DDULUTH, MISSABE AND IRON RANGE FAMILY U-4/D-4 ORE CARS

HO-1001 SERIES

Revision 1, effective 6-5-2021.

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.

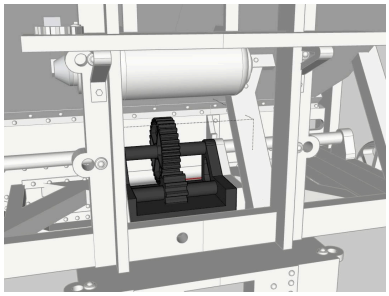
2. Start by removing any remaining sprues and/or sprue marks. **BE VERY CAREFUL. USE A FRESH BLADE FOR THIS**. Clean any uncured resin from the car using a small amount of rubbing alcohol and a piece of paper towel.

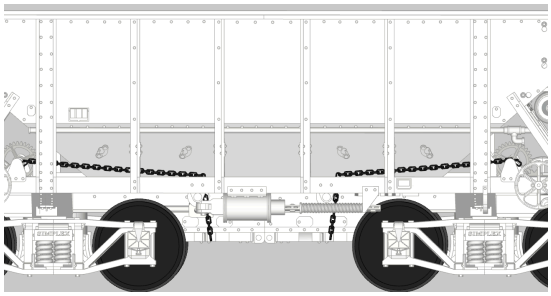
3. Drill out the bolsters to accept a screw of your choice. This location is marked by a small hole included in the print. We recommend a self-tapping 2-56 machine screw, although drilling the hole out first will always help.

Hatch Gear System:

4. Begin by gluing the gear assembly for the hatches into each end of the car, beneath the slope sheet (see diagram).

5. If adding chains for the hatches, do so now. On each side of the car, take a length of chain and glue one end to the shaft above the hatch wheel on each side of the car. Feed the chain through the hole in the bolster sheet, and over the shaft along the side sill. Secure an end to the hatches at the base of the car body with ACC. These are just for appearance and can be omitted.



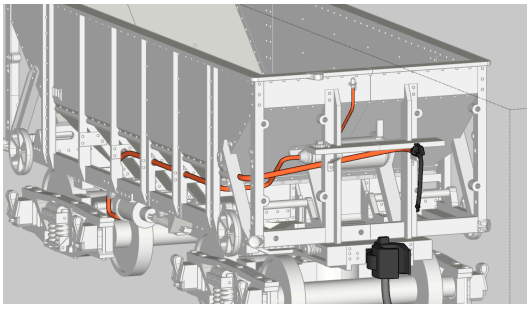


Brake Details:

6. **Train Line:** The majority of the train line is included in the print, running along one side of the car body. Cut a piece of .02” gauge wire a few inches long. Bend it so that it runs from one end of the train line to the bottom right-hand side of the brake platform. Cut to size and secure each end with a drop of ACC. Do this for each end. It is best not to add air hoses yet; they are fragile.

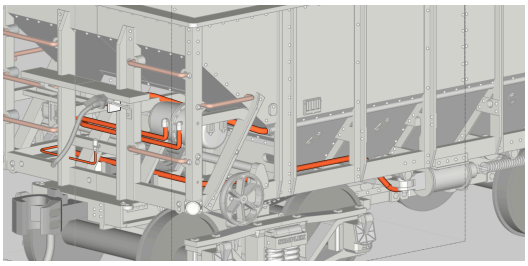
7. **Retainer Line:** Locate the retainer valve on the “B” end of the car. Cut a section of .01” wire to size and glue it to the underside of the valve, then route it so it terminates behind the reservoir (cars with K brakes) or at the control valve (cars with AB Brakes).

8. **Cars with Split-K Brakes:** A pipe ran from behind the cylinder, along the side sill, up to the reservoir on the “B” end of the car, which is included in the print. Using the diagram below, locate the holes for this feature. Cut a piece .01” gauge wire to length, bend it to shape, and secure in place with ACC.



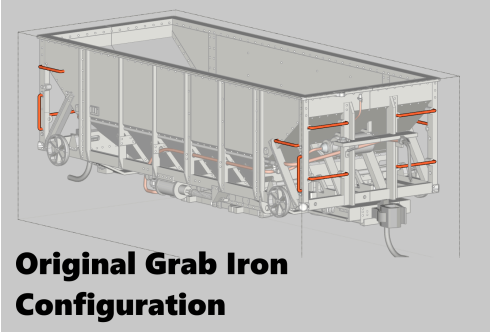
9. **Cars with AB brakes:** A pipe ran from the cylinder to the control valve. Two additional lines ran from the control valve to the reservoir (see diagram). Given the confined nature of this space it may be helpful to omit some of these details.

10. **Version K:** The reservoir and control valve were mounted on the “A” end of the car. The pipe routing was changed accordingly - pay close attention to the rendering below.

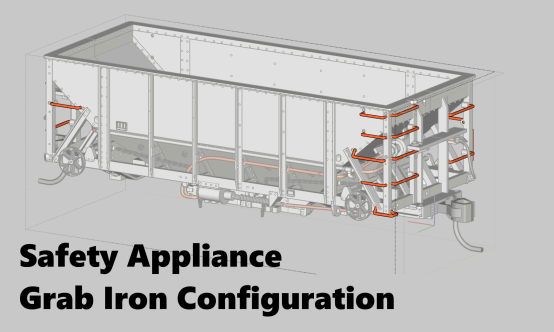


Grab Irons, Couplers and Cut Levers:

11. The holes for grab irons are pre-sunk. Clean them out if needed using a #79 drill bit. Install the grabs supplied in the kit, following the rendering shown below, and secure them in place with ACC.



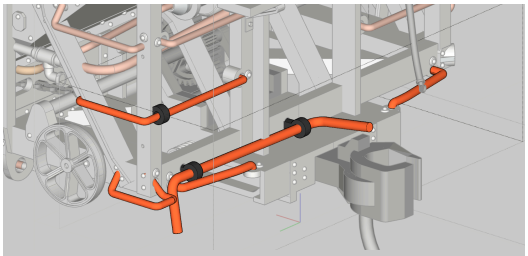
Original Grab Iron Configuration



Safety Appliance Grab Iron Configuration

12. **Versions B-C, E-F, G-J** - The first grab iron on the left-hand corner of each end of the car was continuous, supported with an eyebolt. The grab irons on the end sill were atypical sizes. These will have to be hand-bent from some of the .01” wire supplied in the kit. Ensure everything matches the rendering and secure in place with ACC.

13. Install the couplers supplied in the kit if you ordered them. Ensure the whiskers are trimmed so the coupler centers itself properly. Glue the coupler box cover in place.



Continuous Corner Grab, End Sill Grabs and Cut Lever Configuration - Cars B-C, E-F, G-J

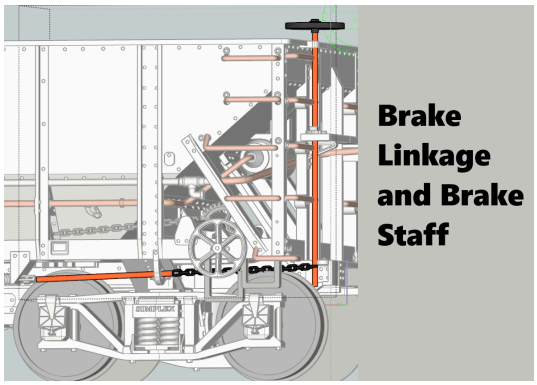
14. **Cut Levers** - The cut lever configuration was roughly the same amongst all cars. You can use the diagram above to bend a piece of .01” wire accordingly. Secure one eyebolt in place with ACC. Thread the cut lever through it, thread the other eyebolt on, push it into the other hole, and secure with ACC. A small section of chain can run from the end of the cut lever to the top of the coupler, recreating the connection to the coupler pin.

Brake Staff and Linkage:

15. Drill out the hole in the brake platform of the “B” end and the bracket that extends from the top of the hopper. Thread a piece of .01” wire through the hole ensuring it runs from the base of the draft gear box to about 4 scale inches above the hopper. Secure in place with ACC.

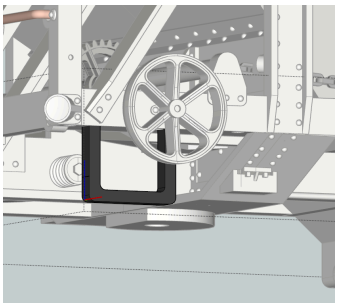
16. Drill out the brake wheel supplied in the kit and attach it to the top of the brake staff. Secure with ACC.

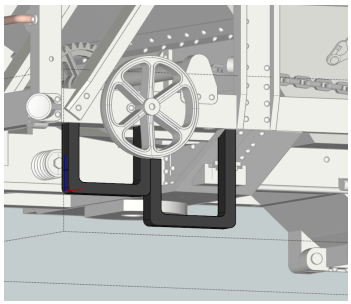
17. A rod ran from the clevis included in the print, through a bracket below the end sill. Cut a piece of .01” wire to length, attach it at both points and secure with ACC. For added detail, use a piece of chain to connect this rod to the base of the brake staff.



Stirrups:

18. These cars were delivered with one stirrup on each corner (left). After World War 1 they were upgraded with an additional step (right). Holes are pre-sunk in the side sills to accept the stirrups provided in the kit. Secure them in place with ACC.





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. ‘

20. See the history sheet for information on paint colors.

21. 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.

22. 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. Paint the trucks separately from the body and assemble after the paint has dried completely. 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.

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

ACKNOWLEDGEMENTS:

Zenith Model Works extends a gracious thank-you to David and Kristin Kmecik at 3DPTrain for assisting in prototype development and hosting production, Daniel Holbrook for providing valuable roster data, and to the Lake Superior Railroad Museum for providing me the opportunity to measure a surviving example of this car. Without the kindness and generosity of these individuals this project would not have been possible.

DULUTH, MISSABE AND IRON RANGE FAMILY U-4/D-4 ORE CARS

HO-1001 SERIES

General History:
The Duluth and Iron Range and the Duluth, Missabe and Northern railways, both owned and operated by U.S. Steel since 1901, rapidly expanded their ore car fleets in the first decade of the twentieth century. Several classes of steel ore cars were built by Pressed Steel Car Company beginning in 1899. After several design refinements, what became known as the U-4 on the DM&N and the D-4 on the D&IR were built between 1905 and 1907. While ordered and delivered separately between the two roads, these cars were identical in all aspects except paint scheme. They featured C and L section vertical ribs and two sets of horizontal doors for dumping, actuated by a large wheel on each side of the car body. These cars were originally painted in Illinois Steel Graphite Black with white lettering for both railroads, although they used separate typefaces.

Duluth and Iron Range D-4 :
The D-4 class on the D&IR numbered 1,700 cars. In 1916, they were repainted to maroon, and given a revised lettering scheme. Ladders and grab irons were updated in compliance with the 1911 safety appliance act around this time. An octagonal herald began appearing in 1926. This final scheme lasted until the merger in 1938.

Duluth, Missabe and Northern U-4:
The original U-4 class on the DM&N numbered 1,900 cars. In 1917, they were repainted to maroon, and given a revised lettering scheme with a round herald. Ladders and grab irons were updated in compliance with the 1911 safety appliance act around this time. The lettering scheme was adjusted in the mid-1920s with subtle changes in data block placement.

Duluth, Missabe and Iron Range U-4/D-4:
Following the merger, ore cars began to be repainted with a round “Duluth, Missabe and Iron Range” herald similar to the old DM&N herald. In 1942, the words “Safety First” were added to the outside of the logo. This final revision lasted until the cars were pulled from revenue ore service. During the late 1940s, a number of cars received rebuilt, welded slope sheets that slightly changed the hopper profile. These cars were used for early Taconite shipments to prevent leakage. It appears this rebuild program was sporadic in nature. Cars with welded hoppers received a white “weld” symbol on the upper left-hand side of the car body. Many cars were fitted with AB Brakes and used in MOW service until the late 1970s. Their hatch configuration made them very favorable for ballasting.

Chicago, Rock Island and Pacific:
The Chicago, Rock Island and Pacific Railway purchased 25 of these cars in 1950 and they became series 99000-99025. They were probably painted black; the retirement date remains unknown.

Duluth, South Shore and Atlantic:
The DSS&A rostered 123 former DM&IR U-4s in 1945. They were acquired at an unknown year sometime prior to that point. Photos indicate they were given AB brakes and continued to operate through at least the early 1960s. The paint color was most likely Soo Line family freight car red.

Pre-DM&IR Merger Statistics (1905-1938)

Railroad:	Original Number Series:	Builder:	Class:	Year Built:	Total Number:
D&IR	3900-4399	Pressed Steel Car Co.	D	1905	500

D&IR	4400-4899	Pressed Steel Car Co.	D	1906	500
D&IR	9000-9699	Pressed Steel Car Co.	D	1907	700
DM&N	100-849	Pressed Steel Car Co.	U-4	1906	750
DM&N	10555-11704	Pressed Steel Car Co.	U-4	1907	1,150

Post-DM&IR Merger Statistics (1938-1960)

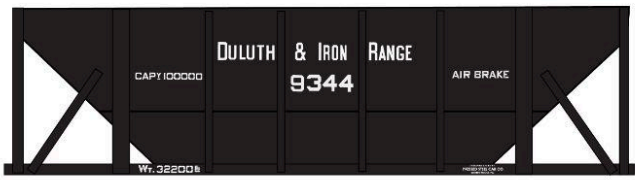
Railroad:	**Number Series:**	**Class:**	**1-1945 ORER:**	**7-1950 ORER:**	**1-1955 ORER:**	**1-1959 ORER:**
DM&IR	33900-34399	D-4	179 cars	19 cars	1 car	0 cars
DM&IR	34400-34899	D-4	356 cars	71 cars	18 cars	17 cars
DM&IR	39000-39699	D-4	599 cars	155 cars	52 cars	51 cars
DM&IR	100-849	U-4	626 cars	159 cars	0 cars	0 cars
DM&IR	40500-41249	U-4	341 cars	252 cars	0 cars	0 cars

Sales to Other Railroads:

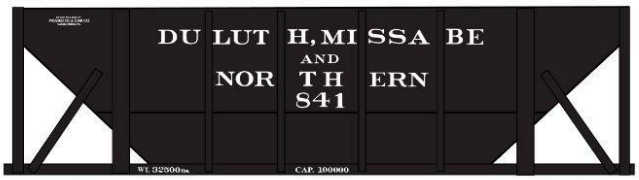
Railroad:	**New Number Series:**	**Year Sold:**	**Quantity:**
RI	99000-99025	1950	25
DSS&A	34400-34899	Unknown, prior to 1945	123

Data provided by Daniel Holbrook's book "Duluth, Missabe and Iron Range Equipment, 1883-2004. Signature Press, 2019.

Lettering Schemes:



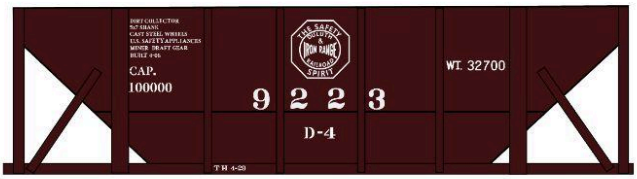
DULUTH & IRON RANGE - ORIGINAL SCHEME, 1905



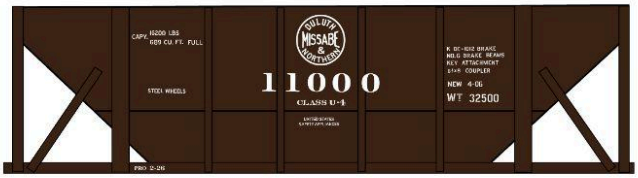
DULUTH, MISSABE AND NORTHERN - ORIGINAL SCHEME, 1906

DULUTH & IRON RANGE - UPDATED SCHEME, 1916

DULUTH, MISSABE AND NORTHERN - UPDATED SCHEME, 1917- CA. 1925



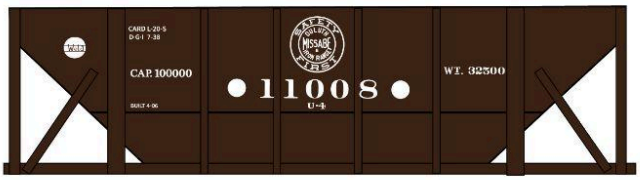
DULUTH & IRON RANGE - UPDATED SCHEME, 1926



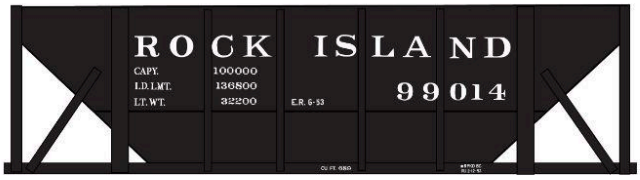
DULUTH, MISSABE AND NORTHERN -

DM&IR, 198 POST-MERGER REPAINT

DSS&A OWNERSHIP, CA. 1953



DM&IR, POST 1942 LOGO UPDATE



ROCK ISLAND OWNERSHIP, CA. 1953

DM&IR MOW SERVICE, 1950S