Scratchbuild a bulk material barge

Bulk cargo barges are a common sight along industrial waterfronts across the country. Follow James Ferguson as he describes how to scratchbuild these river-going workhorses.

Learn how to model this common watercraft with styrene and a few detail parts

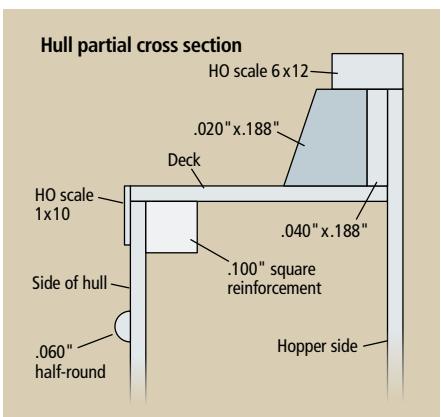
By James A. Ferguson • Photos by the author

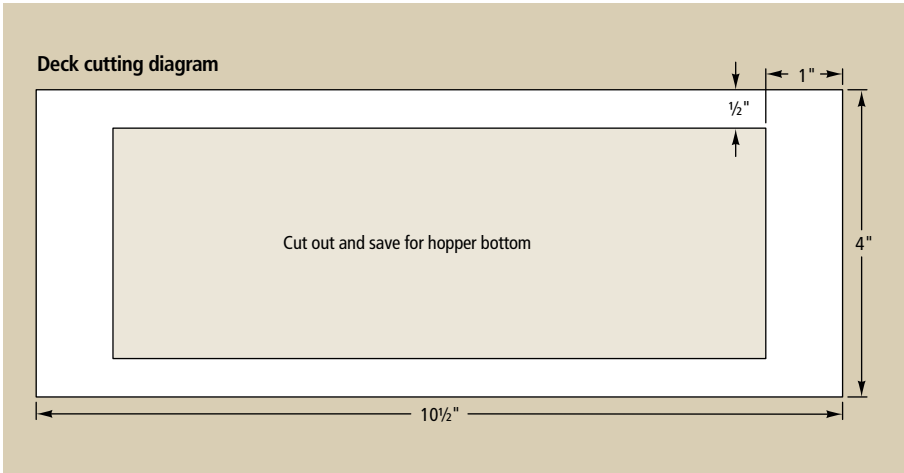
A bustling riverfront loosely based on the Pittsburgh area provides the theme for a 2 x 10-foot addition to my freelanced HO scale Lebanon Valley RR. One of the most prominent industries in the scene is a limestone unloading facility. However, I found that I needed some bulk material barges to bring the crushed stone to the large bridge crane unloader.

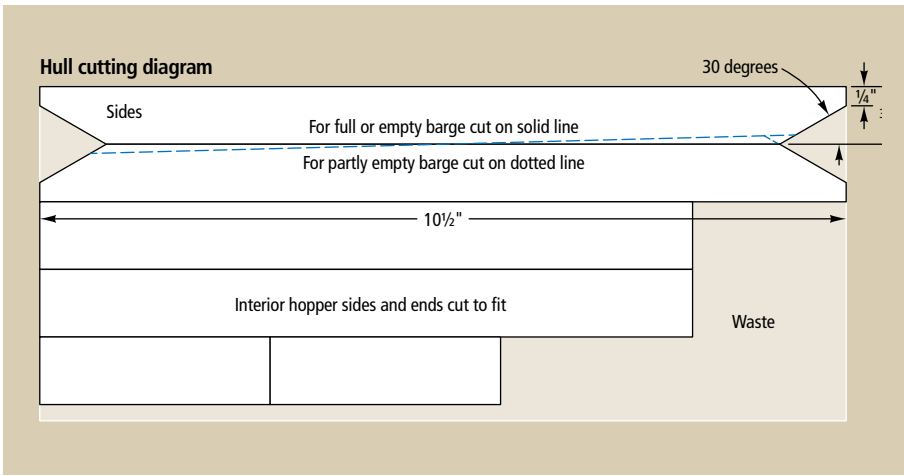
At the time I couldn't find any kits of bulk material barges appropriately sized for my waterfront. The models were either too large or too small, and the kit I liked the best was available only in N scale.

I turned my Internet searches to prototype barges. Flat-bottomed barges haul all sorts of cargo on rivers, canals, and harbors across the country. These watercraft, also called dry bulk material barges, are either pushed or pulled by small tugs or workboats.

A bulk material barge is designed to carry coal, sand, gravel, stone, or other similar material. As on a rail car, the hopper where the material is stored can







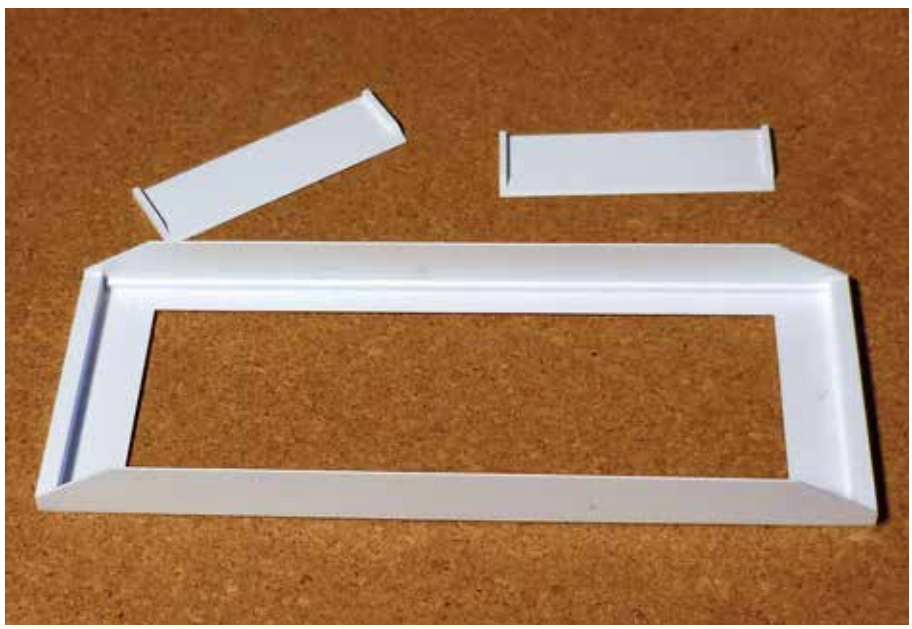
be either open or closed. I was interested in the open-hopper type.

I studied the general shape and proportions of the barges as well as the cleats and other details that would be needed. Rather than building or modifying a kit, I would scratchbuild my barges from styrene.

Cutting the pieces

One 8" x 21" sheet of .030" styrene provided most of the material for the two barges I built. First, I scribed the sheet lengthwise and crosswise to make four 4" x 10½" pieces. These dimensions equal 29 x 76 HO scale feet, just enough selective compression to fit on my layout. Prototype barges are usually 35 feet wide and 185 to 200 feet long.

My cutting diagrams for the deck and hull are shown above. First I laid out the deck on one of the 4" x 10½" sections of the .030" sheet. I used a pencil and a straightedge to draw lines 1" from each



1 After attaching the hull sides to the bottom of the deck, James reinforced the seams with .100" square styrene strip and .250" square strip at each end. The ends of the hull are made from .040" sheet and .010" strip. One end of each hull end piece is beveled to make a tight joint when installed against the .250" square strip.

2 James built the coaming, or raised area around the hopper, from .040" x .188" styrene strip. He cemented the strips on edge around the hopper opening using methyl ethyl ketone (MEK).

3 Smooth-jaw micro alligator clips held the hopper side in place while the cement cured. James installed the interior ends of the hopper in the same manner.

4 A cap along its perimeter and gussets along its sides finish off the coaming, while edging made of HO scale 1 x 10 finishes off the hull. James then added deck details, including an access hatch, cleats, and bollards. The hopper bottom, a rectangle of .030" styrene sheet, has also been installed.

end and ½" from each long side. Next I made several light passes along the lines with my hobby knife, again using a straightedge to guide the blade. Then I snapped the pieces free. The center will be the hopper bottom and the remainder is the deck.

Again using a pencil and straightedge, I laid out the hull and hopper sides on another 4" x 10½" section. Note that the shape of the hull sides is different for a full or empty barge versus a partially unloaded barge. The partial load will make the heavy end of the hull sit slightly lower in the water than the empty end. I modeled both a full and a partially unloaded barge on my layout, as shown in the photo on page 46.

I cut out the hull sides following the same score-and-snap technique that I used with the deck and hopper bottom. The hull sides are ¾" tall, which left me enough material to cut three more ¾" wide strips to use for the hopper sides and ends.

Assembling the hull

I used mainly methyl ethyl ketone (MEK) as the adhesive for this project. I can purchase a quart can of MEK for just under $12 at my local hardware store. [Be sure to work in a well-ventilated area when using MEK. – *Ed.*].

Like plastic cement, MEK is brushed on a joint and works by melting the plastic parts together. Since MEK cures fast, I still use plastic cement when I need some extra working time to ensure that parts fit.

I modified the applicator brush attached to the cap on the MEK container by trimming off all but about six to eight bristles. This allows me greater control over the amount of MEK applied.

For the assembly process, refer to the cross-section illustration on page 46. First I attached the sides to the bottom of the deck. Be careful not to glue the sides to the edge of the deck. I used .100" square strips to reinforce the joints and help keep the parts square.

Next I cut two .250" square strips to fit between the sides under each end of the deck. Then I formed the sloped ends of the hull from .040" styrene sheet cut to fit between the hull sides. The thicker material made it easier to bevel one edge to fit snugly against the .250" strip under the deck. I also used additional .100" square strips to reinforce the joints between the ends and the hull sides. The hull components are shown during assembly in 1 on the previous page.

Assembling the hopper

With the hull complete I began building the coaming, which is the short wall that runs around the perimeter of the hopper opening. Using the hopper opening as a guide, I cut four lengths of .040" x .188" strip styrene to fit. Then I attached the strips on edge around the opening, as shown in 2.

Next I made the hopper sides from the ¾" tall strips I cut earlier from the .030" sheet. These strips should fit inside the hopper opening and must be flush with the tops of the coaming. To help hold these parts in position while I applied MEK, I used smooth-jaw micro alligator clips, as shown in 3. [Note: the RadioShack clips shown (part no. 270-373) have been discontinued. However, similar clips can be purchased from other electronics suppliers, such as Mouser Electronics, at www.mouser.com. – *Ed.*]

With the hopper sides in place, I installed the hopper bottom. Next, I made the cap around the coaming from HO scale 6 x 12 styrene strip cut to fit, as shown in 4. The inside edges of these strips should be flush with the inside of the hopper.

I finished off the hopper by modeling the gussets around the coaming that fit underneath the lip formed by the cap. Using a NorthWest Short Line chopper, I cut the gussets into 5/32" lengths from .020" x .188" styrene strip. Starting at the center of the sides and ends, I cemented the gussets in place. I spaced the gussets 4 scale feet apart and added two extra gussets to reinforce each corner. Then I used a sharp hobby knife blade to taper each gusset, as shown in the cross-section diagram.

At this point I decided to cut a bottom for the hull and cut a piece to fit the opening from .030" styrene sheet. Before gluing the bottom in place, I added .125" square styrene strips around the opening for added support.

Deck and hull detailing

First I modeled a band of steel reinforcement that runs along the top edges of the hull. Made from HO scale 1 x 10 styrene strip, this detail looks prototypical and conceals the seam between the deck and hull. Starting on one side, I cemented a strip in place, keeping it flush with the deck and carefully bending it around the corner, as shown in photo 4. The next strip began on one of the ends, butted tightly against the first

5 To make it look more like a prototype barge, James added a rub rail along the edge of the hull made of half-round styrene rod. He then airbrushed the entire model a grimy black color.

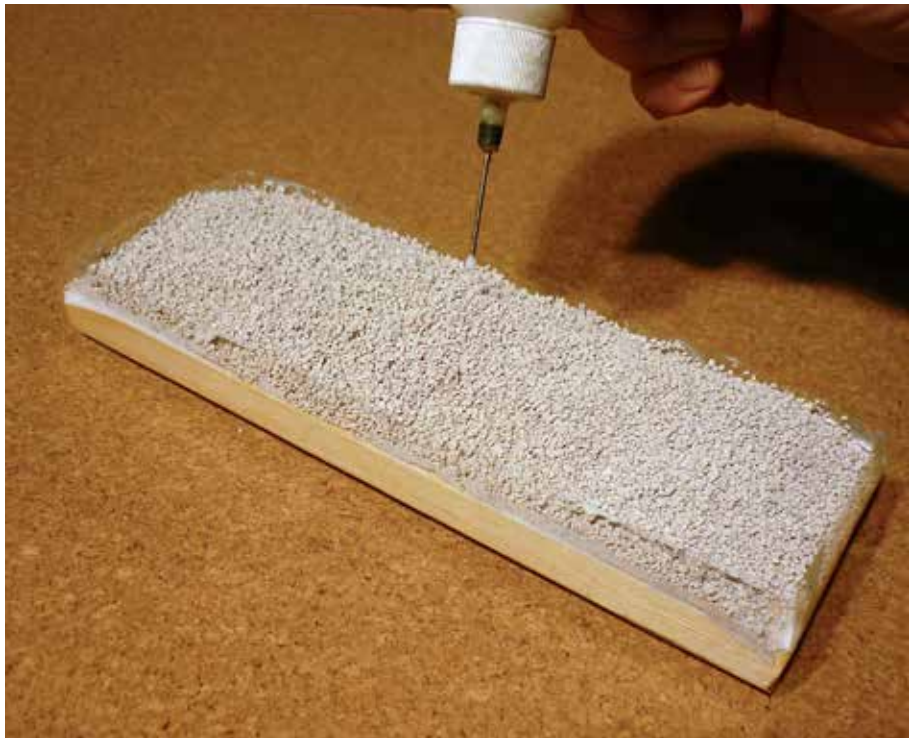
6 James carved the base for the load out of balsa wood. After applying a coat of shellac and letting it dry, he brushed a thick coat of white glue on the wood. He also added a clear packing tape fence along the base's perimeter to contain the crushed stone used in the next step.

Materials list

Evergreen Scale Models
Styrene
128 .020" x .188" strip
148 .040" x .188" strip
175 .100" x .100" strip
186 .125" x .125" strip
199 .250" x .250" strip
222 .062" rod
241 .060" half-round rod
8110 HO scale 1 x 10
8212 HO scale 2 x 12
8612 HO scale 6 x 12
9040 6" x 12" .040" sheet
9104 8" x 21" .030" sheet

Detail Associates (available from Wm. K. Walthers)
229-6212 covered hopper car square hatch

Frenchman River Model Works www.frenchmanriver.com
1131 small cleats



7 James sprinkled crushed stone over the surface and added matte medium. The packing tape will be removed after the adhesive sets.

8 James also modeled a partially unloaded barge. The hull is identical except that the end with the partial load sits ¼" lower in the water than the empty end.

More ideas

Check out "Railroading along the waterfront" at KalmbachHobby Store.com.

strip. After installing the second strip, I found a short gap on the other end that needed to be filled with another short segment.

Next I added a rub rail to the hull sides made from .060" half-round styrene rod. The rub rails should be positioned 3/16" from the bottom of the 1 x 10 banding along the top of the hull. I beveled the ends of the rub rails before cementing them to the hull sides. The finished rub rails and banding are shown in 5 on the previous page.

Barges commonly have deck hatches for inspection and maintenance. I modeled these parts with Detail Associates HO scale covered hopper hatches. I had to sand off the ridges on the underside of the hatches prior to gluing so they sat flush on the deck.

All the cleats shown in 4 and 5 came from Frenchman River Model Works. I attached these metal parts to the styrene deck with cyanoacrylate adhesive (CA). The bollards are scratchbuilt from .062"-diameter styrene rod and strip.

With the deck details in place, I airbrushed my barge with Scalecoat II Locomotive Grime, a color I had on hand. Any grimy black color would look prototypical. [Note: Scalecoat paints are available from Minuteman Scale Models at minutemanscalemodels.com. – *Ed.*]

Making the load

For my two barges, I made bases for both full and partial loads. While a chunk of extruded-foam insulation board would work as well, I used part of a ½" x 3" x 36" scrap of balsa wood I had left over from a previous project for the two loads.

To make the bases for the loads, I cut pieces of balsa to fit the length of the hopper for the full load and about ¾ the length for the partial load. Then I laminated the pieces together, carved them to shape, and applied two coats of shellac.

The base for the full load is shown in photos 6 and 7. I brushed a heavy coat of white glue on the bases and sprinkled limestone track ballast over that. I wrapped packing tape around the bases to help contain the loose ballast while the glue set. I dribbled diluted matte medium over each limestone load and let them sit overnight.

After filling in any bare spots and letting them dry, I used a sanding block around the edges of the base to ensure a smooth fit into the barges' hoppers. The finished partially unloaded barge is shown in photo 8.

These barges were a fun scratchbuilding project and make interesting and prototypical additions to my waterfront scene. MR

James A. Ferguson lives in Pittsburgh, Pa. He wrote "Repowering a Westside PRR D16sb with tender drive" in the March 1987 Model Railroader.