Micro Engineering Company

ASSEMBLY INSTRUCTIONS
COMBINATION BRIDGES
#75-530 HO 110' BRIDGE
#75-532 HO 160' BRIDGE

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I. GENERAL

- The Micro Engineering HO Combination Bridges are a combination of thru girder and deck girder bridge spans modeled after bridges frequently used by prototype railroads as railroad overpasses over other tracks or highways.
- This kit is easy to modify. The square ends of the thru girder spans can be modified to rounded girder ends as found on many prototype bridges (see fig. 4). Longer bridges can be constructed by adding additional thru girder spans, deck girder spans, and bridge support assemblies or by substituting 50' deck girder spans for the 30' deck girder spans supplied with this kit. The unused 30' spans can be used as normal deck girder bridges elsewhere on your layout. Other Micro Engineering kits that can be used for modifying this kit are 50' Thru Girder Bridges #75-520, 100' two span Thru Girder Bridges #75-522, 50' Deck Girder Bridges #75-501, 30' Deck Girder Bridges #75-502, Bridge Supports #80-175, and HO Code 83 Bridge Flex-Trak™ #11-101.
- Most parts in this kit are made of injection molded styrene plastic and should be glued with a styrene solvent cement (such as Testors®). Glue the Delrin® bridge track and the white metal parts with a cyanoacrylate (CA) or a rubber based cement (such as Pliobond®, available from Micro Engineering).
- Read each instruction step completely before proceeding with that step. Refer to the photos and drawings for reference.

II. PARTS

- Before beginning assembly cut the plastic and white metal parts from their sprues and file or trim off any flash, ejector pads, and gate nibs. Use care when handling the parts as some are thin and easily broken. If a part breaks, lay in on a flat surface and cement it back together.
- The following parts and the number needed to assemble your kit are listed below with most keyed to the drawing (see fig. 1). Extra parts that will not be used may be included in your kit.

Part	Parts per Kit #75-530	#75-532
① 30' girder	4	4
② 30' lateral bracing	4	4
③ X-brace	4	4
④ 30' rivet plate	4	4
⑤ 50' girder	2	4
⑥ 50' lateral bracing	1	2
⑦ crossbeam	5	10
⑧ stringer	8	16
⑨ long rivet plate	4	8
⑩ short rivet plate (2 places)	2	4
⑪ leg half	8	12
⑫ cross-girder	2	3
⑬ leg cross-lacing	8	12
⑭ leg rivet plate	8	12
⑮ bearing plate	8	12
⑯ girder support	4	4
⑰ bridge shoe (not shown)	4	4
⑱ bridge Flex-Trak	3	4
⑲ rail joiner (not shown)	4	6
⑳ guard timber	6	8

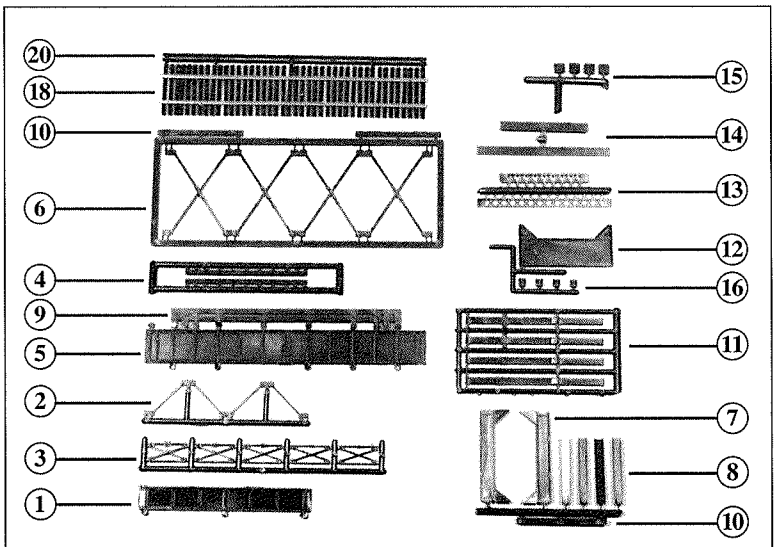

Fig. 1

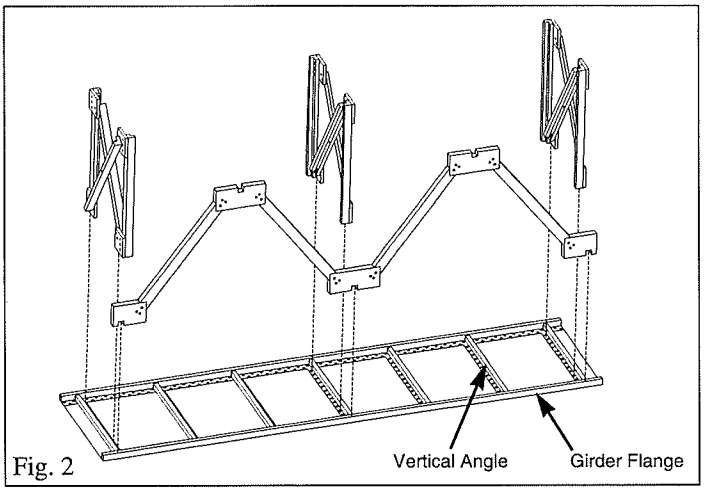

Fig. 2

III. DECK GIRDER ASSEMBLIES

1. Examine a **30' girder** (1) and note that each side of the **girder** has a number of **vertical angles,** each with an adjacent row of rivets (see fig. 2). For assembly, the **girders** need to be aligned correctly. Place both **girders** side by side on your work surface. The row of rivets on the center **vertical angles** of both **girders** should be facing the same direction. If one row of rivets is facing left and the other facing right, rotate either **girder** end for end so the row of rivets are facing the same direction.

2. Note that the **30' lateral bracing** (2) has three rivet plates on one edge, two rivet plates on the opposite edge, and rivet detail on only one side. Hold a **lateral bracing** on edge aligned with the three rivet plates down and the rivet detail facing the outside of the bridge. Match the notches in the rivet plates with the appropriate **vertical angles** along the bottom edge (as it sits on your work surface) of one of the **girders** and cement in place against the inside edge of the **girder flange.** Hold the **lateral bracing** square to the **girder** while the cement dries. Cement the second **30' lateral bracing** to the second **30' girder,** again cementing the **lateral bracing** to the bottom edge of the **girder,** making sure the rivet detail is to the outside of the bridge.

3. Note that the girder **X-braces** (3) have three angle flanges on one side and one angle flange on the opposite side. Place an **X-brace** on one of the **girders,** on the rivet side of the center **vertical angle,** positioned so the side with the three angle flanges is facing away from the **vertical angle.** Cement the **X-brace** against the **vertical angle** and to the **lateral bracing** rivet plate, holding it square while the glue dries. Cement the other four **X-braces** to the same **girder,** positioning them in the same manner.

4. Place one of the **girders** on edge with the **lateral bracing** down. Place the other **girder** on edge with the **lateral bracing** up and slide the two assemblies together. While holding the bridge square on a flat surface, cement the **X-braces** and **lateral bracings** to the other **girder.** Be sure the **lateral bracing** rivet plates are positioned against the inside edge of the **girder flange** and the **X-braces** are positioned on the rivet side and against the appropriate **vertical angles.** You may want to use tweezers to hold some of the parts in place while cementing.

5. When the glue is sufficiently set, place the girder assembly on a sanding block and sand off the draft angle/parting line from the top and bottom edges of the **girders.** Center and cement a **30' rivet plate** (4) to the bottom edge of both **girders.** The girder assembly is now complete. Fabricate the other deck girder assembly.

IV. THRU GIRDER ASSEMBLIES

1. The **girders** for the thru girder span(s) are slightly different than those for the deck girder spans. Examine a **50' girder** (5) and note that each side of the **girder** has a number of **vertical angles,** each with an adjacent row of rivets (see fig. 3). On one side of the **girder,** the row of rivets on the end **vertical angles** are toward the center of the **girder.** This will be the **outside face** of the **girder.** On the opposite side, the row of rivets on the end **vertical angles** are toward the end of the **girder.** This will be the **inside face** of the **girder.**

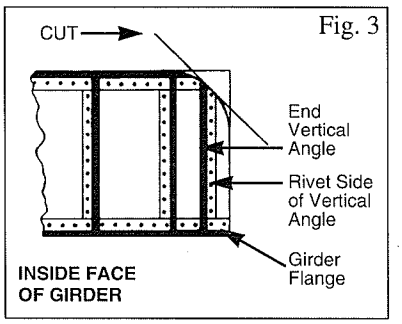

Fig. 3

2. For correct assembly, the **girders** need to be aligned in two ways. First, place both **girders** side by side on your work surface with the **inside faces** up as described above. Second, the row of rivets on the center **vertical angles** of both **girders** should be facing the same direction. If one row of rivets is facing left and the other facing right, rotate either **girder** end for end (without flipping the **girder** over) so the row of rivets are facing the same direction.

3. If you want to modify the **girders** to rounded end girders (see fig. 4), cut the top corners off the **girders** with a razor saw, at a 45° angle (see fig. 3). File the corner round to an approximate 5/16" radius. Use fig. 3 as a template for cutting and filing. If you are building the 160' bridge, leave the end of the **girders** square where the two thru girder spans will join one another.

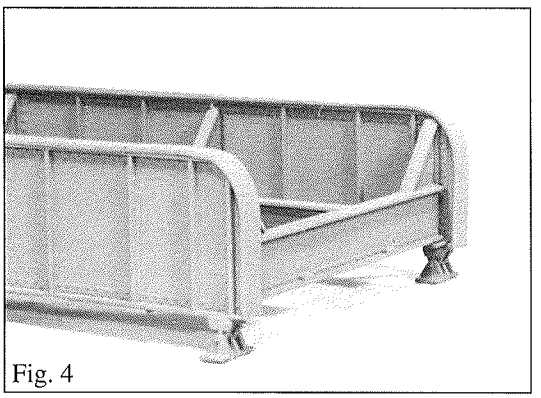
Fig. 4

4. Hold a **50' lateral bracing** (6) on edge with the rivet detail to the outside of the bridge and match the notches in the rivet plates with the appropriate **vertical angles** along the bottom edge of one of the **girders**. Cement the **lateral bracing** against the inside edge of the **girder flange** holding it square to the **girder** while the cement dries. Rotate the assembly so the **lateral bracing** is flat on the work surface and the **girder** is vertical. Hold the second **50' girder** on edge, aligned as described in step **2**, with the **inside face** toward the **lateral bracing,** and cement the **girder** to the lateral bracing rivet plates. Be sure the rivet plates are against the inside edge of the **girder flange** and the **girder** is square to the assembly (see fig. 5).

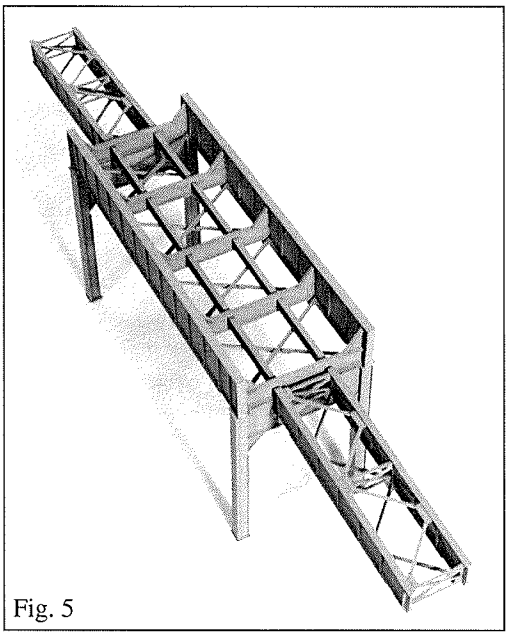

Fig. 5

5. Starting at the center of the bridge, place a **crossbeam** (7) across the bridge with its angled knee braces against the smooth side of the **vertical angles** (not the rivet side, see fig. 3). The crossbeam should sit on the lateral bracing rivet plates at each end. Cement the **crossbeam** in place and repeat with the other four **crossbeams.** If using rounded end girders, trim off the tops of the knee braces on the two end **crossbeams** so the knee braces fit below the top of the rounded ends. It is easier to square up the bridge if the **crossbeams** are installed immediately after the **lateral bracing,** before the cement has completely set.
6. Trim off the short extensions that are on one end of the **stringers** (8). Place the **stringers** between the **crossbeams,** on the pads located on the bottom flange of the **crossbeams.** Cement the **stringers** to the pads and to the face of the **crossbeams.** Be sure the **stringers** are in line with each other and are parallel with the **girders.**
7. When the glue is sufficiently set, place the thru girder assembly on a sanding block and sand off the draft angle/parting line from the top, bottom, and end edges of the **girders.** Center and cement a **long rivet plate** (9) to the bottom edge of each **girder.** Trim the last section (at the step) off each end of two more **long rivet plates** and center and cement these shortened plates to the top edge of each **girder.** The rivet plates are easily centered by aligning them with the **crossbeams** on the bottom edges and with the **vertical angles** on the top edges.
8. If your thru girder assembly has square ends, cut a section from each **short rivet plate** (10) long enough to fit the ends of the **girders** and cement in place. Cement the remaining portions of the **short rivet plates** to the top edge of each **girder** in the areas not covered by the **long rivet plates.** Extend these sections over the ends of the **girders** and trim to length. If building a 160' bridge, do not install rivet plates on the ends where the two thru girder spans will join.
9. If your thru girder assembly has rounded ends, cement a **short rivet plate** to the top edge of each **girder,** starting at the end of the **long rivet plates** and continuing around the radius and down the **girder** end. The rivet plates can be bent around the radius more easily by applying solvent cement to their underside which will soften the plastic. If building a 160' bridge, do not install rivet plates on the ends where the two thru girder spans will join.
10. The girder assembly is now complete. If building the 160' bridge, fabricate the other thru girder assembly. Place the two finished thru girder spans on a flat surface and cement them together end to end at the ends without rivet plates. Be sure the spans are properly aligned.

V. BRIDGE SUPPORTS

1. Place two **leg halves** (11) on edge and cement together at the two spacers. Repeat with two more **leg halves.** Insert one end of a **cross-girder** (12) halfway into the first leg assembly and cement it to the spacers and the edges of the legs. Cement the opposite end of the **cross-girder** into the second leg assembly. Be sure the **cross-girder** is square to the leg assemblies (see fig. 6).
2. You have your choice of finishing the legs with **leg cross-lacing** (13) or more modern looking **leg rivet plates** (14). Cement the short **leg cross-lacings** (or **leg rivet plates**) to the inside of the leg assemblies and the long **leg cross-lacings** to the outside of the leg assemblies. Be sure the cross-lacing is flat and seated properly on the leg edges.
3. Cement a **bearing plate** (15) to the top and bottom of each leg. The bridge support is now complete. Fabricate the other bridge support. If building the 160' bridge, fabricate two more bridge supports.
4. Place the thru girder assembly(s) up side down. Cement a bridge support to the bottom edge of the **girders** at each end of the span with the top **bearing plates** flush with the girder ends. Be sure the bridge supports are square to the girder assemblies. If building the 160' bridge, cement the third bridge support where the two thru girder assemblies join.

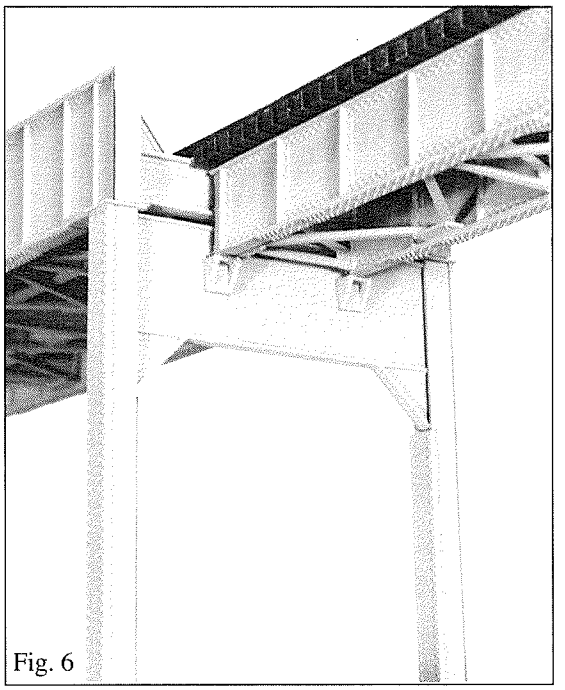

Fig. 6

VI. PAINTING & FINAL ASSEMBLY

1. Place a deck girder assembly against the end of a thru girder assembly, centered side to side, with the top of the **girders** flush with the top of the **crossbeam.** With a scribe mark the location of the bottom edge of both **girders** on the face of the bridge support. Cement a **girder support** (16) at each marked location so they will be centered on the bottom edge of the **girders** and will support the deck girder span at the correct height (see fig. 6). Repeat at the other end of the thru girder span(s).
2. Paint and weather the bridge before further assembly. Prototype bridges are usually a flat black or silver color. Weather some of the metal structure with areas of rust color. After the paint has dried, with a file remove paint from those areas where cement will be applied.
3. Cement a **bridge shoe** (17) to the bottom of each girder at one end of the deck girder spans. You may want to assemble the remainder of the bridge on your layout or you can assemble the entire bridge before placing it on the layout using the bridge track to support the two end spans. Whichever method you use, one end of the deck girder spans will be cemented to the girder supports, while the other end (the end with the **bridge shoes**) will be cemented to bridge abutments on your layout. Use a straight edge to be sure the top surface of the spans are in good vertical alignment. The bridge support legs should be cemented to bridge piers or some sort of footing.

VII. BRIDGE TRACK

1. Connect the sections of **bridge Flex-Trak** (18) together using the **rail joiners** (19) or solder the rail ends together. To enable the bridge track ties to sit on the **stringers** of the thru girder span(s), six ties must be removed from the section of track where they interfere with the **crossbeams** (see fig. 7). Cut out two ties at the center **crossbeam** and a single tie at the other four **crossbeams** so the track on the thru girder span will be left with four sections of nine ties. Adjust the spacing of these four tie sections and the spacing of individual ties for proper fit to the span. Use care when cutting and spacing ties to avoid popping the remaining ties off the rail. If building a 160' bridge, repeat with the second thru girder span. Trim the track to length to fit your bridge but do not cement the track to the bridge yet.

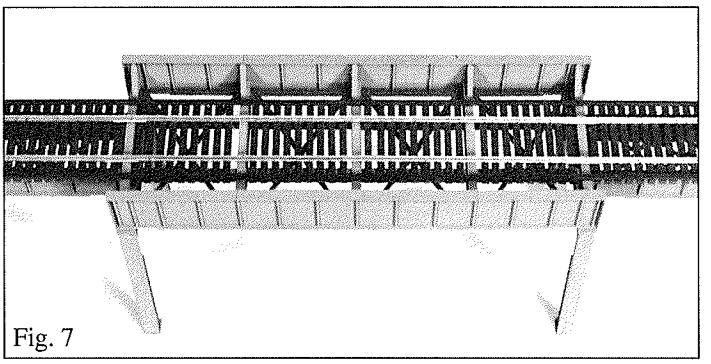

Fig. 7

2. Using CA cement, glue the **guard timbers** (20) to the top of the ties, with the bolt head detail up, 2 scale inches (.023") in from the tie ends. If you want to weather the bridge track do so at this point.
3. Center the finished bridge track on the bridge and cement the track to the top edge of the **stringers** and **girders** using a rubber based cement.