**Car 1- HO scale wooden tank car**

A picture of the Wood Tank Car being modeled. Photo by Model Railroader

During research on various types of railroad cars a book entitled "Easy to Build Model Railroad Freight Cars" which was published by Kalmbach Publishing in 1973 was purchased. There were several projects in the book and an article by Eric Stevens on how to build a wooden tank car from scratch inspired the construction of the car constructed. The author noted that it appeared that the tank car was a tank mounted on a flat car. I picked the wood tank car as my first project and following the article's instructions the car was built in HO scale.

**CAR COMPONENTS**

***General***

Scale Coat II #2012 Tuscan Red paint. (I painted the undercarriage and tank wood components)
Alene's tacky glue (I glued connections involving wooden parts and where styrene plastic parts were connected to wooden parts with this glue)

***Undercarriage of flat car***

*Coupling assembly- (parts purchased)*

2- KD #31 couplers
2- KD #234 gear boxes
2- KD #634 centering springs
2- KD 256 Nylon insulated screws

*Trucks- (parts purchased)*

2-KD 509 Andrews (1898) trucks

***Flat car (scratch built)***

Evergreen #275- 5/32" styrene plastic I beam (used for undercarriage support beams)
3/32" x 3" x36" basswood (used for flat car flooring
Evergreen #9040 - .040 plastic styrene sheet (used as subfloor for flooring)
Evergreen #297 – ¼" styrene plastic angle (used for corner protection of flat car)

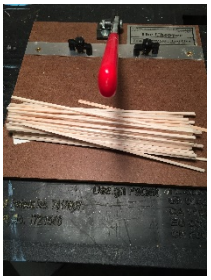
Evergreen #225 5/32” styrene plastic tube (used for poling pockets on ends of flat car)
Northeastern Scale Lumber #3070 (HO scale 12”x12”x11’) basswood (used for spacing of tank to flatcar connection)
Northeastern Scale Lumber #3020 (HO scale 3”x3”x11’) basswood (used for various wood component of flat car)
Evergreen 3020- .020” styrene plastic sheet (used as spacing material for the coupling pockets)
Detail Associates #6427 Grab Irons, drop type 19.5” wide.
A-line #29002 Stirrups Steps, Style “C”
Kadee #438 Air hose and angle cocks
Kadee #441 brake pads
Tichy #3005 K style Westinghouse brake set
Kadee #2040 Ajax Brake wheel
A Line Products #29220, tie down chain-black- 27 links per inch
Tichy Train Group #3034 split K brake kit

***Tank (scratch built)***
1” wood dowel (ho scale 40 feet)
3/32” x 3” x36” basswood (various components were made from this material to include the end staving and tank staving by measuring and cutting the material to the size and shape needed.)
Evergreen #9206 (.022 x .066- HO scale 2”x 6”) styrene strips (used for tank straps)
John Randell (JV Models) #8481 eyebolts (.020 diameter, 1/16” eye x 1/2” long) (used for connecting/supporting side handrails tank.)
Precision Metals #497 (.039” diameter) metal music wire (used for handrails on side of tank.
Precision Metals #8159 .020 brass rod (used for ladder steps on the side of the tank.
Plasticstrut #90516 ¼” I beam (used for angular end supports of tank and channel preventing tank from sliding on flat car)
A-Line #50108 Fuel tank (cut down and used for dome cover)
Microscale #90101 3/16” Railroad Gothic letters and numbers

**HOW THE CAR WAS CONSTRUCTED-**

The project started with fabrication of the tank. Using a 36” length of 1” (scaled 7.5’) diameter wood dowel cut off at 5.5” (scaled 40’) length. This provided a cylindrical tank shape measuring 7.5 feet in diameter and 40 feet in length that could be used to apply the staving material. After a light sanding with 120 grit sandpaper the tank shape was set aside so preparation of the staving material could begin.

A sheet of 3/32”x3”x36” basswood was used to fabricate the staving material. An available picture was scaled and was determined that the staving material needed to be 2”x6” in size. Basswood was cut to create pieces that would be 2”x6”x40’ using a paper cutter.

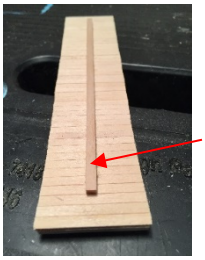


Using a Northwest Shortline Chopper the staving was cut to the lengths needed for the side and ends of the tank.

Guidelines were drawn on opposite sides of the tank shape by placing the tank shape on a flat surface and aligning a small ruler with the surface and side of the tank assuring the guidelines were parallel to the surface. This provided a starting line to align the staving material so it would be straight along the length of the tank. The staving material was then glued to the ends of the tank shape, one piece at a time, using Elmer's Carpenter Wood Glue applied with a small brush.

After allowing the glue to dry 24 hours the excess lengths of staving were cut off with an Xacto knife and then sanded making the staving ends flush with the tank shape using a fine sanding paper. After completion of the ends the staving was glued to the sides of the tank using the same procedure and then set aside to allow the glue to dry. Fabrication of the flat car which the tank would set on was then started.

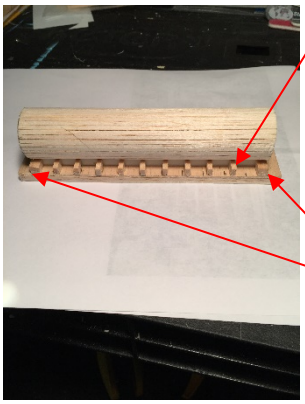
To construct the flat car a piece of .040 styrene plastic was cut into a rectangular shape measuring a scaled 42' long and 9' wide to create the subfloor of the flat car. Using the same material used for the tank staving the wood flooring was glued to the styrene plastic, one piece at a time, in the same fashion used for the staving on the tank. After completing the flooring the car sides and ends were added using pieces of 3/16" (scaled 15") wide basswood that I had cut the same way as the staving. The excessive lengths of flooring were then removed using a sharp Xacto knife. The flooring, sides, and ends were then lightly sanded using a 200 grit sandpaper.



After allowing the glue to dry a piece of scale 10"x16" basswood was glued to the flooring to act as a spacer between the tank and the flatcar with the 16" side being the top and bottom of the spacer. The length of the spacer needed to be the same length as the tank and centered on the flat car both along the length and width.

After allowing the glue to dry the tank assembly was then glued to the spacer on the flat car using glue making sure that the tank assembly was aligned with the flat car.

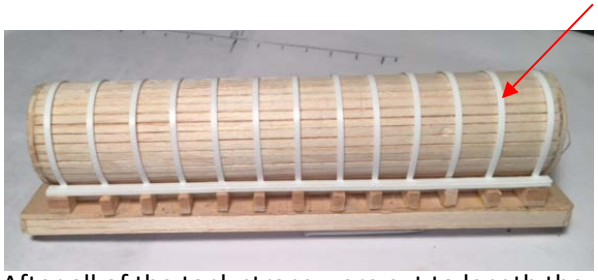
Next, the completed tank/flat car assembly had the tank support strips consisting of .020 styrene plastic cut to a width of scale 16” and a length equal to the length of the tank were added to the floor of the flat car. To provide additional strength a 1/8” styrene plastic angle was glued to the inside of floor side of the strips. This reinforcement was not called for in the author’s directions but it was felt that it was needed. These strips were positioned on both sides of the car between the tank and the flat car floor. Care was taken to assure that the strips were mounted at a 90 degree angle to the floor. The strips were glued to the tank and the flat car flooring.




Timbers, consisting of scaled 8” wide by 16” high and 20” by 16” high bass wood were cut to the length equal the distance between the outside of the flat car sides and the tank support strips. They were then glued with a 20” x16” timber at each end of each tank support strip and 8”x 16” timbers at equal intervals between the end timbers.

After the glue dried, the running boards, consisting of .020 styrene plastic cladding board, were added on top of the tank support timbers using glue. After the glue dried the timbers were cut to length and the ends lightly sanded with 200 grit sand paper.

**Tank end rings, made from 3/32" basswood, were fabricated by cutting them from a piece of the stock basswood.** To make the rings a piece of basswood was held up against each end of the tank. A sharp pencil was used to trace the outline of the tank onto the basswood. After assuring the tracing was accurate the basswood was put on a smooth surface and a second circle was placed on the basswood. The second circle was scale 4" inside the first circle. This established the shape of the each end ring and they were cut out using a sharp Xacto knife. Each ring was glued to the appropriate end of the tank with wood glue. The rings are delicate and subject to breaking as they did when I attempted to glue them. However with a little attention to detail I was successful in getting them glued onto the tank ends. After the glue dried a light sanding was done to the end rings to make them flush with the staving.

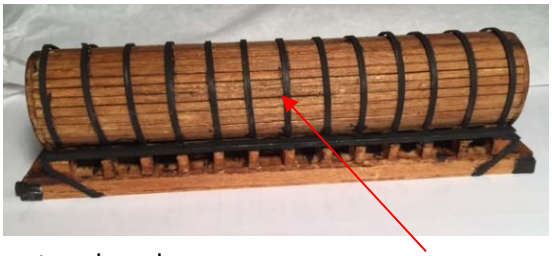


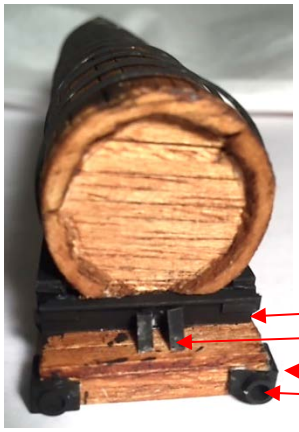
After mounting the tank end rings tank straps, consisting of scale 2"x6" styrene plastic were cut to appropriate lengths. Each strap was cut and test fitted to assure it was of appropriate length.

After all of the tank straps were cut to length they were painted flat black prior to permanent mounting.

At this point a made the decision to seal the car and undercarriage then paint it Tuscan Red later in the build.

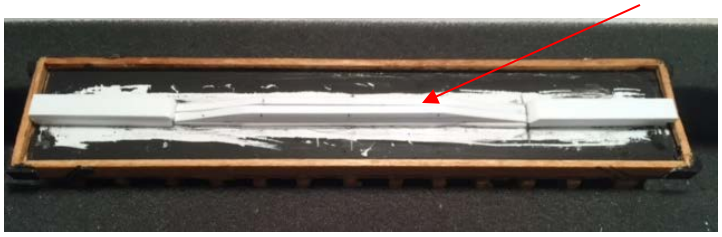
When the sealer was dry the tank straps were glued to the running boards using a plastic solvent cement. The straps were also glued to the tank at the top of the tank using Alee's tack glue. In the prototype the tank straps would have been bolted to the running boards. Additionally, two angular supports, consisting of scale 2"x6" styrene plastic were added to the sides of the flat car at each end.





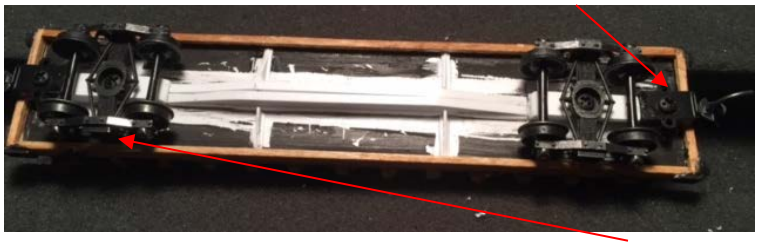

End tank supports consisting of ¼" styrene plastic "I" beam and channel made from the same material with one flange removed and the remaining sanded to make a "L" shaped channel were added to both ends of the tank. The tank end rings had to be modified to accept the "L" channel.
Corner supports, consisting of scale 2"x6" angular styrene plastic, and poling pockets, made of 5/32" tubular styrene plastic were added to the sides and corners of the flat car.
The supports and poling pockets were painted flat black after mounting.

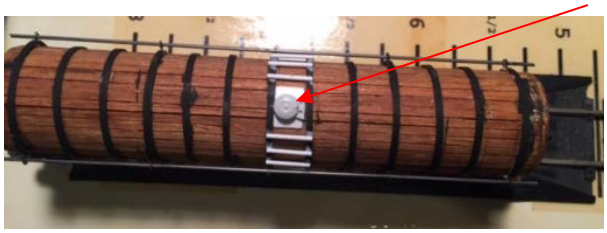
After allowing everything to dry the next step was to add the hand rails to the tank. Two components were needed to accomplish this task. First, .020 thick, 1/16" diameter, and ½" metal eyelets were mounted on each side of the tank at a scaled distance of 3'6" above the running boards on each side. I mounted five eyelets on each side at an equal distance between them. To mount them 1 drilled a 3/8" hole in the appropriate tank strap using a #61 drill bit in a pin drill. I then cut the eyelet to the appropriate length and glued it by placing the stem in glue and putting the eyelet through the drilled hole being careful to align the eyelet with the tank strap. After mounting all of the eyelets and allowing the glue to dry the hand rails were cut for each side from a length of .039 music wire so that the wire was the same length as the tank. The music wire was then threaded through the eyelets and glued to the eyelets using super glue.



The undercarriage of the flat car was then fabricated. Two scale 24' support girders were made from ¼" styrene plastic. At a scaled distance of 6' the web of the girders was removed from inside the flange from the opposite site using a Xacto knife. This allowed for the girder to become angled as it went from that point toward the end of the car providing for the necessary clearance for the trucks to be unobstructed. Additional angled beams were made to create the undercarriage supports running perpendicular to the main girders. The girders were glued using a plastic solvent glue. Additional construction, consisting of two pieces of .040 styrene plastic to form solid beams were mounted along the centerline from the end of the angled girders to the end of the cars to the end of the coupling gearbox. The area of the coupling gearbox had a piece of .040 and .020 thickness styrene plastic to provide support. The truck area had to be thicker to allow the coupling height to meet NMRA standards.

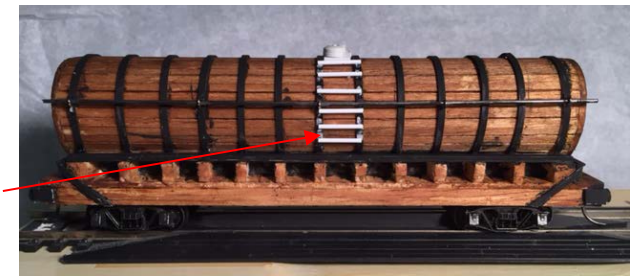
After completing the undercarriage supports the coupling gearboxes, and other associated coupling parts were added as well as the trucks. The gearboxes and trucks (Kaydee 509 “Andrews”) were mounted using Kaydee 256 Nylon Insulated Screws which were installed in holes created by using a #50 tap drill and a 2-56 tap. The holes were drilled to the underside of the wooded flooring on the flat car. The couplers used were Kaydee #31 with Kaydee #634 centering springs mounted in a Kaydee #634 gear box. The gearboxes were mounted to be flush with the end of the car and the trucks were mounted to prevent interference from the gear box. The undercarriage was painted flat black.





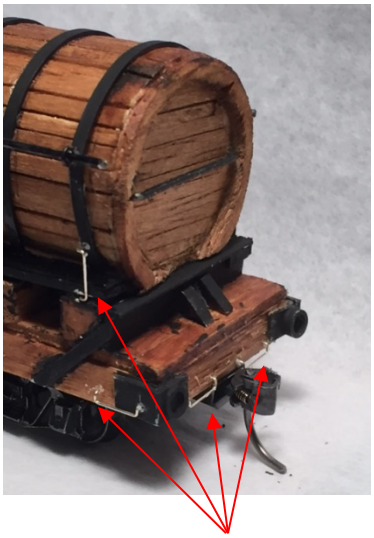
The dome cover, associated tank protection cover, and access ladders were then added to the tank. The tank protection cover was fabricated from a piece of .020 styrene plastic and then bend to match the curvature of the top of the tank. It was secured to the tank using tac glue. The dome cover was kit bashed from a refrigerator car fuel tank by cutting of a portion of the fuel tank then glued using a plastic solvent to the tank protection cover.

The ladder steps were fabricated from .020 brass rod by cutting them to length and then using Gorilla Glue to glue them to the two adjacent tank straps on the tank approximately midway along the tank. The steps were painted flat black.

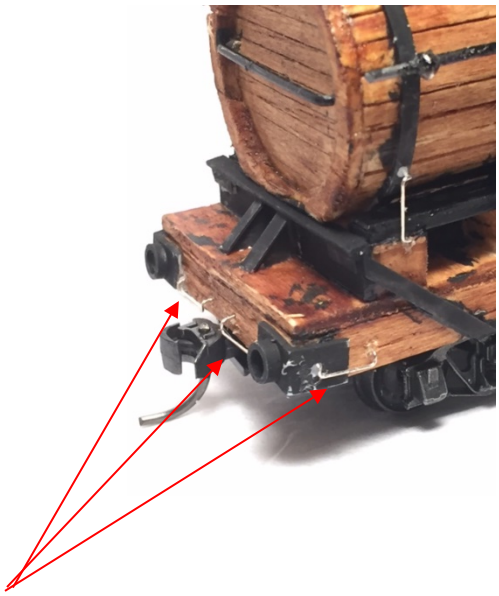


Using a pair of pliers grab rails and **handrails for the ends of the tank were fabricated** using .039 music wire cut to scale 7’ in length between the angled bends.

Then holes were drilled in both ends of the tank assembly using a #61 drill bit and a pin drill. The holes were drilled approximately 3/16” deep to allow sufficient depth to support the hand rails. The hand rails were then mounted using tac glue and then painted flat black.

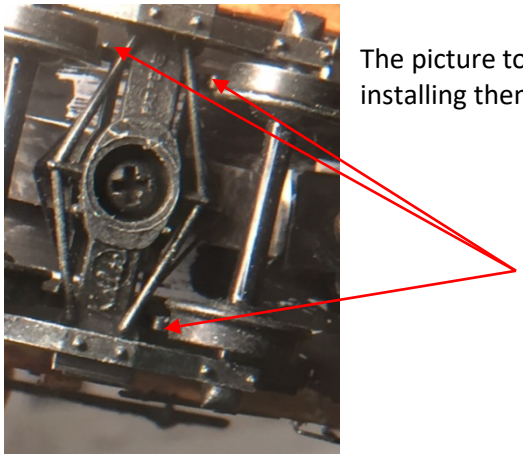


Grab rails were added to the ends and sides of the flat car area as well as on the side of the tank and each end of each side of the tank. The grab rails are scale 22” long and were mounted after drilling holes using a #62 drill bit in a pin vice.



Step stirrups were then added to each end of the sides of the flat car by drilling holes with a #62 drill bit in a pin vice and using tac glue, gluing the stirrups in place.

The brake pads were then added to the trucks by removing the trucks, modifying the brake pad assemblies so they would fit, adding the brake pads, and putting the truck back on the frame. The picture to the right shows the brake pads after modification and prior to installation.



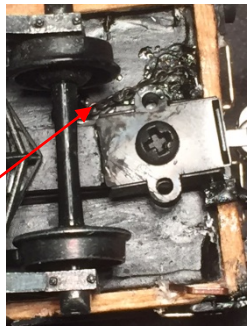
The picture to the left shows three of the four brake pads after installing them on the trucks.

The brake system details were then added to the underside of the car. The brake system shown is a Westinghouse K air brake system.

Air hoses and angle cocks were added to each end of the car just to the right of the coupling. The tank and undercarriage were then painted Tuscan Red.


Lettering was then added to both sides and the callout number was added to each end **by individually placing each letter and number in the appropriate location**.

The manual brake wheel as added to one end of the car and the associated chain between the brake wheel and the braking apparatus was added to the undercarriage on the same end.



The finished Spring Water Company wooden tank car.


Picture of the car modeled from the Kalmbach magazine.