

VI. Scratchbuilding a Flatcar



Scratchbuilding refers to the process of making the parts of the model from materials and using pre-made parts for details.

Scratchbuilding a Flatcar

This is a simple flatcar constructed from styrene utilizing HO trucks and HO couplers. The floorboards are basswood. Detail parts are kept to a minimum.

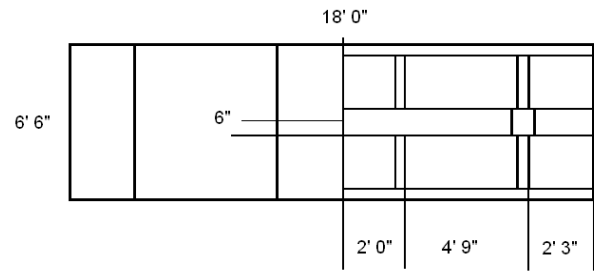
It is presented in two parts in order to show that the underframe and the body do not have to be built at the same time. This concept allows numerous underframes to be built and stored until needed.

1. Underframe Construction

Underframe Parts List

all sized pieces are styrene

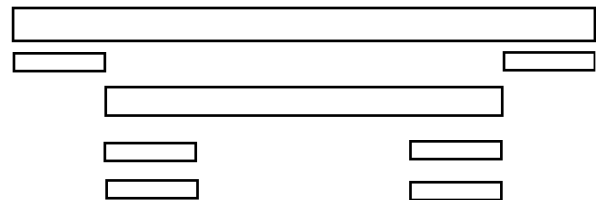
- (1) Core: .060 X 1.625 X 4.50
- (1) Centersill: .060 X .250 X 4.50
.060 X .250 X 3.50
- (2) Coupler Pad: .030 X .250 X .500
- (4) Bolster Pad: .060 X .250 X .250
- (4) Cross Brace: .060 X .125 X .625
- (4) Bolster: .080 X .080 X .625
- (2) Sidesill: .060 X .125 X 4.50
- (2) Beam: .080 X .080 X 2.00
- (4) Turnbuckles: Grandt Line #54
- (8) Queenposts: Grandt Line #136 or #69
- (1 pr) Trucks: Kadee #500 HO archbar
- (2) Truck Screws: 0 X 1/4" wood screws
- (1 pr) Couplers: Kadee #5 HO
- (4) Trussrods: .025 fishing line, approx 12"



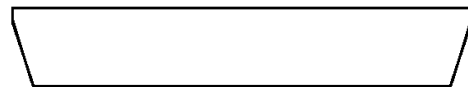
This is a drawing of the core. The left shows only location lines and the right shows how the parts fit to them.

Note that the car is being built upside down. Start by laying out the vertical location lines using an Extra Fine Point Sharpie and a scale ruler. Do the vertical center first, and then the queenpost and bolster locations. These are the 2'3", 4'9", and 2'0" lines. There are five lines in all.

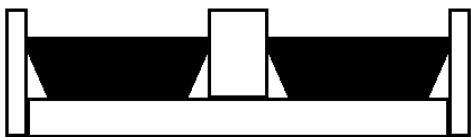
Then do the horizontal center line (this goes along the length). On one side, offset 6", mark a parallel line. This shows the location of the centersill.



From top to bottom: centersill long, coupler pads, centersill short, and bolster pads. Glue these together to form the finished centersill.

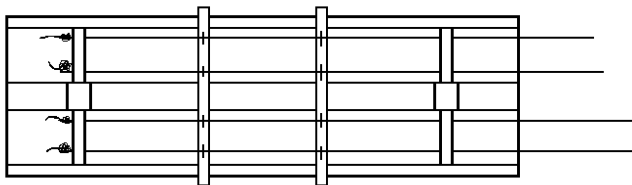


On the four bolster pieces, cut the corners off of the ends on one edge at about 30 degrees. Leave material on the other edge to preserve the length.



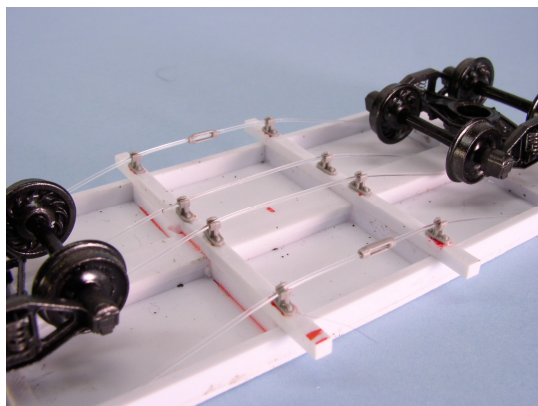
An end view of the car. Glue on the centersill. Install the four bolsters pieces (shown in black) at the 2'3" marks. The crosspieces attach at the 7'0" marks. Add the sides. Glue the beams directly over the cross pieces. Let dry overnight.

Lay the car on a flat surface and mount the trucks. The flat surface prevents the car from warping when drilling and inserting the screw. Once mounting is satisfactory, remove the trucks and screws.

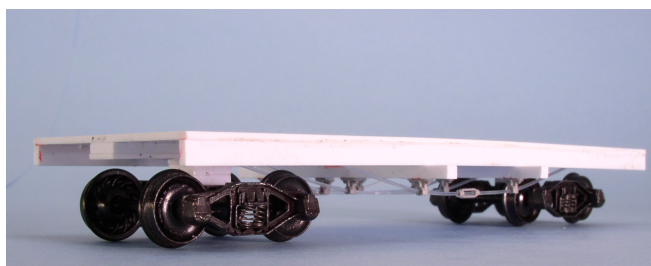


Cut the trussrod material into four pieces and tie a knot in one end of each piece. Put the opposite end through the wedge space between the bolster and centersill or sidesill, run over the top of the two beams and down through the opposite wedge space. Pull tight and straighten and mark where the truss rod touches the beams. These are the locations of the queenposts.

Remove the trussrods, drill the beams, and glue in the queenposts. Eye down the beam to make sure all the queenposts are lined up. Let this dry.



Reinstall the trussrods but only through one bolster. Slip the turnbuckles over the end of the trussrod and install the trussrod into the opposite bolster. Make sure the trussrod is laying to the side of the queenposts and not on top of them. Pull the trussrod tight and secure the end with CA. Then do the same for the knot on the other end. Do all four trussrods. Let this dry for ten minutes or more and then lift the trussrods into the queenposts. The turnbuckles should be between the queenposts. If a trussrod pulls loose from the bolster, remove it from the queenposts, pull tight, and reglue. Once they fit well on the queenposts and are holding the tension, the knots and the excess can be cut off. Slide the turnbuckles out of position and put a bit of CA on the trussrod and slide the turnbuckle back into position. Reinstall the trucks.

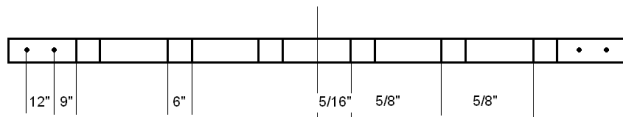


A completed underframe before painting. Couplers are attached after a body is built.

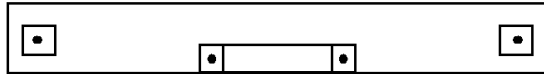
2. Flatcar Body Construction

Flatcar Body Parts List

- (2) Side: 1/16" X 3/16" X 4 1/2" (basswood)
- (2) End: 1/8" X 3/16" X 2" (basswood)
- (38) Floorboards: 1/32" X 1/8" X 1 7/8" (basswood)
- (1) Brakewheel Plate: .020 X .125 X .250 (styrene)
- (2) Buffer: .040 X .125 X .500 (styrene)
- (1) Brake Staff: .022 brass wire 13/16"
- (8) NBW: Grandt Line #80 or #81
- (4) Stirrups: Grandt Line #83 or #90
- (12) Stake Pocket: Grandt Line #53 [2-ubolts]
- (1) Brakewheel: Grandt Line #88



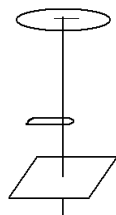
The drawing shows the locations of the stirrups and the stake pockets. All are mounted on the horizontal centerline. Drill and install the stakepockets, glue from the back. When dry, sand the back smooth. Glue on the stirrups. The sides can now be glued to the underframe.



Building the ends. Glue a NBW onto each end of the buffer block and then glue the buffer block onto the end as shown. Glue the two remaining NBWs to the end in line with the trussrods. Glue the end to underframe.

Paint the sides, ends and underframe. Let dry.

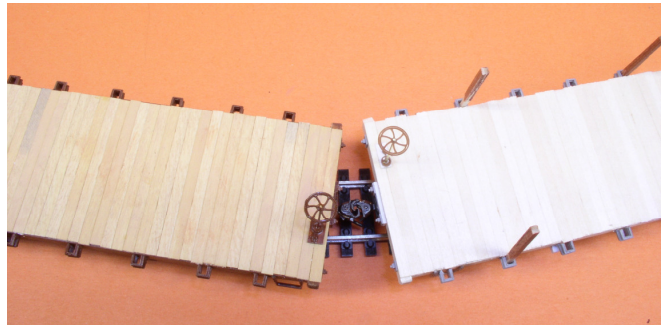
Cut the floorboards, stain, and glue on. Use a thin application of styrene tube cement down the middle of the car and light applications of Elmer's Wood Glue on the sides. Start with the board on the endsill and do a few at a time. Use a square to make sure the boards are perpendicular with the sides.



Build the brake wheel. Drill out the brake wheel plate, the ratchet, the brake wheel, and the mounting location on the endsill. CA glue the brake wheel to the staff. Paint the same color as the car sides. Set it on the car. The ratchet should rest on the plate and the brake wheel should be approximately 3' from the ratchet. CA glue.

Mount the couplers by cutting the lugs off of the boxes and lids. Put the lid and box together and test fit. Then use a small amount of styrene cement and glue the lid to the coupler pad.

Assemble the coupler and glue the pocket to the lid with a small amount CA. The CA will allow the pocket to be pried off--do not use styrene cement as the coupler assembly will not be able to be taken apart. Car is finished.



Due to its small size, the flatcar can easily negotiate 15" radius curves.

An Overview of the Scratchbuilding Process

1. Determine the criteria of the model: scale, gauge, functional items; predetermined choices such as wood floors, or a certain kind of truck or coupler.
2. Research the prototype or similar prototypes to understand construction and to get dimensions.
3. Design the model. It is the modeler's choice how this is accomplished. Not every part on the prototype needs to be reproduced on the model unless that is part of the criteria. Unseen areas don't have to be detailed, such as inside of boxcars (where the doors are glued shut).
4. Create a Parts List. This list describes every part that will be used to construct the model. Include a quantity, the part name, and describe what will be used to make the part.
5. Work out a construction sequence--the order in which parts of the model will be assembled.
6. Collect necessary materials, parts, hardware, tools.
7. Begin construction. Any number of the previous steps may need repeated and modified.