Scratchbuilding Rolling Stock

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Tools & materials

- Razor saw & miter box
- Hobby knife
- Old hacksaw blade, for scribing material to look like weathered wood.
- Clamps
- Square
- Sandpaper - 100 or 120 grit, wrapped around a 3/4"x3/4" stick, also 80grit 3"x21" sanding belt on a piece of 1"x4"
- Needle nose pliers
- Flush cutting side cutters
- Assorted number drills, #1 thru #80 (#10 thru #60 most common)
- Glue:
    - For Styrene, Testor's Plastic Cement, or MEK
    - For wood, Titebond III (completely waterproof)
    - CA glue for dissimilar materials
- Nut pick or similar tool for removing excess glue before it sets up.
- Paint of your choice of colors - suggest Krylon flat black for car underbody, Ruddy Brown .primer for new rust, and gray for most priming.
- 1/16" brazing rod for truss rods under car frame.
- Appropriate sizes of either bass wood or styrene, your choice. Styrene is heavier and stronger, available from Ace Hobby Place up to 14" long, and from Evergreen Scale models, direct, up to 24" long
- Ozark Miniatures; various white metal castings such as Tie rod washers, Queen posts & turn buckles, side sill steps, grab bars, brake wheels, NBW castings and cylinders, etc.

Drawings & plans

- Whether you make a dimensioned sketch or a scale drawing of your project, you need to know what it will look like when you finish.
- Styrofoam board, 1" or 2" thick, about 2' long x 1' wide, to pin your drawing to.
- Wax paper to cover your drawing so that glue doesn't stick to it when assembling parts.
- Dress makers pins to hold parts in place while the glue sets.
- Aluminum angles -1 or 2 pieces, 6" long, 3/4"x3/4"x1/16", for assembling car

side at a 90 degree angle.

- Couplers and trucks: Gary Raymond offers the best selection of wheel sets for every scale, and Aristo, USA, Bachmann, Hartland Loco Works and Hartford Products offer truck frames and bolster bars; KaDee offers knuckle couplers, and hook & loop couplers are available from Aristo, USA and Hartland.
- Patience.

Assembly

Begin with the car underframe, cutting the end beams to the car width, and the side and intermediate sills to the car length, less the end beam thicknesses, making sure the frame is square.

Apply the car floor, boards to be at right angle to the sills. You may use individual boards such as coffee stirring strips, 3/16" plywood door skins, or scored styrene - Evergreen #4250 is a fine choice. It is .040" thick, scored 1/4" o.c., and resembles 1X6 decking. Use two layers back to back to simulate 2X6 planking.

At this point, it is time to mount the trucks and couplers to insure the couplers are at the right height. Select wheels, trucks and bolster members to bring the underside of the car body to the desired height of 1 5/16" above top of rail. For body mounted couplers, adjust by shimming the underside of your car body to achieve this 1 5/16" dimension using scraps of the car material or other stock.. After you are satisfied with the coupler height, remove the trucks and couplers to simplify the rest of the car's construction.

Next, apply the cross beams that support the truss rods. Before adding the truss rods, add any brake mechanisms and/or details you may want to the underframe, such as truss rod pads or Queen posts, then add the truss rods.

Build the car sides and ends, sides to be the length of the car, and ends to fit between the sides. When these are complete, glue one side to one end, using the aluminum angles to insure squareness. Repeat with the other side and end, then glue those assemblies together to form the car body. When the car body is assembled, glue it to the car floor, making sure it does not overhang the floor at any point, which would interfere with the later application of the siding boards.

Now is the time to cut and fit the roof supports. Cut them to match the slope of the end walls, and notch them to accept a ridge beam, and to fit between the car sides. Cut a ridge beam to fit between the car ends, and shape its top surface to match the slope of the end walls and roof supports. Space the supports equally in the length of the car, and glue the ridge beam to the supports, making sure the top of this assembly will support the roof deck without any humps or dips. Glue a small block to each

end wall to support the ends of the ridge beam.

At this point, it's time to apply the car siding - vertical boards (scored styrene sheet or basswood) on the outside for a box car or reefer, or spaced boards on the inside for a stock car.

Before gluing the ridge beam and roof support into the car body, it's time to paint the inside of the car if you want to. Then glue the roof support assembly into the car body.

Next, cut and fit roof panels, allowing an overhang of about 3/16" at each end and side. Bevel the edge of the panels where they will meet at the ridge in order to allow a tight joint, and glue the panels in place.

Now is the time to detail the roof with such things as catwalks, hatches for a reefer car, or strips to simulate joint covers in metal roofing.

Adding the doors is next. For a box car, build a single door for each side of the car, using the same material you used for the car siding. For a stock car, the doors should be built with spaced individual boards for ventilation. For a reefer, build pairs of doors, again, using the same material you used for the car siding.

For either a box car or stock car, the door should overlap the opening by about 1/8" all around. For a reefer, the doors should be the same size as the opening. In all cases, the door(s) should be backed with a frame of thin strips, say, 1/16" x 3/16" to give them some rigidity. For either stock or box cars, the doors should be allowed to slide open and closed. However, you may want to simply glue them in place - your choice. If you want the doors to open and close, this can be accomplished by adding suitably sized strips of materials above and below the door opening. The strip immediately next to the car side needs to be slightly thicker than the door and it's backing, and the strips placed on the car siding to allow a small amount of up and down play in the door, but no more the 1/16" total.

Next, apply wider strips to these, in order to keep the door from falling out. Then apply a small scrap of material, the thickness of the door, to each end of the door's travel to act as door stops. Ozark Miniatures has some cast metal stops if you want to be finely detailed.

For a reefer, add some strips to the inside of the door openings to act as door stops. You can then glue the doors in place, or if you want them to open and close, Ozark Miniatures has cast metal reefer door hardware.
In either event, the Ozark hardware can be used to finish the reefer doors, or you can use paper card stock to simulate hinges and locks, and rod or dowel materials to simulate the door latch.

Should you want to add further small details to your car, now is the time to do it. I simulate rivets or small bolts by drilling small holes and inserting small diameter styrene rods into the holes, adding a drop of MEK to secure the rod, then cutting the rod off above a thin (.010, .020 or .030) strip of styrene to give the appearance of the height of the rivet or bolt head I want. .030, .040 or .060 rod will give the appearance of ½", 3/4" or 1" bolt heads or rivets.

Now is the time to paint the car in your choice of colors. Decals can be applied later, or if you like, use vinyl letters applied to the car after painting it the color you want for the letters, and paint over the vinyl with the final car color. Then peel off the vinyl letters and you have a nicely lettered car.

Now add the details to the car - such things as push plates, corner braces, nut-bolt-washers, brake wheel and staff, **AFTER** first painting the details a contrasting color. Use CA glue for this, or if you are allergic to CA, a tiny amount of Marine Goop will work as well. Of course, if you do not want the details to contrast, you should apply them prior to the final coat of paint on the car body. After the paint dries overnight, add any decals you may desire, and overspray them with Krylon Matte finish so they blend in.

Lastly, add the couplers and trucks, and you have a car unique to your line.

Happy Garden Railroading!