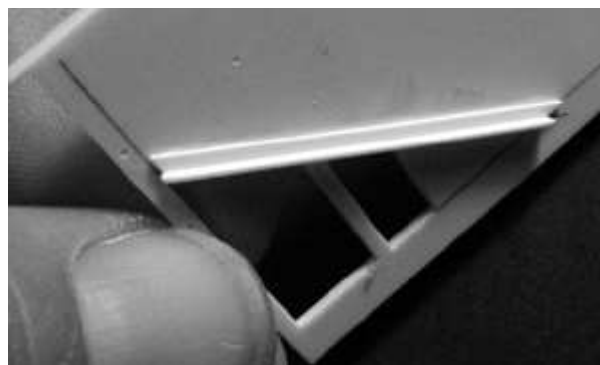
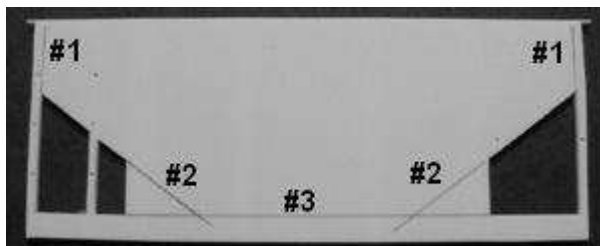


# Boulder Valley Models ..... #561-564 Steel Hopper -- 15' Single Bay ..... Instructions & Ideas

**Note:** Instructions describe building a single car; repeat steps for multi-car packs.  
**Before you begin:** Wash resin parts, read notes on parts listing page, read instructions & consider your own preferences regarding painting, etc. prior to assembly. Some parts may need to be sanded or filed for proper fit -- test fit and dress parts before gluing.  
**Metric equivalents:** See notes at end of instructions.

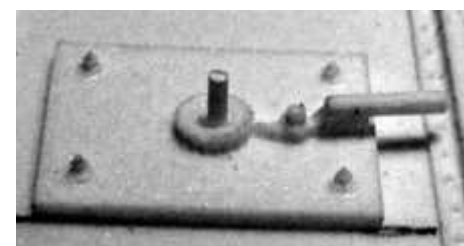
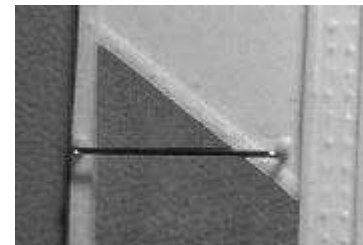
## Prepare Car Sides

- ★ Refer to color photos and photo of finished car side below for placement of grab-irons.
- Pre-drill (8) #75 holes for grab-irons on each side (Part B). Locate the drill tip directly below each NBW (nut-bolt-washer) detail. Drill one pair for the long grab-iron on the left and three pair for the short grab-irons on the right. [Approx. 0.5 mm drill bit for metric -- match to fine wire and grab-irons provided.]
- ★ Turn side over and use a pencil and straight edge to draw lines as shown. These lines will help in placement of brackets for the slope sheets (angled interior panels.)
- At each end, draw a vertical line (#1) to extend the end post up on to the side. Extend each of the angled areas (#2) into the center. Across the center, draw a horizontal line (#3) to extend the side sill.
- Place a piece of styrene angle (Part W) with the bottom edge along line #2. Mark the ends to be cut along lines #1 and 3.
- Place angle on a cutting surface and trim ends with a hobby knife. Tip: Cut flat bottom edge first, then turn and cut the other edge.
- Test fit between lines and check ends. Glue in



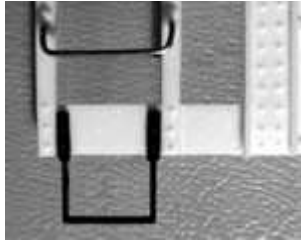
place with the bottom edge along line #2, noting the orientation of the angle as shown in photo. Repeat for other slope. Then repeat both pieces on the other car side.

- Turn side over and add (3) drop-style grab-irons (Part R) to each side as follows. Trim the legs of each grab-iron to approx. 4" scale [2 mm] using wire cutters; lightly sand ends if needed to remove burrs. Test fit in pre-drilled holes and use pliers to lightly bend grab-irons if needed. Place a droplet of ACC on a piece of wax paper, hold grab-iron with tweezers and dip each end lightly into the ACC. Press into place. Wire ends should be flush with interior of car side -- these can be dressed with a sanding stick or emery board if needed.
- Use fine wire (Part T) to form the long grab-iron for the left side. Hold wire with pliers and bend approx. 4" scale [2 mm] from end. Hold wire against car side to determine length and make another bend at opposite end. Trim off approx. 4" scale and test fit. Use pliers to gently bend if needed. Glue in place. Repeat for other side.
- ★ Optional side plates: We have provided two different plates for the car sides. On one side, there is a door release mechanism with a ratchet, wheel and release lever. On the other side is a bearing for the end of the rod (not modeled) that would cross the interior and hold support chains used to raise the hopper doors. These side plates may be omitted if you prefer to model a different style of door mechanism. If you're feeling adventurous, you could add these details -- we've chosen to omit them for simplicity, as the deep interior of the car is not visible under typical operating conditions.
- Each plate is placed between the center ribs on each side. Mark a line 9" scale [4.75 mm] above the bottom edge of car side for placement of side plates (Parts D and E). Glue in place as shown.
- Add door release details as shown. Drill a #66 hole in center of ratchet wheel detail. Cut a piece of styrene rod (Part Q) to 9" scale length [4.75 mm]. Glue in place with back end flush with interior of car side. [Metric drill approx. 0.76 mm -- match to styrene rod provided.]
- Carefully trim out door release lever (Part L) and glue in place as shown on previous page. Extra pieces are



# Boulder Valley Models ..... #561-564 Steel Hopper -- 15' Single Bay ..... Instructions & Ideas

included in case you drop this small part! A brakewheel will mount over the styrene rod. We'll leave this until final assembly since it is easier to paint and weather the car before adding this detail.



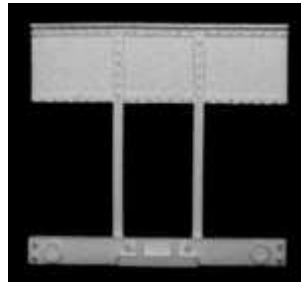
- Use a hobby knife to carefully remove the plastic foot stirrups (Part S) from the sprue. Use ACC to glue to car side as shown. Place two on each side -- outer edge will butt against the raised rivet strip on each end of car. Molded pegs on the back of stirrup butt against bottom edge of car side. If you break the stirrup, you can use plastic cement to repair.
- Finished side will have grab-irons, foot stirrups and side plate as shown ... plus the interior angles shown on previous page.



## Prepare Car Ends

- ★ Car ends (Part C) are molded with an

extra rib along each side edge to provide strength for shipping. These ribs and the thin film backing are removed prior to assembly.



- Trim ends as shown. Use a hobby knife and press lightly along inside of openings and cut across the thin outer vertical pieces. Repeat light strokes to cut thru the thin backing material, then remove and dress with a sanding stick or emery board. Use light strokes to avoid breakage, as this part will be somewhat fragile prior to car assembly. (If you happen to break the center posts, apply a dab of ACC in the crack and lay flat on wax paper until set.)

- ★ One end will receive brake details as described below. The other end remains plain.

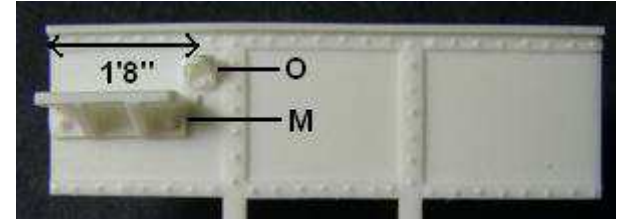
- Mark top surface of end beam 1' 8" scale [10.6 mm] from left and 2" scale [1 mm] from outer edge. Use a #66 drill to make a shallow hole to anchor brake staff. [Metric, approx. 0.76 mm drill -- match to heavy wire provided]



**Note:** The hole is drilled on the TOP surface of the end beam. Photo shows end beam looking down from top edge of car end.

- Mark center line for brake staff bracket (Part O) as shown in opposite column -- 1'8" scale from left edge. Pre-drill a #66 hole thru bracket before trimming the part from backing (much easier this way!) -- then trim and mount as shown with hole centered

above the hole drilled in end beam. Glue brake platform (Part M) in place as shown -- left edge should be flush or inset from edge of car end. Note the orientation of NBW (nut-bolt-washer) detail, which "mounts" the platform to the surface of car end.

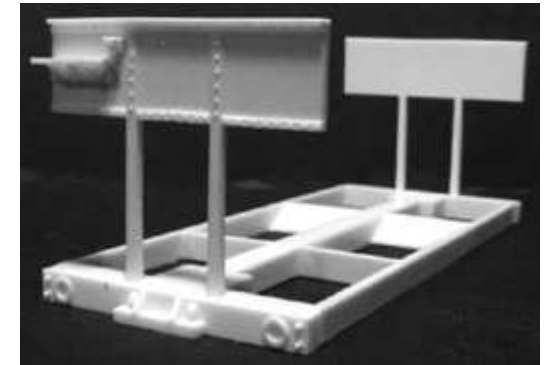


## Assemble the Body

- ★ **IMPORTANT / ORIENTATION of CHASSIS:** The sloped center sections of the chassis are visible from the TOP side. This side should face UP when mounting the car ends.

- Place the chassis (Part A) on wax paper on a smooth, flat surface -- double check orientation as noted so the **sloped areas in center** are visible from the **TOP** side.

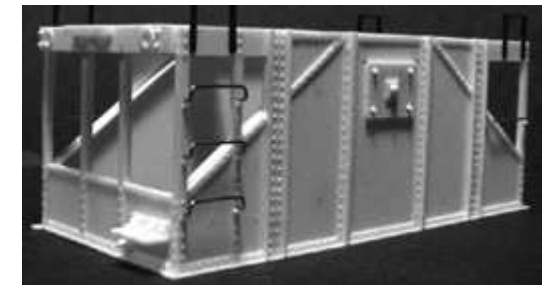
- Glue one car end against the end of chassis, so the bottom edges are flush -- check to make sure that the piece is centered on the end of chassis. Allow to set and repeat for other end.



- ★ **The assembly is turned upside-down prior to adding car sides.** This insures that the top edges are all flush. Also, the top rib along the car sides is molded with extra length that will extend beyond the top rib on the car ends. This allows for variations in assembly and will be trimmed flush after the pieces are set.

- ★ **TIP for gluing car sides:** Apply cement only along edge of chassis and place car sides. Then flex the ends to apply cement to the thin outer edges as described below.

- ★ **Another TIP for gluing car sides:** If you're not fully comfortable with ACC, then use 5-minute epoxy for this step -- this allows more time to adjust placement of parts.

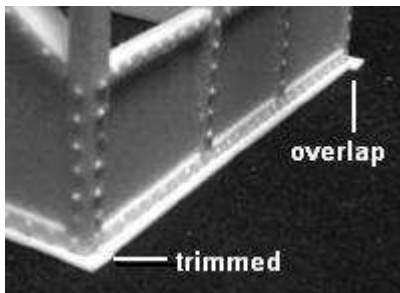


- Test fit side against chassis/end assembly and get a feel for the location and centering

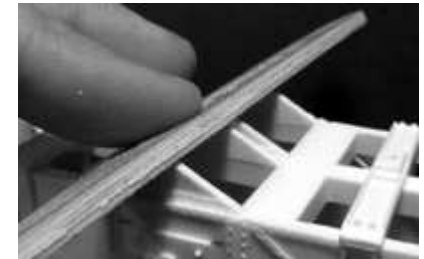
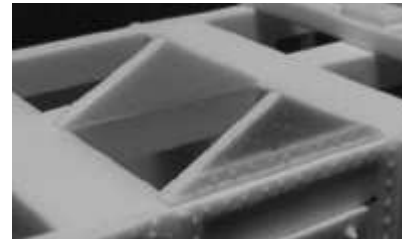
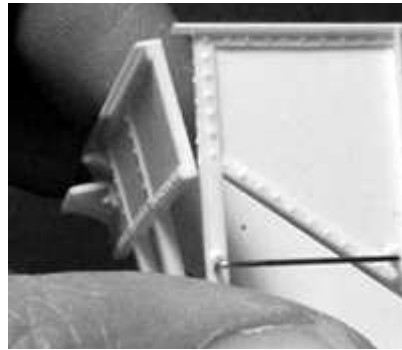
# Boulder Valley Models ..... #561-564 Steel Hopper -- 15' Single Bay ..... Instructions & Ideas

of this part. Apply ACC along the side of chassis and mount car side in place as shown on previous page using the **upside-down** orientation of parts to insure that **top edges are flush**. Make certain that car side is **centered** properly and has an even amount of overlap on each of the end beams. Repeat for opposite side.

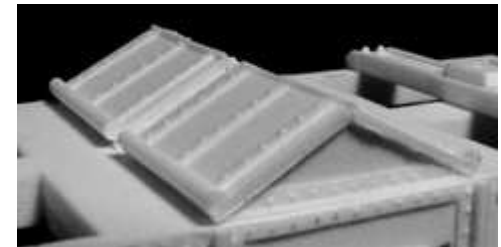
- If you followed the gluing tips and glued only the bottom edge of side, then proceed as follows. Gently flex the end as shown and use a toothpick to apply a thin bead of ACC or epoxy along the edge of end. Press into place so that the rivet bands along the top and bottom of end panel is flush with the rivet band on outer edge of car side. Check for both sides of end and hold until set. Photo at right shows alignment of sides and ends.
- Place upside-down and trim top ribs on sides even with top rib on ends as shown above.



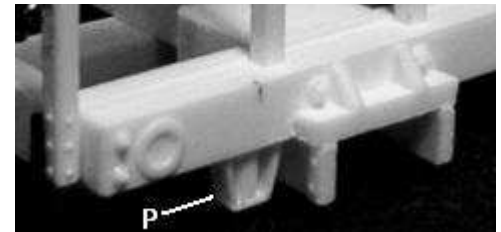
- Pre-drill a 1/16" diameter hole [1.6 mm] in the center of each bolster (Part F). Test fit to determine placement -- the ends of the bolsters align with the large channel ribs on the car sides. Place bolster loosely on chassis and draw pencil lines where the bolster crosses the chassis -- this will show where to apply ACC. Glue in place as shown and double check placement from each side to insure correct placement. Repeat for other bolster.
- Trim coupler boxes (Part G) from backing and glue in place as shown -- outer edge should be flush with outer edge of end beam. Make sure part is centered.
- Hopper bays (Part H) are placed so that the smooth surface is flush with the center opening in bottom of chassis. Test fit and glue in place as shown in next column -- keep centered across opening. Two bays are added to each opening.
- Allow bays to set, then use a sanding stick or emery board to sand across the bays to make sure they're all even -- this will compensate for small variations in placement.



- Hopper doors (Part J and K) are molded in pairs. One has a small lip on the bottom edge. Separate into pairs prior to assembly.
- Lightly bevel the bottom edges of the doors and round the back of the "hinge" end. Loosely test fit. Place Part K (door without lip), then butt Part J (with lip). These pieces may be centered over the bays or shifted out toward the sides (as shown) to create more shadow and emphasize the doors. Glue in place as shown. Repeat for second pair.



- Identify brake roller (Part P) and trim out triangular openings prior to removing part from backing (much easier that way!) -- trim out roller and place on brake end directly below the hole in end beam as shown.



- ★ **Painting tip / plan ahead:** In the next step we'll trim the slope sheets (angled interior panels).

We suggest that you **do not glue** these in place at this time. Painting the interior of a hopper car can be tricky. By painting these panels separately and leaving the bottom open, it's much easier to spray paint (or at least primer) into and thru the car, thus minimizing the blow-back effect of spraying into an open-top car.

- Two pieces of thin styrene sheet (Part V) are provided to make the slope sheets. The finished size is approximately 5'6" x 5'9" scale [35 x 36.5 mm]. This will vary slightly depending on alignment of parts and angled brackets, so we suggest cutting scrap paper to the size indicated. Test fit the paper pieces and use these as patterns once the exact size is determined. Cut and test fit styrene pieces -- **do not glue!** We suggest painting these pieces separately as noted above.
- The length of the brake staff can be varied. We cut ours to a length of 6'9" scale [42.8 mm]. Use wire cutters to trim staff to desired length and use sanding stick or emery board to remove burrs on end. Test fit thru brake staff bracket and into hole in end beam. Lift slightly and add a droplet of ACC to bottom end, then seat in hole in end beam. Pre-drill #66 holes in each of the two brakewheels (Part N). Glue one to the top of brake staff. Set the other aside to add to door release plate.

# Boulder Valley Models ..... #561-564 Steel Hopper -- 15' Single Bay ..... Instructions & Ideas

## Prepare Kadee Couplers

**Photo** -- Stock parts with "ears" are shown at left front. Modified parts with the ears removed are shown at right front. Completed couplers are shown at right rear



- ★ Trucks & couplers are not included. To maintain the HO coupler height frequently used on On30 equipment (such as the Bachmann Spectrum locos & cars), we suggest the following combinations:
- ★ BVM T-2 trucks (18" wheels) with Kadee #5 couplers. (Shown on our sample.)
- ★ BVM T-1 trucks (20" wheels) with Kadee #42 couplers.
- ★ The coupler boxes provided in the kit are designed to accept Kadee coupler housings with the ears removed as shown.

## Painting Body Assembly and Separate Parts

- Paint body assembly. Paint separate parts: (2) slope sheets and (1) extra brakewheel. You may also want to assemble trucks and couplers and paint those while you're at it.
- ★ **Painting tip / CAREFULLY build up paint coverage:** As noted, painting the interior of an open-top car can be tricky. Don't try to "force" paint into the corners by spraying heavily -- instead, use multiple light passes and spray from different angles. Take care to gradually build up a good primer coat (and use a brush with matching gray paint if needed for tiny areas) -- color coats don't have to reach as deep, as it's natural for dirt and grime to accumulate in the "shadow" areas and a little darkness in these areas will enhance the overall appearance and detail of the finished car.
- ★ **Paint on sample models:** Most of the paint effects on our sample were achieved with misty coats of spray paint. After priming parts and assemblies with a basecoat of Krylon primer, we applied misty coats of flat black and earth brown paint -- these coats were light enough to create a somewhat speckled appearance with a touch of the gray primer showing in spots. We followed this with a misty coat of Krylon red oxide primer -- although this is the "finish" paint color for our model, we allowed a little of the speckled undercoat to show through for a slightly weathered/aged affect.
- ★ Following the spray paint coats, we just added a few highlights by dry-brushing light to medium gray paints over the various ribs, rivets, edges and so forth. We used Polly S brand, but others may be used. "Dry brushing" is a technique in which you dip the brush lightly into the paint, then brush off most of that paint onto scrap paper until the paint brush is nearly dry. Then lightly brush over the raised surfaces on the model to deposit very small amounts of paint and create highlights. (Practice on items in your scrap box to get a feel for this technique!)
- ★ Our web page (noted at end of instructions) includes a variety of suggestions and illustrations for painting On30 models.
- ★ Lettering: We used Woodland Scenics dry-transfer number sets to mark our hoppers.

## Final Assembly

- Glue slope sheets in place along angle brackets inside car.
- Add brakewheel to door release plate on one side.
- Use a piece of scrap wood to support car when adding trucks -- place car upside-down on support with brake end overhanging scrap to protect brake staff and wheel. Place one truck and use light even pressure to tap screw (Part W) into bolster hole. Repeat for other truck.
- Use small dabs of ACC to glue coupler boxes in place -- avoid getting glue into the center opening.
- Weather your hopper(s) to taste and get some coal moving on your On30 layout! When you get a chance, please email photos for our gallery of BVM kits built by modelers like you.

## Metric Equivalents

- ★ **What is "O" scale?** In various parts of the world, this designation is used for several similar but slightly different scale ratios. These include 1:43, 1:45 and 1:48 -- our instructions all refer to scale measurements according to the 1:48 ratio.
- ★ We've tried to provide some useful information for international modelers and welcome your feedback (or corrections!).
- ★ **Feet and inches:** There are 12" (inches) in 1' (foot) of actual measure. (We use the term "actual measure" to define real-world measurements. The term "scale measure" is used for measurements adjusted to the scale of the model = 1/48 actual size.)
- ★ More about feet and inches: A measurement such as 2'4" indicates that the total measurement is 2 feet plus 4 inches.
- ★ **Metric conversion:** 1" (inch) actual measure = 25.4 mm actual measure. 1' (foot) actual measure = 304.8 mm actual measure.
- ★ **Scale measurements:** One scale foot = 6.35 mm actual size. One scale inch = 0.53 mm actual size.
- ★ **Drill conversions:** For items such as grab-irons, match the diameter of the drill to the diameter of the part being installed. For truck screws, drill a hole that is smaller in diameter than the threads on the screw.

## End Notes

- ★ Boulder Valley Models is owned & operated by Dallas Mallerich -- an On30 modeler who shares your interests and enthusiasm. Please feel free to write or email with any questions or ideas that you may have!
- ★ Thank you for your continued support, interest, ideas and encouragement! -- *Dallas*

## Boulder Valley Models

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