Thank You for purchasing the Industrial Model Shop, 100 Ton Slab Car kit. This HO scale railroad car kit was conceived in September 2012 while driving home from the Steel Mill Modelers meet. In the period from September 2012 thru May 2013, the masters were designed and redesigned 5 times. Hours of studying and converting original blueprints followed by master assembly, reworking of new masters finally lead to the finished workable product. The first molds were formed in March followed by casting and trial assembly. Everything worked!

At this time the kit was only the Basic kit. I had not considered the" Advanced" kit with side stirrups, and grab irons. I packaged and sent out six of the kits to modelers of various skill levels. I was surprised to find out they were installing the grab irons and stirrups on their own. I asked each of the modelers if these detail parts should be included in the kit, to a resounding, yes! Based on their feedback, it was decided on to produce two variations, the "Basic" kit and the "Advanced" kit.

The "Basic" kit comprises of all the major parts of the car and can easily be assembled by a modeler with little or no experience in assembling resin kits. The "Basic" kit is equipped with plastic wheel sets and E-Z Mate couplers.

The Advanced kit includes all the major parts with the addition of detail parts that require a higher skill level for assembly. The advanced kit is also equipped with steel wheel sets and KD couplers.

INSTRUCTIONS FOR ASSEMBLY.

The kit is basically a resin castings kit equipped with styrene parts and purchased accessories. The castings for this kit are made from resin poured in flexible rubber molds. As with all kits some flash may exist. Careful trimming, filing and sanding may be required for proper alignment of the castings. The castings may become flexible and warp when heat is applied. I recommend washing the finished kit prior to painting with a mild dish soap and slightly warm water. I also recommend Cyanoacrylate (CA) for the assembly of this kit. Do not use instant cure CA which sets in 1 to 3 seconds. You need to have a few seconds to position the parts in place before the CA cures. Familiarize with the parts of the kit. Hold them in place and make sure everything aligns smoothly. File, trim and sand the parts for proper alignment prior to applying CA.

Note: Should you choose to attach the coupler pockets with screws, go to Step 6 and follow the instructions prior to Step 2.

I have tried to make these instructions as simple and complete as possible. The Basic kit can be assembled in as little as 30 minutes. After you have assembled the kit, if you have any suggestions that may improve on the kit or the instructions feel free to send them to me. Thank you once again.

I would like to thank Jason Lowe, Brandon Wehe, John Gallagher, Chuck Pravlik, Jim Dipaola and Tim Donahue for their daily input into this kit. In addition to their input; Brandon's contribution of his drawings for the packaging, Figure 3 photo, Images 1, 4 and 6; Johns contributions of images 2 and 5. Image 3 is my photo and Jason Lowes editing of all the drawing and photos. Thanks again guys!

STEP 1; familiarize yourself with the parts.

Resin parts: A one piece car body, 2 x bulkhead ends, 8 x end braces for the bulkhead ends (2 extra braces), a one piece center bulkhead, 2 x coupler pocket plates.

Styrene Parts: cut from Evergreen styrene, 10 x "I" beam slab supports, 8 x "H" beam side stakes.

Purchased accessories; Basic kit: Tichy air brake parts, 2 x plastic trucks, 4 x plastic wheel sets, 2 x E-Z Mate Mark II Center Shank couplers and two 2-56 x 3/16 brass screws

Advanced kit: Tichy grab irons, side stirrups and air brake parts. Steel wheel sets, "KD" couplers.

Note: all the parts can be purchased individually from the "Industrial Model Shop" should you need one or more of the parts. <http://industrialmodelshop.com>

STEP 2; test fit the parts then attach them.

After you know where the parts go, test fit them. As stated earlier some trimming and sanding may be required. The three castings that make up the top portion of the slab car are the two bulkhead ends and the bulkhead center. It is important that these three parts properly align. The two bulkhead ends are the simplest parts to trim and sand. The bulkhead center has little surface area for this. When test fitting equally, trim and sand the inside edge of the bulkhead ends, then test fit. When you feel the parts fit correctly, fasten them with CA. Should you over sand, don't worry. This area is covered with slag, as a heat insulation when doing the painting and weathering. Start with the car body and 1 bulkhead end. Make sure the bulkhead end aligns perfectly flush to the end of the body, with slow curing CA attach the bulkhead end to the car body, clamp with mini clamps and let dry. Next attach the opposite bulkhead end to the car body following the same method. With both bulkhead ends attached, test fit the bulkhead center between the bulkhead ends. If additional sanding or trimming is required do it equally from each end of the bulkhead center. After a proper fitting, CA the bulkhead center and clamp with mini clamps.

Step 3; trim and attach the bulkhead end braces.

There are 8 end braces in the kit. You will only need 6 of them. Two are extras in case of mistakes. On prototype slab cars these braces differ widely in how they are shaped. As the cars are shopped braces are made from whatever material is available. Although generally close in size and shape, the braces often differ in width and length and many of the braces are torch cut and the cut is rarely the same. On many of the slab cars the braces consist of a piece of flat plate with a piece of 90 degree angle attached to the back. The angled piece is bolted to the "C" channel uprights on the bulkhead ends. The plate is them bolted to the bulkhead end and the car body thereby strengthening the bulkhead end. The exposed corner is trimmed or rounded with a torch cut to prevent injury to employees from grabbing the sharp corners. As recommended and stated by John Gallagher, "No two cars are exactly the same. Find a photo of the type of brace you prefer and detail to your heart's desire".

Step 4; attach the slab support beams and side stakes.

There are 10 slab support beams cut from #274 Evergreen styrene “I” beams, one for each slot between the side stake pockets on each side of the car. There are 8 side stakes cut from #181 Evergreen styrene “H” columns. On the prototype cars the side stakes are placed in the first and the third pocket in from each end leaving two empty pockets between each side stake. The side stakes are rarely straight up and down as employee abuse when loading and unloading slabs damage the side stakes. The tops of the side stakes are sometimes spray painted white for increased visibility for the loader.

Step 5; attach the brake wheel

Tichy, AB brake parts are provided with the kit. You will only need 3 of the brake parts, the brake wheel, the brake stand and the take up chain. You have to drill a #68 hole through the bulkhead end and through the car body so you can insert the take up chain into the hole. Looking directly at the end of the car, between the two left “C” channel upright supports, this is where the brake stand is located. The brake stand is centered directly between these two “C” channel supports. The height of the brake stand is eleven 32$^{nd}$ of an inch or 30 scale inches from the top of the car body. Refer to Figure 1 drawing, Figure 3 photo. The top of the basic kit is now finished. Flip the car over for the bottom. When designing the kit, I did not have detailing the underside in mind. Future projects may include under body detailing. There are additional brake parts included in the kit. It is up to the individual how much detail to add to the underbody.

Step 6; couplers

The Basic kit contains 2 E-Z Mate Mark II Center Shank couplers and 2 resin cast coupler pocket plates. The Advanced kit has Kadee couplers. The Basic kit is simple, place the coupler in the pocket and CA the plate over the pocket. Brandon Wehe suggested that some may wish to attach the coupler plate with a screw as “somewhere along the line they will invariably require some maintenance”. Brandon used the Kadee Tap and Drill set No. 246. Following Brandon’s suggestions, if you choose to do so, with a sharp pencil carefully mark and drill the small round tab in the center of the coupler pocket with a No. 50 drill bit followed by a 2-56 thread die. Carefully align and with a sharp pencil mark the coupler pocket plate and drill with a No. 43 drill bit. Install a No. 2-56 x 3/16 brass screw to secure each coupler.

Step 7; trucks and wheel set

The Basic kit contains two plastic trucks and 36 inch plastic wheel sets. The Advanced kit has steel wheel sets. Attach the trucks and wheels with the provided No. 2-56 x 3/16 inch brass screws. The hole for the screw is pre drilled. It is not necessary but you may choose to tap the hole also for the screw. This can be done with a No. 2-56 thread die as the optional method used for attaching the couplers. Place the truck over the alignment pin to help support the screw hole from breaking out, insert the brass screw and carefully tighten. Be careful not to over tighten as this will strip out the screw hole. Should you strip out the screw hole, remove the screw, place a drop of CA in the hole and carefully reinsert the screw and allow the CA time to dry.

The trucks are not a prototype match. Prototype trucks are 125 ton Dalman Two-Level trucks. The closest match to the prototype trucks can be purchased from Bethlehem Car Works, part number 718-1224 at $9.95 per pair.

The Basic kit is now done and ready for painting, decals and weathering. The car as delivered was painted with U S Steel supply division No. 303 or approved equal, Black paint. Lettering and numbers were White.

Decals. Decals are available separately for the kit. The decal sheet will give the modeler enough decals for 3 cars plus decals for additional U S Steel cars. These can be purchased from the Industrial Model Shop for $2.50 per sheet, http://industrialmodelshop.com. Refer to Figure 2 drawing, Images 5 and 6.

In the prototype, a layer of crushed slag was applied to the top of the car body as an insulation buffer to insulate the car body from the intense heat from hot slabs. The exposed areas such as the slab rests and side stakes rust quickly as the paint is burned off from the intense 2000 degree heat from the hot slabs. As the slabs, cool a thin layer of scale falls from the slabs onto the slag. Over time the scale mixes in with the slag and rusts giving the slag insulation a rusty, grayish appearance.

Advanced Kit

Grab irons and side stirrups.

In any car kit, grab irons and side stirrups can be very difficult and nerve racking. It takes a higher skill level and a lot of patience, however; the results can be very rewarding. There are several methods for installing grab irons. I suggest that if you are installing the grab irons and side stirrups that you do so before assembly of the castings. Here's why, should you assemble all the castings then attempt to install the grab irons and stirrups and you make a mistake and damage any part of the kit, you may ruin the entire kit. If you damage a resin cast part before assembly and wish to replace the individual damaged casting, the "Industrial Model Shop" will sell you individually the resin cast part for a small fee much less expensive than the price of the entire kit. Refer to image 4.

Placement of grab irons and side stirrups. On the original car as delivered from the U S Steel Johnstown Works there were four grab iron steps located on each end of the car. The top three of these were straight grab irons and the bottom one was a 4inch drop grab iron. Over the years as the cars were shopped for repairs one of the grab iron steps was removed and the other steps were relocated. This is why there are small open holes in the end of the bulkhead ends. In addition, and it varies from car to car, either; the top grab iron is straight with two 4 inch drop grab irons - or – the top two grab irons are straight and only the bottom grab iron being a 4 inch drop grab iron. This is where you have to rely on prototype photos if you want to be 100% prototype for each individual car. I have included enough grab irons for either step pattern you choose to model. As Brandon Wehe stated "Not much point and you would not be able to physically drill all the holes properly to keep the grab irons at the same position per FRA regs. It is overkill." Well put Brandon. Refer to Figure 1 drawing, Figure 3 photo and image 1photo.

For the following instructions, I use a combination of John Gallaghers and Brandon Wehes methods.

There are 6 vertical grab irons, all 18 inch, three on each end of the car, one on the left side and two on the right side. For the horizontal grab irons there are two sizes 18 inch and 24 inch. There are two 24 inch grab irons, one for each end of the car. All the remaining grab irons are 18 inch. Refer to the photograph for grab iron locations. Refer to Figure 1 drawing, Figure 3 photo and image 2 photos.

If you plan to do several slab cars, make a jig or several jigs so you can place the hole locations in the same position on every car. This will save time. With a sharp pointed pencil, mark the location where the grab iron holes are to be drilled. With a sharp pointed object such as a sewing needle, carefully place in small dimple in the center of your pencil marked location. This serves as a starter location that will help prevent the drill bit from wandering off center. Starting with the flat surface of bulkhead ends which are very thin, using the thinnest or smallest pin vise drill bit, use a No. 80 bit (.0135) carefully drill all the way through the bulkhead for each hole. For the vertical upright grab iron located in the corners drill away from the corner at an angle, refer to image 4 photo. For the car body which is much thicker drill a slightly larger hole, No. 79 (.0145) because the material is so thick.

Insert the grab iron through the holes carefully bending straight while feeding through the holes. After inserting to the desired depth, you may or may not want to bend the back side of the grab irons to help hold it in place. The trick to gluing the grab irons in place is Insta-cure CA which is very thin. It is applied to the back side of the grab iron which wicks in deep into and around the grab iron and the drilled hole. Let the CA dry overnight, then the next day clip off the ends and carefully file smooth. One or more of the grab irons may need straightening. This can be done easily with a pair of flat edged or needle nose plyers. For the side stirrups, drill the holes, apply CA to the stirrups and insert them into the drilled holes.

Couplers

KD couplers are included in the advance kit and are secured using either method as described in Step 6.

HISTORICAL INFORMATION:

AAR classification – FMS; URR classification – Flat Slab Rack; Car Builder – U S Steel, Johnstown works

Date build – 1960; Length - 48 ft.; Capacity – 100 Tons; Car number series 800-919

Prior to 2012 there were two different types of Slab Racks used on the Union Railroad to serve the U. S. Steel Mon Valley Works. Both were classified as FMS, 100 ton slab racks. These cars were built by U. S. Steel at the Johnstown Works for the EJ&E as Hot Billet Cars. The cars were modified for slab car service in 1970 and 1971. Car number series 600 to 652 were stenciled URR and were retired in 2012. Car number series 800-919 were stenciled APEX, APXX or USCX. At some unknown point all became APEX. These cars are all past retirement age and may soon be removed from the property.

HOW THE INDUSTRY DECIDED HOW MANY CARS IT NEEDED

The following information is from steel industry documentation. This information will help the steel modeler understand how to determine how many slab cars are needed in a small portion of the steel industry. This scenario represents movement between a caster facility and a rolling mill facility several miles apart.

Memorandum; Production at the caster is estimated at three million tons per year. Slabs will be 36 ft. long, 55 inches wide, and 10 inches thick weighing 33 tons each. There will be two caster run outs and a slab will be produced on each run out every seven minutes. Slabs will be loaded at a hot temperature of 1800 degrees.

Memorandum; The customer forecasts the production rate of the caster at 350 tons per hour with hot slabs averaging 35 tons to be loaded from either strand at 7 minute intervals. In essence, they contemplate loading out a single track of 7 slab cars every two hours with the cars being moved by the railroad in blocks of 28 cars, one move per turn, to the rolling mill.

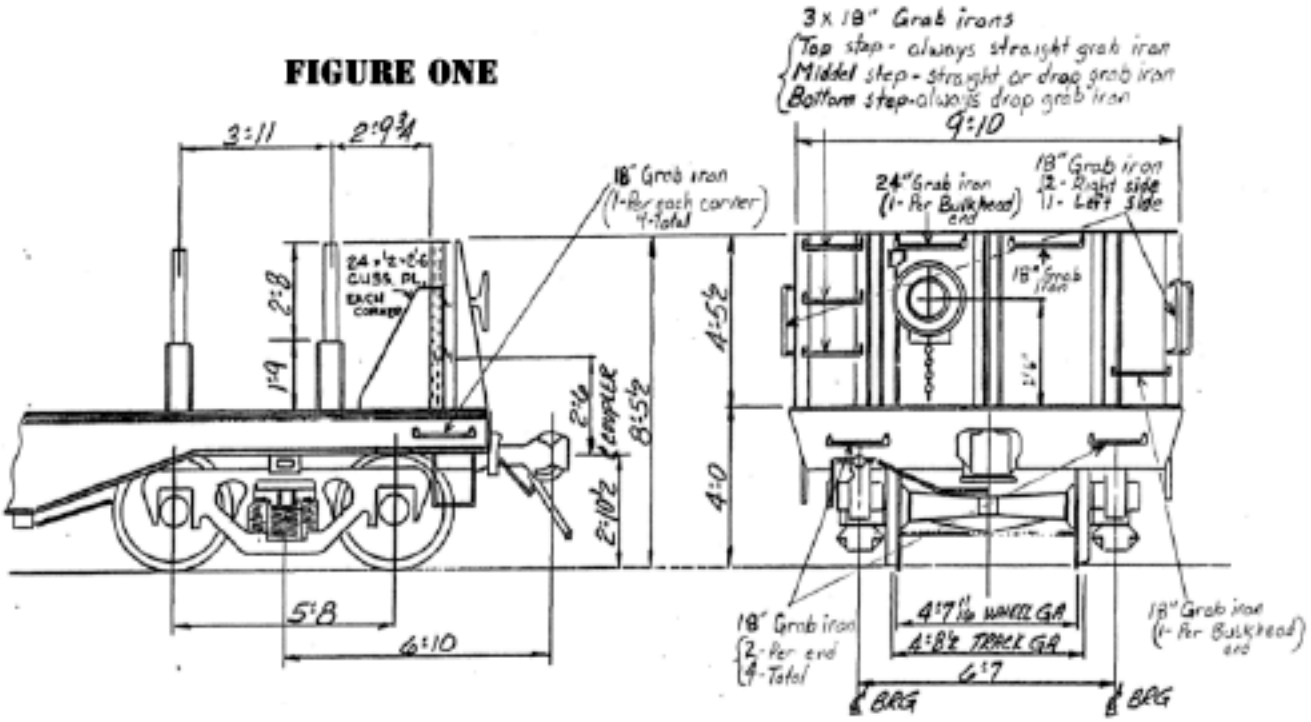
Memorandum; The movement of loads between the caster facility and the rolling mill facility. This is then followed by the return of empties from the rolling mill facility to the caster facility. Assuming that we handle 30 loaded slab cars per turn from the caster to the rolling mill (7,000 tons per day @ 81.5 per car). At the end of any given turn the railroad should have 30 cars under load for the move from the caster facility to the rolling mill facility, 15 cars spotted at the caster for loading, and 15 cars available to be spotted to the caster for loading. The crew which is going to handle the loaded move to the rolling mill facility may not return to the caster facility with the empties for several hours. During this period of time the 15 cars at the caster will have been loaded and the caster will have been spotted with fresh empties. The scenario reflected above results in 60 slab cars located at the caster facility at the end of a turn and prior to moving the loads to the rolling mill facility.

At the same point in time the rolling mill facility should have completed the unloading of 30 slab cars for the return trip to the caster facility. When the second of 15 of the 30 empties were pulled from the unloading area an additional 15 loads were spotted for unloading. This scenario results in 45 cars required at the rolling mill facility to prevent uninterrupted operation at the rolling mill facility.

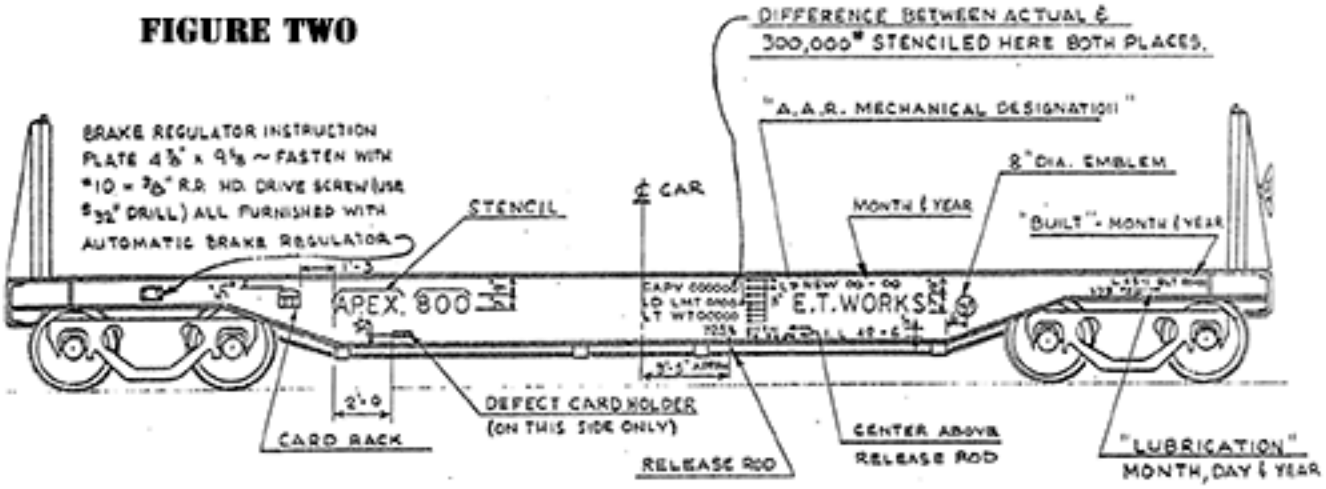
The above cycle will be repeated each shift. If any of the steps are interrupted a shortage will occur immediately. Assuming that there may be shop cars and miscellaneous delay cars (estimated 28 cars) results in a requirement of 133 slab cars. Based on these figures I indicate that a minimum requirement of slab cars would be approximately 130 cars.

The above memorandums represent one portion of the daily movement in an integrated steel mill. These figures will vary from facility to facility and company to company.

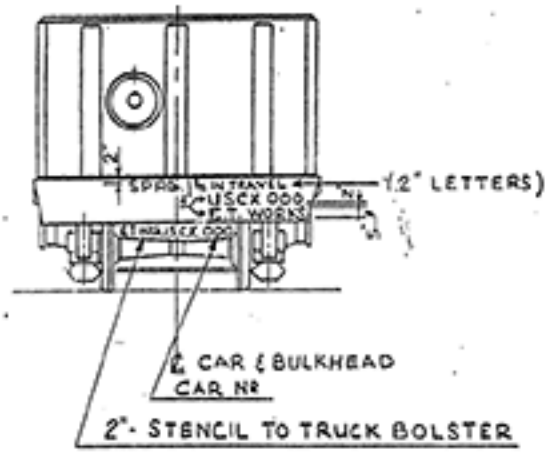
## FIGURE ONE




## FIGURE TWO




## FIGURE THREE



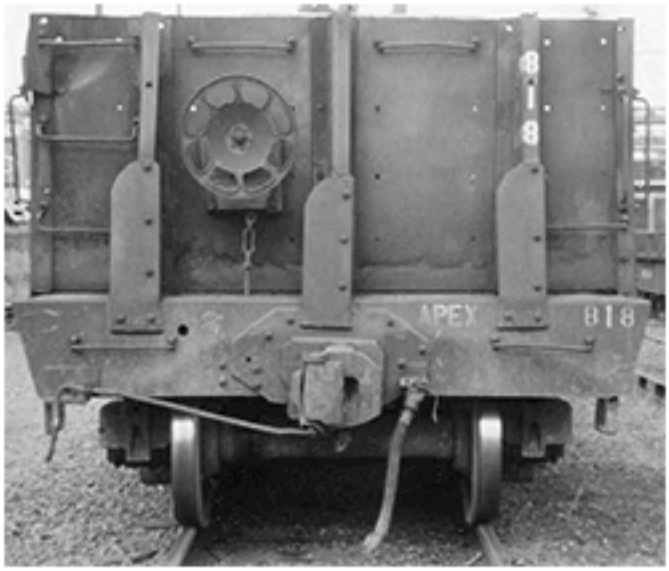



**IMAGE ONE**

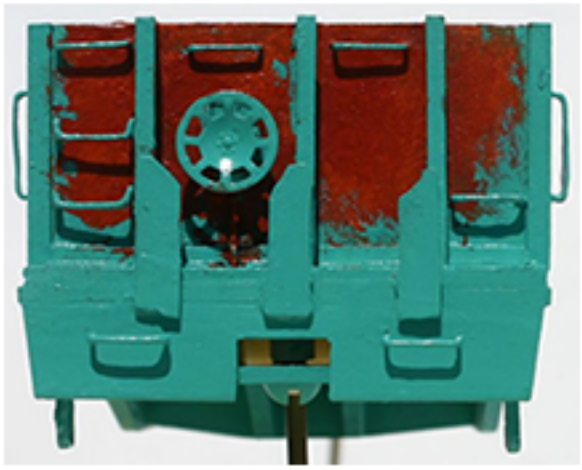


**IMAGE TWO**

**IMAGE THREE**

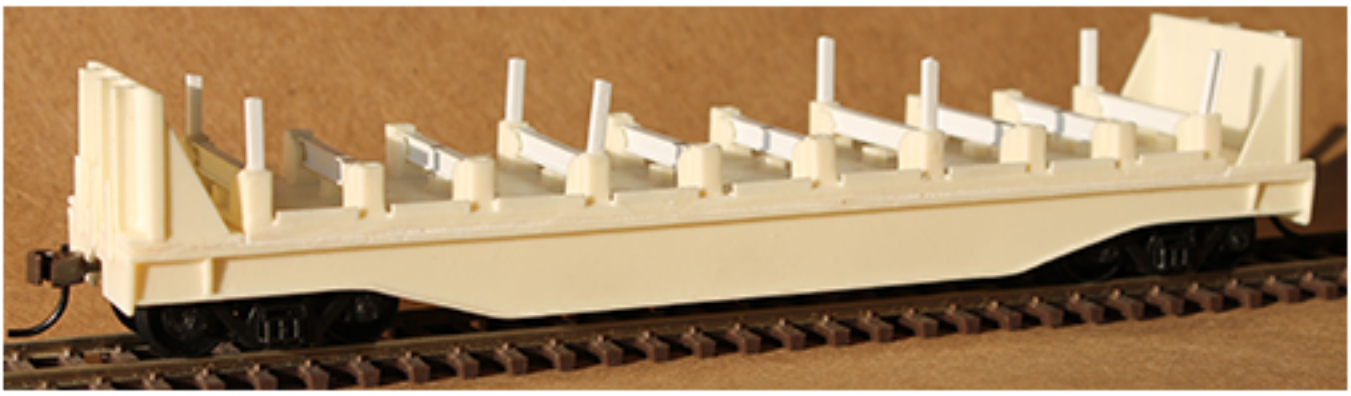


**IMAGE FOUR**

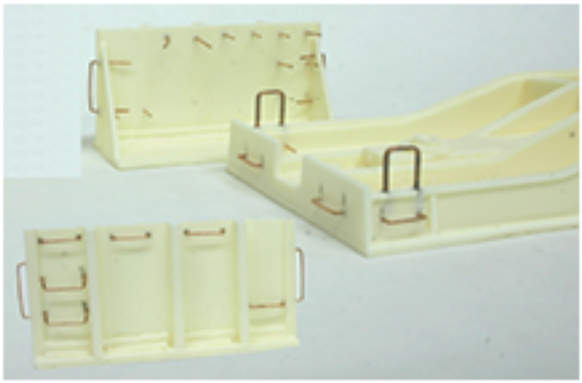


**IMAGE FIVE**

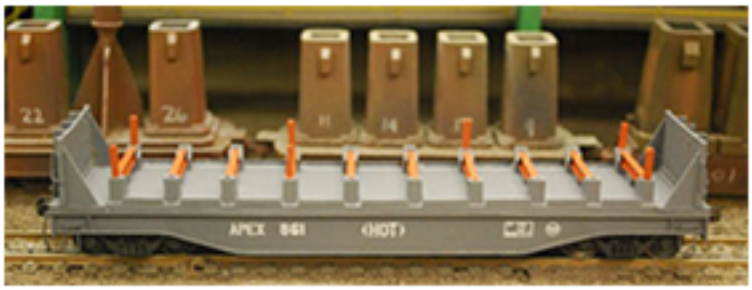


**IMAGE SIX**