# DULUTH AND IRON RANGE CLASS C/DULUTH, MISSABE AND NORTHERN CLASS R 22-FOOT WOODEN ORE CAR

## HO-1000 SERIES


Revision 1, effective 4-16-2021.


**Thank you for choosing Zenith Model Works!** We recommend having at least some experience in building model railroad kits before you begin. Refer to sheet 2 for a history of the car, its specifications and lettering schemes. ‘

**IMPORTANT INFORMATION:**
Our models are 3D printed in resin. This material is similar to styrene plastic, but it is slightly harder and more brittle. The resin we use responds to ACC, but it will not work with most solvent cements. Unlike traditional resin kits, most of the major components are printed together and very little major assembly is required. Unfortunately, one drawback to resin 3D printing is that sprues used to support the model during the print job are inevitable. At the time of this writing, there is no way to print models without sprues; however, most sprues are easily removed with a fresh X-Acto blade. There may be subtle lumps or deformities in the material where sprues were located; these can be easily sanded or smoothed with contour putty. The resin cures under exposure to UV light. If the model is too soft to work with, place it in a sunny environment for a few days and it will harden. It will become more brittle over time, so use caution. When you receive your model, there may be areas where the resin hasn’t fully dried. This residue can usually be wiped away without any significant changes to the quality of the model. 3D printing is a rapidly changing technology and we hope to update our kits as things improve. Thank you for your patience, and as always, thank you for choosing Zenith Model Works. Should anything be missing or broken, please email us at info@3dptrain.com and we will ship replacements at earliest convenience.

**RECOMMENDED TOOLS:**
Read the instructions thoroughly before beginning construction. Keep a pencil and/or highlighter handy to underscore key details or check off steps. The following tools are necessary to build this kit:

1. Metric ruler or similar measuring device
2. A hobby knife of your choice (a typical X-Acto® knife with a #11 blade works very well)
3. Needle-Nose Pliers
4. Wire Clipper
5. A pin vice
6. #76 and #78 drill bits
7. Flathead or Phillips screwdriver depending on your choice of bolster screw
8. Tweezers
9. ACC

It will help to have some familiarity with standard freight car features. You can add as much or as little detail as you like; feel free to omit certain steps or make modifications where you feel necessary. Wheels and couplers are included at this time.

**Preparation:**

1. If your kit feels soft, allow it to cure in a sunny window for around 24 hours before beginning. This may make assembly easier and the model will take paint better if properly cured.

2. Start by removing sprue marks and cleaning any uncured resin off the model. A small amount of rubbing alcohol and a paper towel usually works very well.

3. The brake staff bracket was designed with excess material on the back side to support it during printing. Carefully file or trim it slightly to allow clearance for the trucks to swivel.

4. Drill out the bolsters to accept a screw of your choice. This location is marked by a small hole included in the print. We recommend a self-tapping 2-56 machine screw, although drilling the hole out first will always help.

**Grab Irons:**

5. Start by drilling #78 holes adjacent to the nut-bolt-washer assemblies on the top of the car body. Small dimples indicate where the bit should be positioned. Cut the grabs to the proper length and secure them with a small amount of ACC. See photo.

6. Side grabs were located on the right end on both sides of the car. These were bent in an “L” shape and attached by two NBWs (see photos). Drill out the holes adjacent to the NBWs. Small, crescent shaped extensions exist to provide support material; they won’t be noticeable when the grabs are attached and can even be filed down if necessary. Cut a piece of straightened wire supplied in the kit about 11 millimeters long, and bend it approximately 4 millimeters long on one side and 7 millimeters long on the other. Bend the ends slightly inwards so that they fit into the holes. Secure the grabs in place with ACC.

7. **Original Cars:** One grab iron each is located on the right-hand side of the end beams. It might help to drill these holes inwards at a slight angle since there is little clearance in this area. Once drilled, cut a grab iron to length and secure in place with ACC. Repeat this process on the other end of the car. **D&IR Modernized Cars:** At some point the end grabs were upgraded and secured to the end support beams about a foot above the original location. NBWs and holes should mark the location. Drill out the holes and install the grab irons supplied.

**Truss Rods:**

8. These cars had both vertical and horizontal truss rods. Start with installing the vertical truss rods. Cut a piece of .010” wire about 12 millimeters long. Test to see if it fits diagonally between the truss rod ends located on the top and bottom of the car. Trim if necessary, and secure each end in place with ACC. Alternatively you could drill through the top of the car body at an angle. NBWs mark where these truss rods terminated. Repeat this step four times until the four vertical truss rods are installed. See photos.

9. The horizontal truss rods are fastened from a piece of .010” wire. Bend the wire to nest in the brackets attached in the queen beam. Cut the ends so that the truss rod ends are secured against the bolsters and glue in place. The truss rods are now done.

**Brake Details:**

10. Add the train line. **D&IR Cars:** This ran along one side of the car, suspended above the side sill. It connected on either end with the air hoses. **DM&N Cars:** The train line ran along the top of the side sill. Using an elongated drill bit, carefully drill through the beams supporting the hopper to allow for the train line to pass through. It may be helpful to omit this step and glue the train line down in sections on the DM&N cars, as there is little room to drill.

11. The brake cylinders are included in the print. We did not have sufficient photos to map out brake levers and hangers, but due to the small size and confined nature of the car body, they can be omitted without any great reduction of detail. **D&IR Cars:** The brake cylinder and reservoir are located underneath the car on one side. A pipe connected the train line to the reservoir; this can be replicated by gluing a piece of wire vertically between these features. The cylinder's connection would not have been easily visible on the DM&N cars. **DM&N Cars:** The DM&N used a Split-K brake system that was mounted on the B-End (see photo). The brake cylinder and reservoir, located side-by-side, were connected by a pipe. A piece of wire fastened into the shape of an elongated U and inserted into the holes provided will replicate this feature. See photos.

12. Air hoses are included in this kit. **Original D&IR Cars:** the air hoses were originally located to the right of the couplers below the end beams as on most other freight cars. By the mid-1890s, the air hoses were secured directly above the original location, under the top end beams. This practice continued when steel cars were introduced. **All DM&N Cars:** air hoses were not raised until about 1900. Photos indicate they were raised by 1902.

13. Drill out the brake platform to accept the brake staff using a #79 drill bit.

14. Cut a piece of .010" wire approximately 14 millimeters long and thread it through the brake platform. It should rest in the bracket that extends below the end beam. Drill out the brake wheel and install it on the staff with ACC. See photo.

15. Retainer valves are included on the body. **D&IR Cars:** the retainer valve is located to the left of the brake platform. The retainer line ran vertically down from the valve. A straight piece of wire glued to the rear of the end beam and connecting to the valve will look correct. Secure with a small amount of ACC. **DM&N Cars:** the retainer valve is located to the right of the brake platform. The retainer line ran downwards at an angle and terminated at the rear of the air reservoir. Bend a piece of wire to fit between the two locations and secure with a small amount of ACC. See photo.

**Stirrups, Cut Levers and Couplers:**

16. **D&IR and DM&N Original Cars:** stirrups were originally of the shallow straight-drop variety. Remove the stirrups from their sprues using a fresh knife blade. Holes under the car should be drilled out to accept the ends of the stirrups; secure them in place with ACC. DM&N stirrups were roughly 24" long and this size is not currently commercially available; correct stirrups could be fastened out of brass strips and glued in place. **Modernized Cars:** sometime around 1900, the original stirrups were replaced with the straight side-mount variety. The modernized carbodies have holes located on the side of the bottom beam to accept these stirrups. Drill out the holes, install the stirrups and secure them in place with ACC. Assembly is now complete.

17. Cut levers were mounted on top of the end beams. Drill out the existing holes using a #76 drill bit to accept eye bolts supplied in the kit. Cut a piece of wire roughly 6 scale feet long and bend it to match the cut lever shown in the supplied photos. Thread it through the eyebolts, then insert them into the holes you drilled. Secure in place with ACC.

18. Our models come with coupler boxes that accept most standard HO scale couplers. Insert a coupler of your choice if you didn't purchase any with the kit. If the coupler doesn't fit, file away some material inside the box until it fits correctly. If you want the couplers to be removable, drill and tap the coupler box and then drill through the coupler box cover supplied. Alternatively the cover can be glued onto the box.

**Painting and Final Adjustments:**

19. Prepare the completed model for painting by washing with detergent to remove any skin oils. Allow the car to fully dry before applying paint. When built, these cars were a dark brown that tended to fade to a maroon that was almost purple. You can use any standard model paint meant for plastics. Paint the underbody and sides first, and then the top. The car's interior would have been tan or grey, probably with red or grey streaks; the wood being constantly subjected to heavy, abrasive iron ore resulted in considerable wear, and boards were probably replaced frequently. This look could be easily simulated with the use of a paint brush. View the instruction sheet for more information on painting.

20. Decals adhere best to a glossy surface. Gloss Coat the car if necessary, then apply our water slide decals with Micro-sol, Solvaset or a similar decal solution. Allow the setting solution to cure (at least 12 hours) before applying a flat finish.

21. At the time of this writing, Zenith Model Works is proud to be the only HO scale kitmaker to offer stenciling for the trucks of its freight cars. Each truck had the journal size and road number of the car applied to the ends of the bolsters. Paint the trucks the same color as the car and carefully add these decals if desired.

22. These cars were usually heavily weathered, and much of the lettering soon became completely obscured. Beginning around 1900, raised numbers were applied over the originals to make identification easier. Resin-printed decals can be purchased from Tichy Train Group, and some aftermarket manufacturers produce etched-metal number sets. If using the decals that come with the kit, when weathering the car it may be more prototypical to have the road numbers be the most visible lettering blocks on the car. From the few photos we have, it seems when the stirrups were upgraded, the original builder's stenciling was moved and in some cases painted over. Refer to the history sheet for details about lettering over the years.

23. Our trucks accept most standard HO scale wheelsets. It is advisable to install the wheels soon after you receive your kit, because the resin will continue to harden over time and may eventually break if strained too much. When fully assembled, test the coupler height. If the couplers are too high, file some material off the bolsters. If they are too low, you can use a washer to raise the height.

24. This car comes with a load piece and a set of cross-braces and can thus be modeled loaded or empty. The pieces can even be swapped out in staging if so desired. If they are too snug to be easily removed, file or sand until they fit in place with minimal difficulty. Paint both to match the color of the car body. Cover the load piece with an adhesive of your choice and sprinkle with a suitable crushed material over it to represent a load. Additional weight can be added beneath it. These cars carried iron ore, coal and ballast. Refer to the history sheet for detailed service life information.

25. Congratulations! Your car is complete. For questions or comments, feel free to contact us at info@3dptrain.com. We appreciate your support.

**ACKNOWLEDGEMENTS:**

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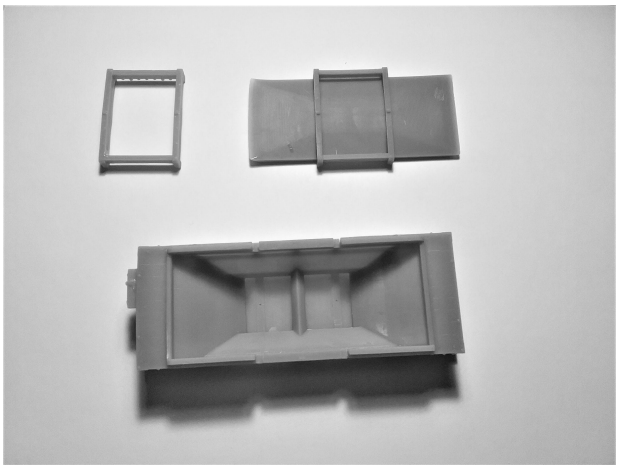
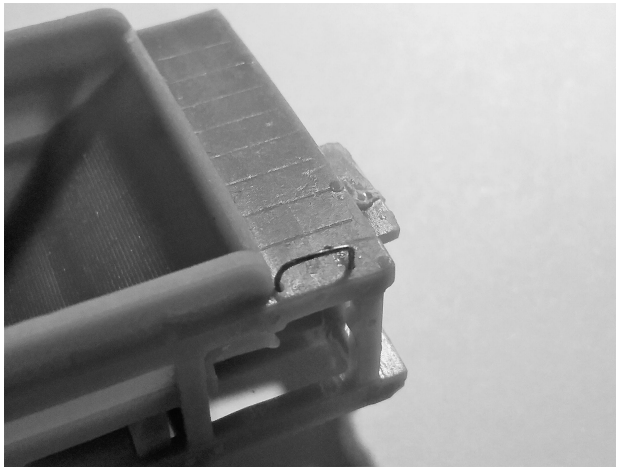
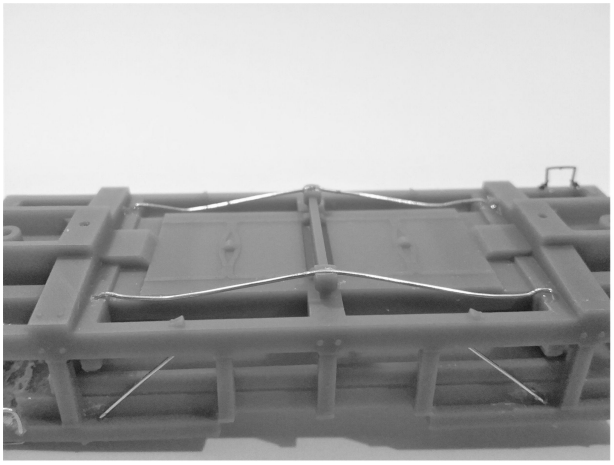
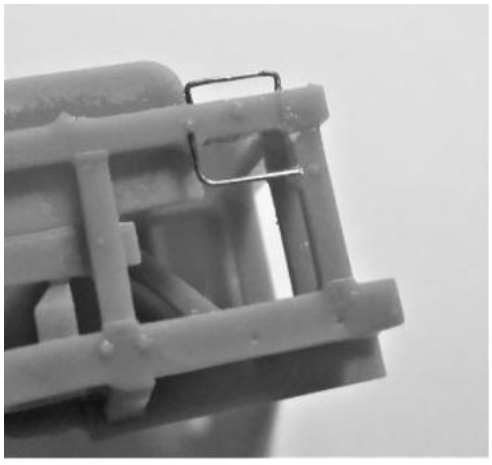


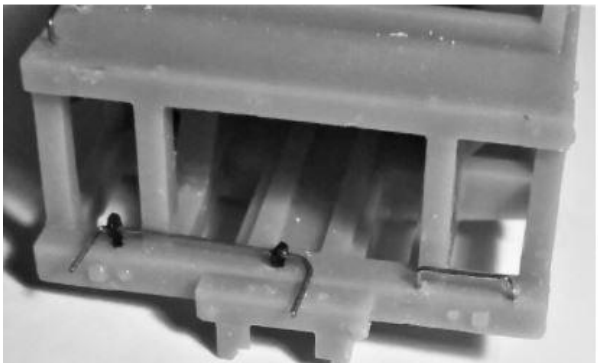


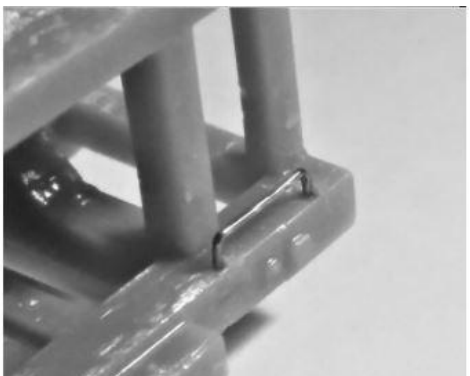


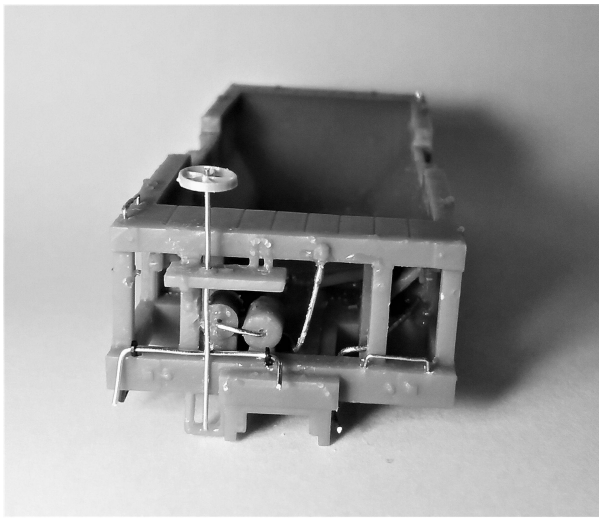
Truss Rod Placement, all D&IR Versions, DM&N Class R



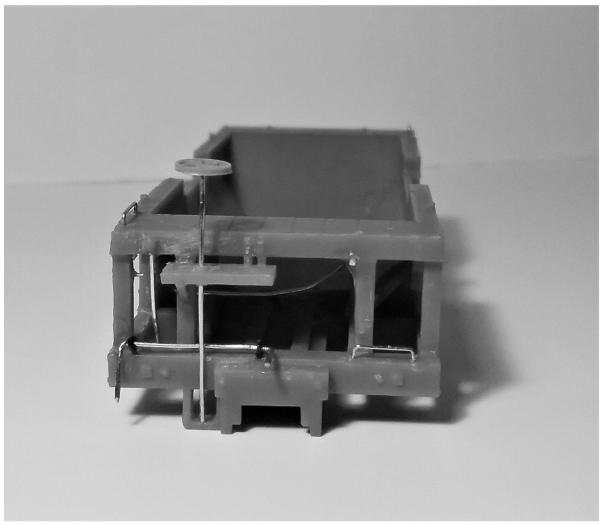
Grab Iron Placement, All D&IR Versions and DM&N Class R



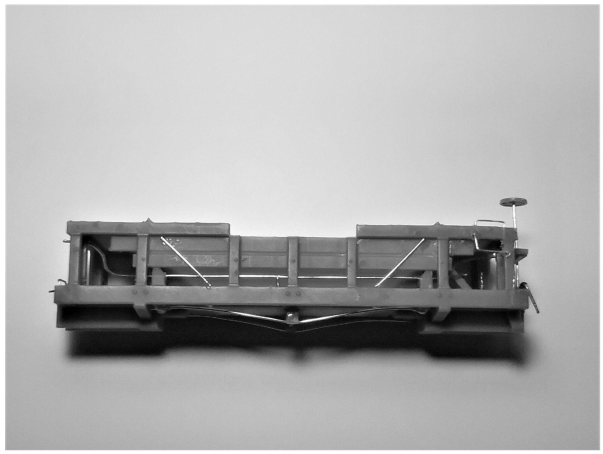




All DM&N - KC Versions: B End



All D&IR Versions: B End

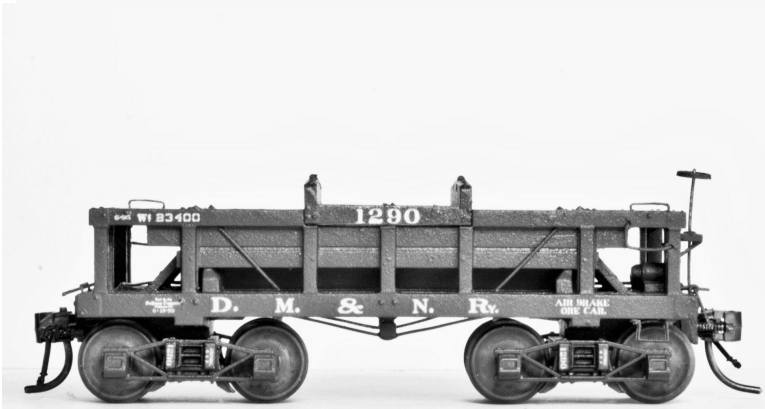


Completed D&IR Body showing Truss Rod and Train Line position.

Completed DM&N Class R body showing Truss Rod and Train Line position.


W1 24000
1220
D. & I. R. R. R.


W1 24000
1220
D. & I. R. R. R.


W1 23400
1290
D. M. & N. Ry.
AIR BRAKE
ORE CAR.


W1 23400
1290
D. M. & N. Ry.
AIR BRAKE
ORE CAR.


1220


1290

# DULUTH AND IRON RANGE CLASS C/DULUTH, MISSABE AND NORTHERN CLASS R 22-FOOT WOODEN ORE CAR

## HO-1000 SERIES

**General History:**
The Duluth and Iron Range Railway designed these cars at their Two Harbors Shops in 1892. The design was built in several batches by several builders for the D&IR, and it was soon adopted by the neighboring Duluth, Missabe and Northern Railway. Research indicates The Keweenaw Central Railway received 30 of these cars, probably secondhand from the DM&N, in 1907. The Spokane Falls and Northern Railway ordered 25 of these cars from Illinois Car and Equipment Company in 1896. Historical information on these variants is currently lacking, and as of April 2021, Zenith Model Works only offers lettering for the D&IR and DM&N cars built by Pullman.

**Duluth and Iron Range Variations:**
These cars were painted in the Duluth and Iron Range's "Standard Freight Car Paint", which was a brown-maroon that faded to what was almost purple. The air brake hoses on the original cars were located to the right of the coupler, as was standard on most freight cars. The second order introduced brake hoses that hung from the top of the frame, a practice that continues today. All cars were delivered with bottom-mounted stirrups, but sometime prior to 1905 these were replaced with deeper side-mounted stirrups. Beginning in 1896, 38 of the cars delivered from Terre Haute Car and Manufacturing Co. had side extensions for additional heaped capacity, and this feature remained standard on all future orders. Eventually, many earlier cars were rebuilt with this feature as well, but some cars did not have side-extensions as late as 1910. Swing-motion arch-bar trucks were standard on all cars except numbers 2549-3049, which were built with Barber arch-bar trucks.

These cars were typically very dirty while in service. Raised numbers were applied around 1900 to make identification easier; oftentimes most of the original stenciling was obscured. We do not have adequate photos at this time to make decals representing stencil changes that occurred later in life, but many of the changes were probably fairly minimal. When replicating cars built by builders other than Pullman, we recommend you use intense weathering to your advantage and omit the builder's stenciling.

Steel cars began arriving in 1900 and were far superior in strength and capacity. Beginning in 1907, the Duluth and Iron Range began to pull the wooden cars from the ore roster, placing them in coal service. 272 cars were in coal service in 1908, followed by 486 the following year. Retirements began in earnest in 1910 and numbers were reduced to 1,029 cars that year. 329 wooden ore cars remained on the roster in 1911, and almost all of them were restricted to coal service. In 1917, 67 cars remained on the roster in coal service, but they were gone the following year. At this time, we don't have evidence to indicate the cars received the safety appliances mandated in 1911, as they were retired well before the grace period ended in 1923.

**Duluth, Missabe and Northern Variations:**
These cars were probably painted similarly to those of the D&IR, and after 1901 when both railroads were under common ownership, it appears especially likely. The DM&N did not adopt raised air hoses on their ore cars until sometime after 1900. The first batch of these cars delivered to the DM&N was listed as Class R in diagram books and was almost identical to those of the D&IR, but they had larger bolsters and vertical trusses along the side beams (these features are included in the print job). The second batch of cars, listed as Class S, featured additional diagonal truss rods and an additional ladder grab above the stirrup. All of the cars in Class R and Class S were upgraded with side raising timbers in 1900 and 1901. Cars on the DM&N had a split-K brake system located on the B end. At the time of this writing, class S cars are a planned future release but are not yet complete. Photos indicate both the R and S classes were probably off the roster by 1912.

As of May 2021, the car we offer represents the original 1895 delivery, both with and without side-raising timbers. Photos indicate both the R and S classes were probably off the roster by 1912.

**Keweenaw Central Variations:**
The July 11, 1908 edition of the Boston (Michigan) Evening Transcript indicated “J.C. Shields, superintendent of the Keweenaw Central Railroad, owned by the Keweenaw Copper Company has been in Duluth the last few days inspecting thirty rock cars which have been purchased from the Duluth, Mesaba & Northern Line. The work of connecting the spur from the mainline of the Keweenaw Central to the old road running to the stamp mill will be finished in a week or two.” Photos indicate that these cars were built as Class S on the DM&N. The 1910 official railway equipment register shows 30 rock cars on the Keweenaw Central’s roster, numbered 310-339. By 1916 the number block was changed to 300-339. There must have been some gaps in this series.

| Railroad: | Number Series: | Builder: | Year Built: | Total Number: |
|---|---|---|---|---|
| D&IR | 1667-1991 | Wells and French Car Co. | 1893 | 325 |
| | 1201-1500 | Pullman Standard Car Co. | 1895 | 300 |
| | 2192-2548 | Terre Haute Car and Manufacturing Co. | 1896 | 357 |
| | 1146-1200 | Terre Haute Car and Manufacturing Co. | 1896 | 55 |
| | 2549-2848 | Illinois Car and Equipment Co. | 1897 | 300 |
| | 2849-3049 | Illinois Car and Equipment | 1899 | 200 |
| DM&N | 1201-1400 | Pullman Standard Car Co. | 1895 | 200 |
| | 1401-2000 | Pullman Standard Car Co. | 1896 | 600 |
| KC | 300-339 | Pullman Standard Car Co. | 1895 | 35 |

**Bibliography:**

Holbrook, Daniel. *Duluth, Missabe and Iron Range Equipment, 1883-2004.* Wilton, Ca: Signature Press, 2020.