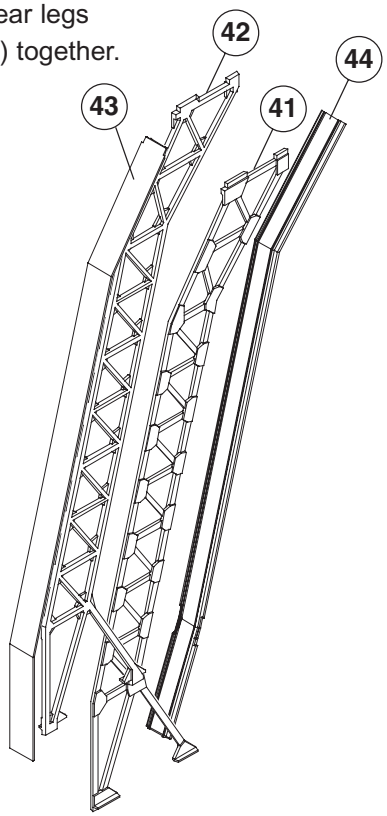


7. Glue the bogey top (49) and the lower tops (52) to one of the bogey sides (50). Next glue on the other side (50). Glue on the ends (51, 53). Glue the wheels (55) to the ends of the axles (56). Note: Push the wheel on until it stops. Set, do not glue, the axles into the slots on the insides of #50. Glue the wheel retainer (54) in place, making sure not to get any glue on the axles. Repeat this procedure three more times. Set aside.

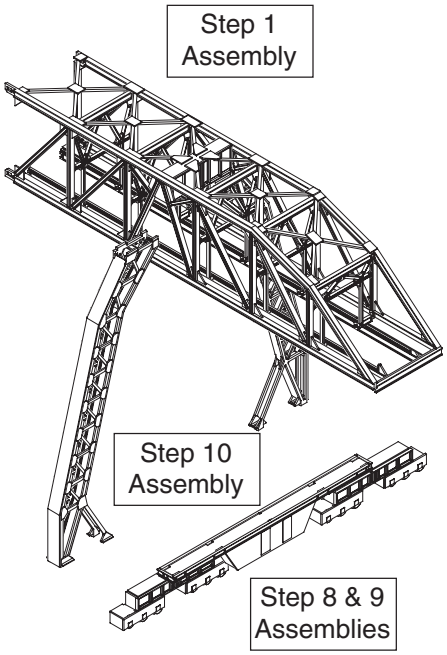
8. Glue the front shear leg base (45, 46, 47, 48) together and glue two of the completed bogey boxes in place on the bottom ends of #45.



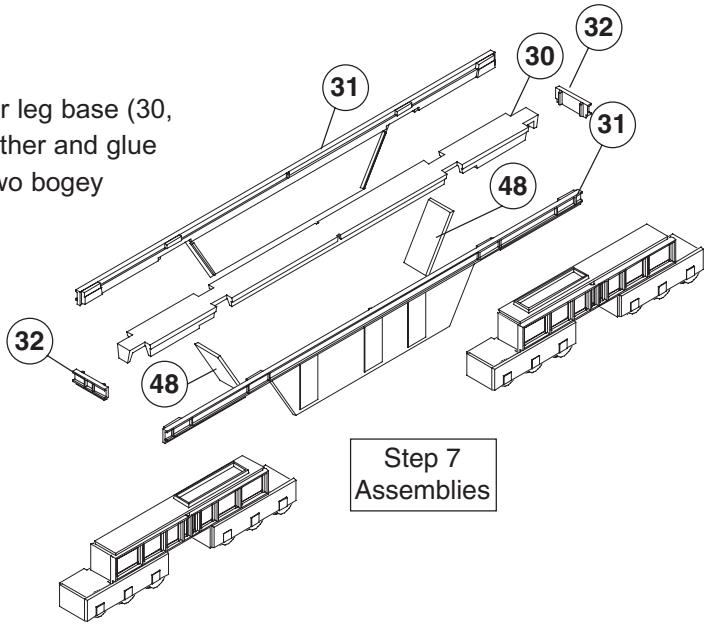
9. Glue the shear legs (41, 42, 43, 44) together.



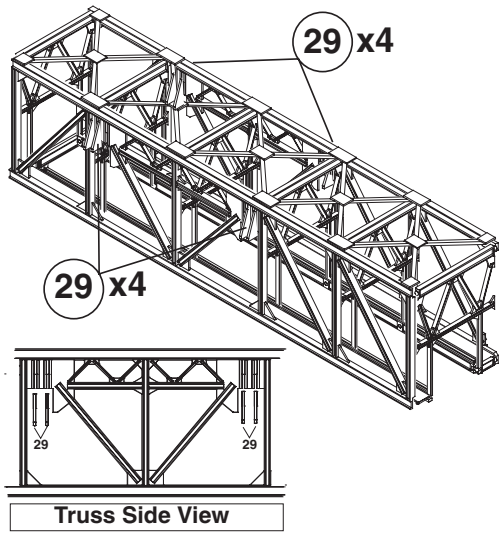
10. Glue the completed shear legs in place on the bottom of the shear leg box, (Parts 39 and 40, Step 1) going through the openings in the trusses. Then glue on the completed shear leg-base.

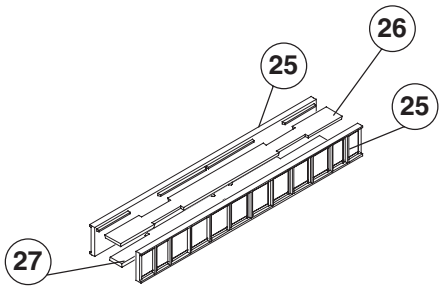


11. Glue the pier leg base (30, 31, 32, 48) together and glue the remaining two bogey boxes in place.

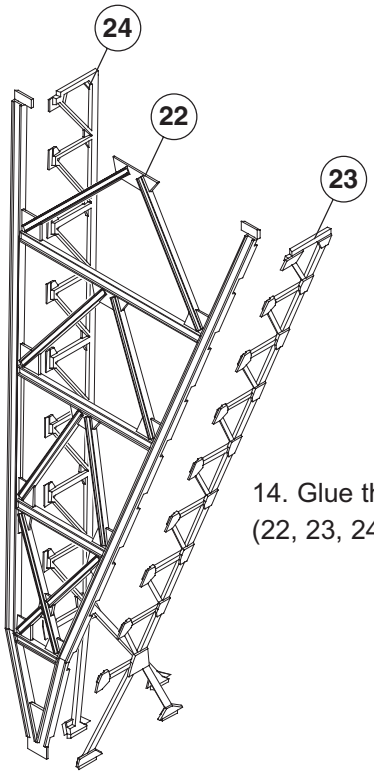


12. Glue the gussets (29) into the slots on parts #2 and 4.

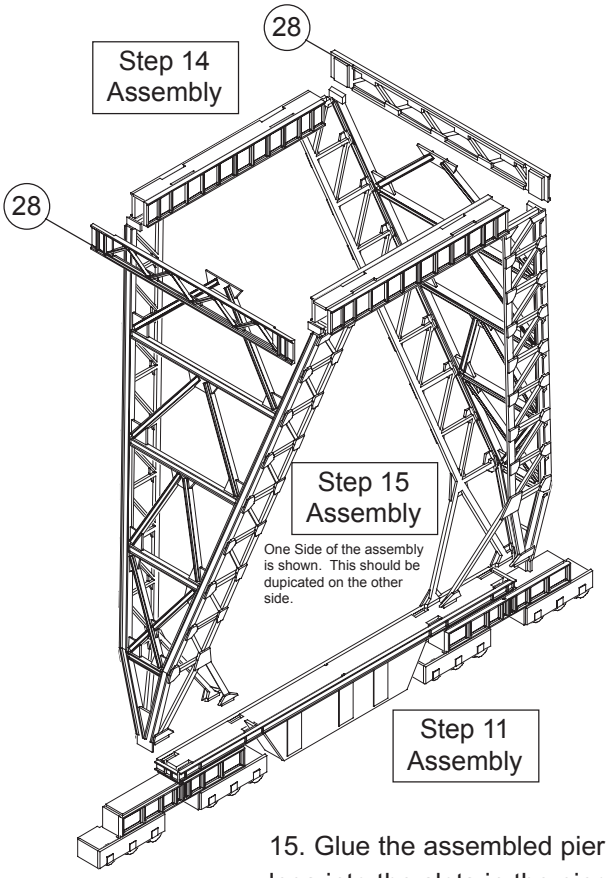




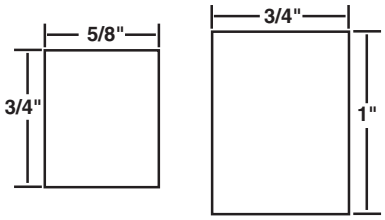
13. Glue the pier leg boxes (25, 26, 27) together and then onto the bottom of the gussets shown in step 12, The Truss Side View. Note: The bottom of the front box must have the two slots facing forward while the box at the back must have the slots facing backward.



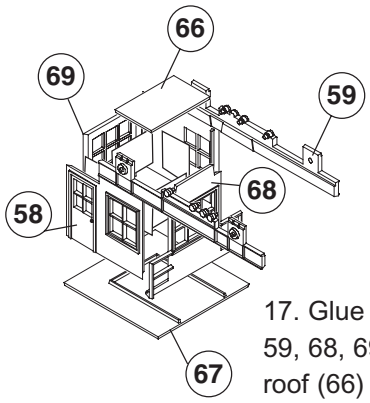
14. Glue the pier legs (22, 23, 24) together.



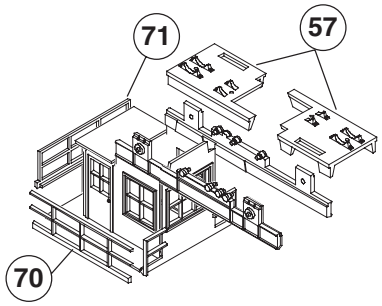
15. Glue the assembled pier legs into the slots in the pier leg boxes. Then glue on the pier leg trusses (28). Glue on the completed pier leg base.



16. Out of the clear acetate sheet, cut three pieces 5/8 x 3/4" and one 3/4 x 1". Then using white glue, glue the 5/8 x 3/4" pieces to the backs of cab walls (59, 68, 69) covering the window areas. Glue the 3/4 x 1" piece to the back of wall #58. Note: Make sure to keep the “glass” away from the side and top edges of the walls so that there will not be any interference when gluing the walls and roof together.

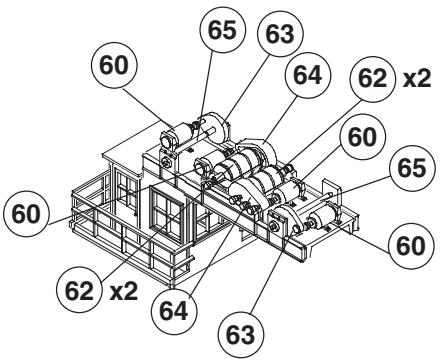


17. Glue the cab walls (58, 59, 68, 69), floor (67) and roof (66) together.

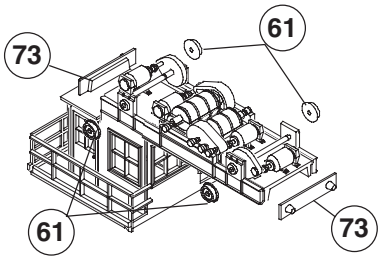


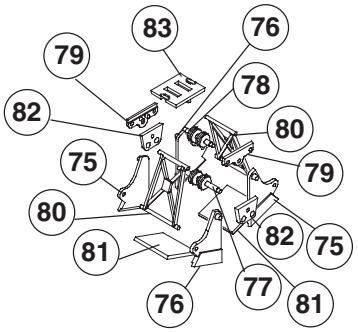
18. Glue the railings 70, 71 on. Place (do not glue at this time) the trolley floors (57) in position.

19. Push the trolley axle (65) through the hole in the drive reduction cowling (63). Gently spread the top of parts #58 and 59 and insert the axle assembly. Glue the drum halves (62) together. Glue the drum reduction cowling (64) on and then snap the drum in place. Glue the motors (60) into the holes in the floor (57). Repeat this process for the other end floor (57).



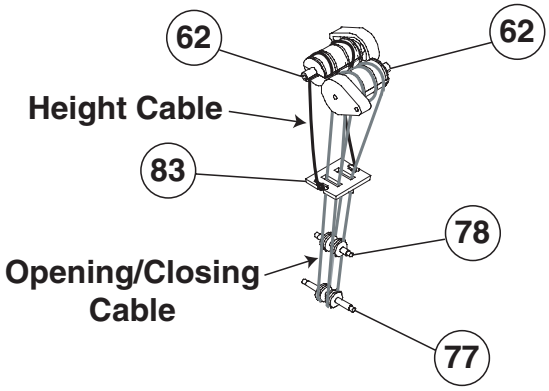
20. After all parts are assembled on both floor halves (57), glue the floors in place and glue on the end (73) pieces. Glue on the trolley wheels (61).





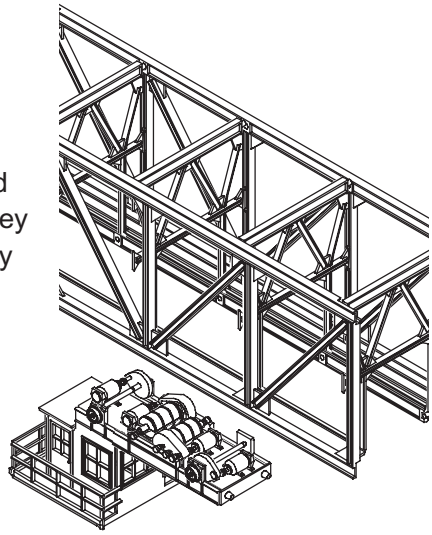
21. Place, do not glue, the bucket arm (80) into the holes in the bucket sides (75, 76) and then glue on the bucket bottom (81). Place the pegs on one side of the arms (80) into the holes in one of the upper sides (79). Also place the shaft of the upper pulleys (78) in the middle hole in part #79. Then push on the other upper side (79). Glue the top (83) on. Note: Do not get any glue on the arm pegs.

RIGGING DIAGRAM

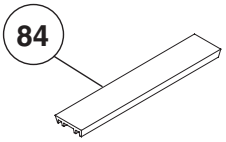


22. BUCKET HEIGHT CABLE: Cut a piece of string (length is dependent on how high or low you desire to hang the bucket) and tie a knot at one end and run it through the end hole on part #83. Wrap it around one of the drums and proceed down to the other end hole on #83. Tie it off with a knot.
BUCKET OPENING/CLOSING CABLE: Cut an appropriate length of string. Glue one end to the other drum. Proceed down through one of the long slots, passing one of the pulleys on #78, loop around one of the bottom pulleys on #77, proceed upward passing the other side of the same pulley on #78 and through the other long slot in #83. Wrap around the drum and proceed downwards and thread the string around the other two pulleys the same way. Glue the end of that string around the same drum.

23. Gently spread the bridge crane apart and insert the finished trolley assembly on the trolley rails.



24. Use rail of your choice (not included) to set the crane on. For the shear leg base, lay one rail down first and then, using the rail guides (84) for proper spacing, lay the other rail next to it. Repeat this procedure for the rails for the pier leg base. Note: You may make the rail as long as you need to fit within your space.



SIGNS

To mount signs, simply cut the desired name and, using a small drop of white glue on the back, glue it in place.