



DM&IR, former D&IR, coal dock at Two Harbors, in July 1957. Company coal and consumer coal both were received at this dock from lake boats. Larry cars on top moved from the dock to storage area located to the left of the photo. (D.P. Holbrook collection)

10,000 tons of eastern coal at the Pickands Mathers coal dock in Duluth, coal started to be transported between Duluth docks and Colby, Minnesota to the new Minnesota Power and Light Co. (MP&L) Laskin power plant. In 1953 they received 153,000 tons of coal.

On April 1, 1960, the DM&IR became party to a through rail-lake-rail rate on coal from Ohio and West Virginia, Minnesota to Colby, Minnesota. This coal was handled mostly in battleship Q2-, Q5- and Q7-type cars instead of ore cars. MP&L began discussions in 1968 to shift from purchasing high-sulfur Eastern coal to low-sulfur Western coal. During May 1969, coal from Peabody Coal Co.-owned Big Sky Mine in Montana was shipped in the first unit coal trains operated by Northern Pacific and Great Northern to the Clay Boswell steam-generating plant located

on the GN at Cohasset, Minnesota.

Initially this was one unit train every six days. During 1969 coal started being trans-loaded at Cohasset and shipped in GN (later BN) and DM&IR hopper cars from that location to the Colby, Minnesota MP&L plant. By 1989 BN unit trains were being operated to Keenan yard for interchange to DMIR. These trains would then be split at Keenan and delivered to Colby as half a unit train. When unloaded the empties would be returned to Keenan and be reassembled into a unit train for BN crews to depart Keenan.

Both Eveleth Taconite and Minntac, for a period of time, used eastern coal at their taconite plants. Minntac in 1979 was receiving 1,165 loads of eastern coal per year. EVTAC received a 10-car test shipment on October 18, 1978, and continued receiving coal during the

winter of 1978, however, freezing of the coal created difficulty in unloading and coal shipments were discontinued to EVTAC during the summer of 1979.

The DM&IR Duluth limestone dock was retired in 1963 and torn down in 1972. Coal and limestone business after this date was handled by Interlake Iron Co., Berwind Coal and other docks in Duluth. By 1972 these movements had been consolidated at Hallett Dock 5 at Duluth and Dock 6 at West Duluth.

REEFER OPERATIONS

What was an iron ore railroad doing with 75 refrigerator cars? Less than carload lot (LCL) perishable business contributed greatly to the development of the Vermillion and Mesabi iron ranges. Until improved highways began to be constructed during the 1940s, rail was the only way to get perishable traffic from Duluth to these locations. Some of the DM&N and D&IR reefers were used to load provisions for the various logging railroads operating in Northern Minnesota. These cars were interchanged off-line to Duluth & Northeastern, Duluth & Northern Minnesota and other logging carriers.

Besides shipping perishable traffic to on-line points, the DM&N had found a niche business in shipping perishables to Northern Minnesota, to points on the Canadian Northern Railway. Perishable and merchandise LCL traffic arrived by rail and highway and was loaded into reefers and box cars. DM&N shared the Northern Pacific freight house in downtown Duluth until the 1938 merger. The D&IR constructed their freight house just northeast of downtown Duluth at Endion, Minnesota. Ice was harvested or manufactured locally and loaded into the reefers via an elevated platform. As traffic declined during the 1950s an icing truck was used at Endion and stored when not in use in a vacant roundhouse stall.

Prior to completion of the Canadian Northern to Duluth on June 30, 1912, and

beginning in 1908, the DM&N hauled perishable from Duluth to Virginia, Minnesota and delivered it to the Duluth, Rainy Lake & Winnipeg at Virginia, who forwarded the traffic on to the Canadian Northern at Ft. Frances, Ontario. The Duluth, Rainy Lake & Winnipeg name was changed to Duluth, Winnipeg & Pacific in 1910. After June 1912, this traffic was delivered to the Duluth, Winnipeg & Pacific at Duluth, thus continuing to earn revenue for the DM&IR.

Service in 1911 was provided as follows: daily Monday-through-Friday service was provided to all points on the DM&N Alborn Branch including Coleraine, except Mt. Iron and Proctor on an overnight schedule. Cars loaded at Duluth (Endion Yard) on Monday night were spotted early the next morning. Proctor and Mt. Iron, were served on Monday, Wednesday and Friday. Mainline points between Proctor and Mt. Iron were spotted on Monday, Wednesday and Thursday.

Service to on-line points on the Canadian Northern (Duluth, Winnipeg & Pacific, DW&P) were provided on Tuesday and Thursday. Service to points in Rainy River Valley on Canadian Northern Railway (Beaudette, Pitt, Graceton, Williams, Roosevelt, Swift, Warroad and Longworth, Minnesota) was provided on Mondays.

By the early 1930s, abandonment of the logging railroads and the use of system ownership reefers by Canadian Northern, had decreased the demand for reefers supplied by the DM&N and D&IR. By 1940 only 37 reefers remained from the fleet of 75. The remaining cars were being used mostly for LCL shipments to on-line DM&IR points.

By 1958 the expense of operating the cars in LCL service was being felt. Total LCL tonnage had fallen below 12,000 tons. DM&IR management authorized a study to determine the cost savings of moving LCL operations to trucks. The study showed that there was insufficient traffic to make trucking LCL profitable. Losses continued to mount and effective Oc-



Far from home rails, express box car UP 9197 is spotted at the Virginia, Minnesota DM&IR freight house during the summer of 1960 along with DM&IR 5270 and one Class F1 5224-5260 box car. The majority of LCL was transloaded and consolidated at the main DM&IR freight house in Endion, but occasionally a foreign boxcar load of LCL had multiple stop-offs at DM&IR stations and it was not transloaded. (Jim Maki Sr.)

tober 1, 1962, instructions were issued to reduce LCL service. Perishable traffic was only to be accepted at Endion, Minnesota freight house three days a week. Non-perishable shipments would continue to be accepted five days per week, but LCL service would only be provided on Monday, Wednesday and Thursday. By October 31st, the reduced service had had the desired effect; LCL traffic was on a downward trend.

In an effort to stem the continuing losses on LCL the DM&IR began to slowly eliminate service. On December 3, 1962, LCL service to Chisholm, Minnesota was discontinued with this traffic being drayed (trucked) from Hibbing. February 1, 1963, the Biwabik, Minnesota, LCL was discontinued with this traffic being handled at Aurora. On March 1, 1963, Eveleth and Gilbert LCL service was moved to Virginia, and by the end of 1963, service to Tower, Minnesota had also been discontinued. LCL loadings in 1962 totaled 8,432 tons dropping to 6,216 tons in 1963. Even with the station closings and reduced service, the DM&IR was still losing money on LCL.

During 1964, 29 refrigerator cars remained in service. A study to use "dry ice" instead of ice to cool perishable traffic was commissioned. The cost savings were favorable and DM&IR AFE 9882 was approved on January 21, 1965, for converting all 29 cars. This was later changed to 23 refrigerator cars be converted from ice to "dry ice" by the addition of racks inside the car to hold the dry ice and insulated curtain walls. This project started on February 1, 1965, and was completed on June 18th. Seventeen reefers had racks installed on both ends and six had racks installed on one end only. The cars with racks on one end could be used for perishable on one end of the car and non-perishable traffic on the other end. The ice truck at Endion was retired during the summer of 1965.

May 1965 found the DM&IR still losing about \$100,000 per year on LCL. Service again increased to five days per week for merchandise and three days per week for perishable traffic. Use of the six reefers with end racks in one end must have been successful and a study was commissioned in October 1965 to



A Interstate Branch transfer crew has cut off the empty GN ore cars sitting on the main and is going up into BN (former GN) Saunders, MN yard to the left of the photo to check condition of yard before shoving the empty cars into yard. Mixing of iron ore for specific boat cargos caused DM&IR to interchange iron ore with GN(BN) at Saunders, WI and NP/Soo at Pokegama during the ore shipping season. Empty cars would also return via these junctions. 1975 photo. (George LaPray)

study the use of "dry ice" racks in box cars. This would allow the cars to be freely used for either perishable or merchandise traffic. No known box cars were ever converted.

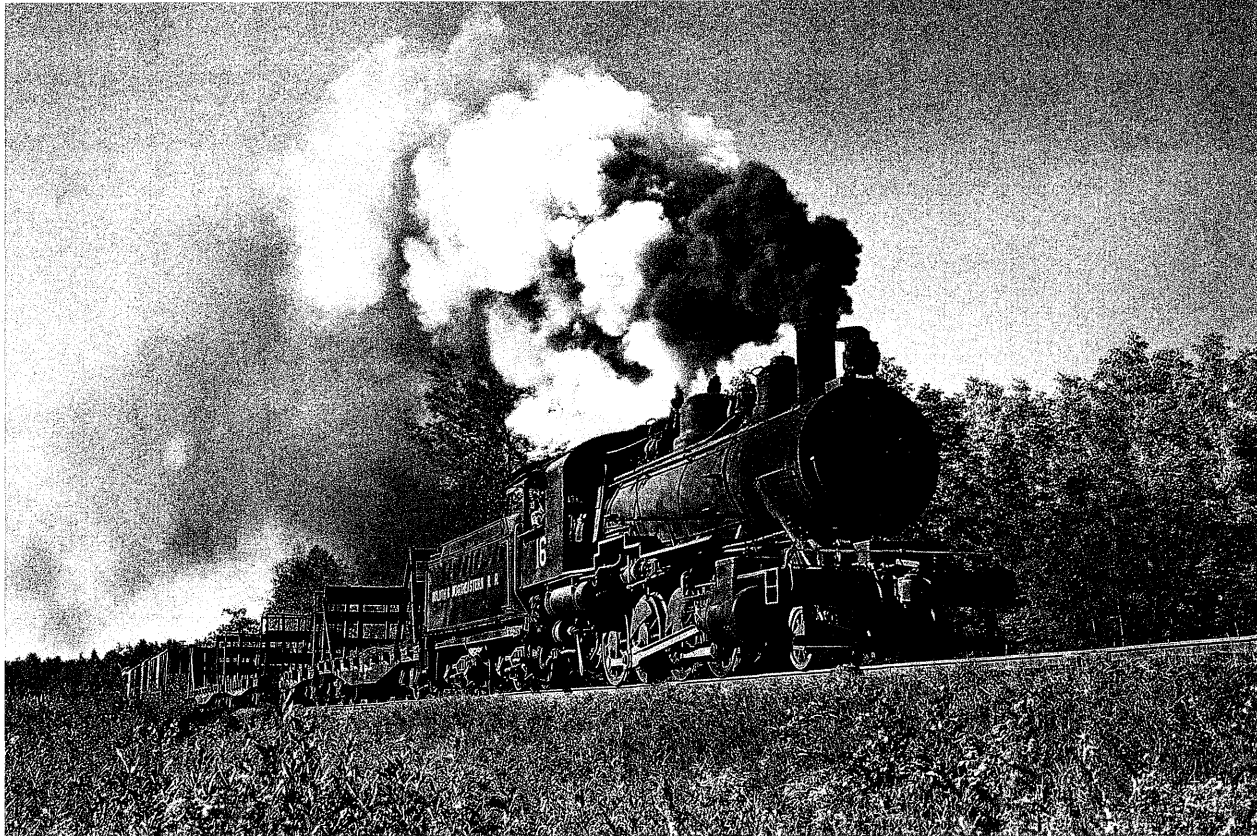
LCL service to Embarrass, Iron Jct. and Fairbanks, Minnesota, was discontinued during 1965. In November 1965 a meeting was held between DM&IR and the Minnesota Railroad and Warehouse Commission (MRRWC) notifying them of their intent to go to a 6,000-pound minimum for LCL shipments. MRRWC advised the DM&IR to submit their proposal.

By late 1966, the 6,000-pound minimum had all but eliminated LCL. Most LCL was shipments had been in small lots from 100 to 2,000 pounds and the 6,000-pound minimum did not allow for small shipments. The development of the highway system in Northern Min-

nesota and the 6,000-pound minimum put an end to LCL shipments on the DM&IR. LCL service was discontinued in 1967.

INTERCHANGE PARTNERS

Most of the iron ore was shipped through the docks at Two Harbors and Duluth, but starting in 1920s natural ore began to be interchanged to Northern Pacific and Soo Line at Pokegama, Wisconsin, and Great Northern at Saunders, Wisconsin to allow steel companies to mix ore for the correct chemical grade for their furnaces. These carriers also interchanged ore to DM&IR for mixing. All-rail ore movements to Granite City, Illinois, and eastern mills began in the early 1930s with a peak movement occurring during World War II to supplement shipping on lake boats. Lake ship-



The shortline Duluth & Northeastern connected with DM&IR at Saginaw, Minnesota. D&NE served the large Northwest Paper Co. and Wood Conversion Co. plants at Cloquet, where it connected with Great Northern and Northern Pacific. Soo and C&NW would use DM&IR to get traffic to and from D&NE at Saginaw. Much of the pulpwood used by Northwest Paper Co. originated on DM&IR. DM&IR also handled interchanged pulpwood from Duluth, Winnipeg & Pacific at Virginia, Minnesota, for NWP. D&NE 16, a 2-8-0, was purchased new by D&NE from Baldwin in 1913 and is on display in the city park in Cloquet. The train is heading north from Cloquet to Saginaw during September 1963 with a string of DM&IR rack flats on the head end. (L.A. Hastman collection)

ping came to a halt each winter and if needed steel mills would have ore shipped all-rail during the winter months.

Traffic was interchanged to:

Great Northern: Chisholm, Minnesota, Coleraine, Minnesota, Hibbing, Minnesota Virginia, Minnesota, Saunders, Wisconsin, and Duluth, Minnesota (Endion and Missabe Jct.)

Northern Pacific and CMStP&P: Pokegama, Wisconsin, Duluth, Minnesota (Endion and Missabe Jct.)

Soo Line: Ambridge, Wisconsin, Saunders, Wisconsin and Duluth, Minnesota (Endion and Missabe Jct.)

Chicago & Northwestern: South Itasca, Wisconsin and Duluth, Minnesota (Endion and Missabe Jct.)

Duluth & Northeastern: Saginaw, Minnesota

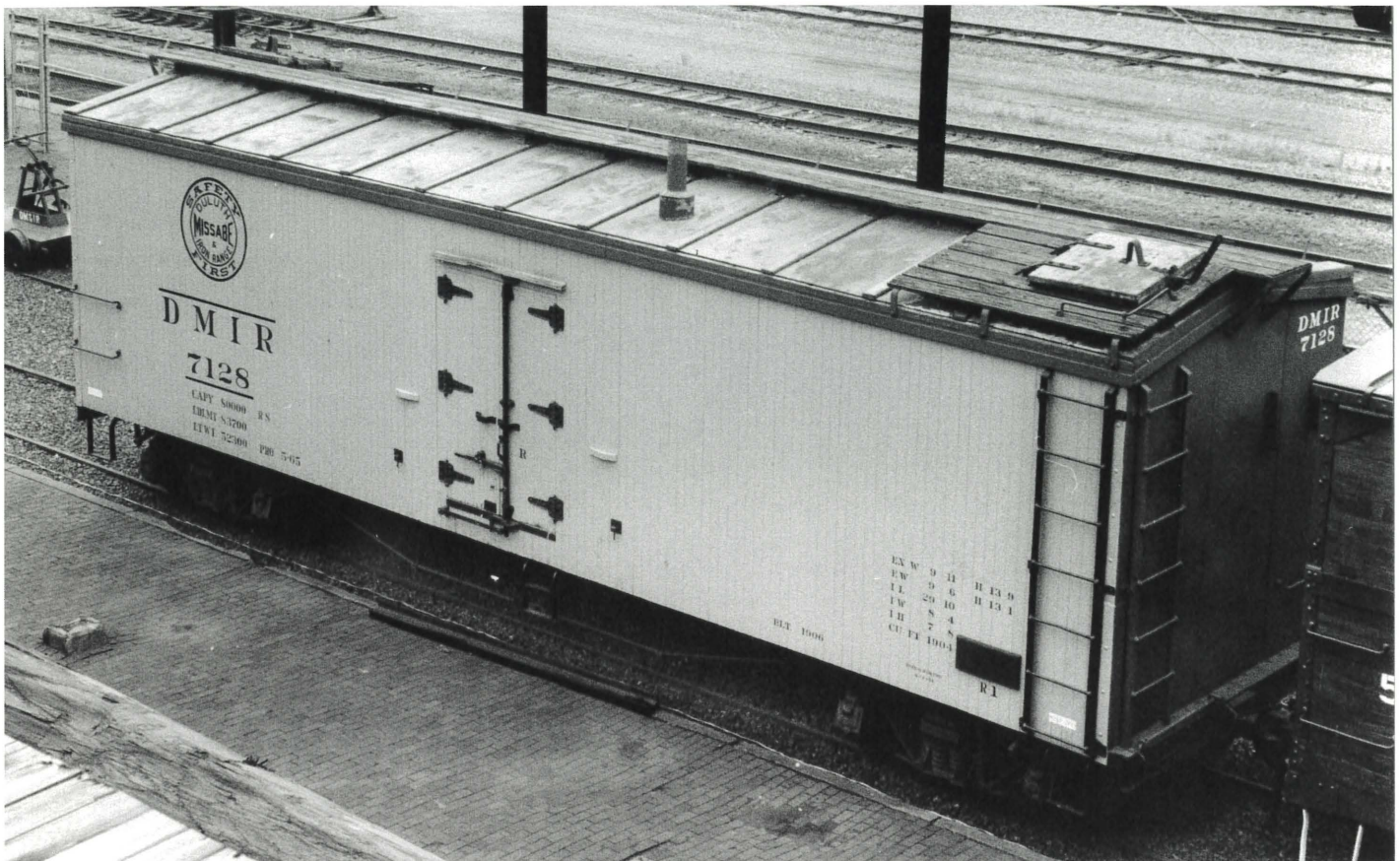
Duluth, Winnipeg & Pacific: Virginia, Minnesota, Duluth, Minnesota (Endion and

Missabe Jct.)

Reserve Mining: Babbitt, Minnesota, Norshor Jct. Minnesota (not a common carrier)

Erie Mining: Emco, Minnesota (not a common carrier).

D&NE at Saginaw, Minnesota was an important interchange partner as Soo and Omaha used DM&IR to handle merchandise traffic to and from D&NE. This consisted of mostly empty box cars for paper loading and chemicals. Much of the pulpwood used by the large Northwest Paper Co. plant located on D&NE at Cloquet, Minnesota originated on DM&IR, much of it later coming from the branch to Forest Center, Minnesota. Pulpwood and wet pulp was also received from DW&P at Virginia, MN and handled by DM&IR to Saginaw for movement to Cloquet by D&NE. Coal for Northwest Paper originated at Duluth Docks served by DM&IR. ■



DM&IR 7128, former D&IR 8028, on display at Lake Superior Museum of Transportation at Duluth, on July 10, 1984. The car was restored by Proctor shop employees. Compare this photo with the in-service photo of 7128 and the built date now shows 1906. The painted door hardware was not used when car was in revenue service. (Bruce Meyer)



Various passenger cars were sold off to museum and tourist operations. Former D&IR 28 was donated to Lake Superior & Mississippi in mid-1980s and then went to Wisconsin Great Northern at Spooner, Wisconsin, and relettered for Duluth & Northern Minnesota Rwy. and named *Arrowhead*. The car is seen at Spooner, September 27, 2000. (D.P. Holbrook)

EPILOGUE

PRESERVED EQUIPMENT

Many pieces of DM&IR and predecessors D&IR and DM&N equipment have been preserved, some of it dating to the turn of the 20th century. Their preservation is a remainder of the constant winter shopping programs at Two Harbors and Proctor, extending their service lives and eventually allowing their preservation. Most of these cars are in excellent preserved condition; however, some have fallen on hard times.

Lake Superior Museum of Transportation, Duluth, Minnesota: DM&N 849 (ore car, former DM&N 4163), 68 (coach), 2124 (flat car), D&IR 6105 (gondola), 19 (coach), DM&IR C-9, C-12, C-205 (caboose), 5124, 5132, 5380 (box cars), 7128 (refrigerator car), 33 (coach), *Minnesota II* (coach), W24 (combine), Missabe and Northland (business cars). One 3300-series box car was converted to passenger car at Iron World and then transferred to LSMT.

Lake County Historical Society, Two Harbors, Minnesota: D&IR 22 (caboose), 251 (wood ore car).

Mid-Continent Railroad Museum, Baraboo, Wisconsin: D&IR 5537 (flat car), DM&IR C-74, C-183 (caboose), 7122 (refrigerator car).

Iron World, Chisholm, Minnesota: DM&IR C-97 (caboose), 3325 (box car),

28034, 28036, 27651 (steel ore cars). All three ore cars were donated on August 14, 1991, on AFE 12346. Two additional 3300-series box cars have been converted to passenger cars for the museum railroad.

Minnesota Museum of Mining, Chisholm, Minnesota: DM&IR 14536, 14613, 14954 (50-ton steel ore cars).

Cloquet Terminal Railroad, Cloquet, Minnesota: DM&IR 5200 (auto box car, on blocks), two 50-ton ore cars.

Soudan Underground Mine State Park, Soudan, Minnesota: D&IR 163 (50-ton steel ore car). Car is actually former DM&N 4727.

Tower Historical Society Railroad Museum, Tower, Minnesota: DM&IR C-73 (caboose), 81 (coach).

Wisconsin Great Northern Railroad, Spooner, Wisconsin: DM&IR 28, 32, 34 (coach), 112 (baggage/RPO). Some of these cars are not in their original as-built configurations.

Illinois Railroad Museum, Union, Illinois: DM&IR 84 (coach).

Lake Superior and Mississippi Railroad, Duluth, Minnesota: DM&IR 29, 85 (coach), W-184 and W-187 (caboose).

Lumberjack Steam Train, Laona, Wisconsin: DM&IR C-160 (caboose). ■

APPENDIX

A: GENERAL INFORMATION

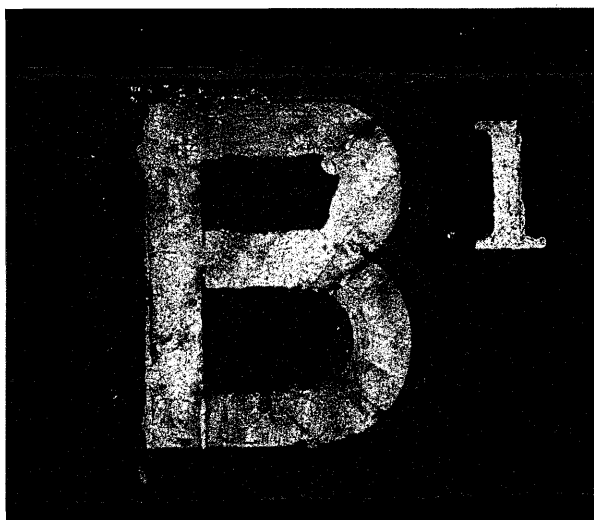
In 1887 Congress passed the Interstate Commerce Act that created the Interstate Commerce Commission (ICC). Besides prohibiting railroads from unfair practices involving freight rates, it also established the ICC as a regulatory body. The reality was the ICC had very little power because of the vague language in the law. The passage of the act was the beginning of Federal regulation of the operating and business practices of the railroads.

The next regulation passed by Congress was the Safety Appliance Act in 1893. The act mandated automatic couplers on all railroad equipment used in interchange by January 1, 1898. It also mandated air brakes on a "sufficient" number of cars to allow the engineer to control the speed of the train without handbrakes being used to control speed. The act was effective January 1, 1898. The act was further amended in 1903, mandating 50-percent of

cars in a train to have air brakes, and again in 1910, the ICC raised this percentage to 85 percent.

In 1910, Congress created the Safety Appliance Act, authorizing the ICC to establish railroad industry standards for sill steps, ladders, grab irons, running boards and handbrakes. The final standards were published in 1911, with full compliance mandated by 1916. The standards specified locations of safety appliances and critical dimensions. The Standing Committee on Safety Appliances of the ARA Section III Mechanical reported at their June 1919 meeting, that 100 percent of the D&IR roster of 7,151 cars had been equipped as specified by the act. The DM&N roster of 9,350 cars had 27 cars left to be equipped per the act. This amounted to 0.3 percent of the roster. By the time of the meeting only 3.8 percent of the nationwide fleet of freight cars remained to be placed into compliance with the Safety Appliance Act.

STENCIL GROUPS



Stencil group letters began to be applied to ore cars in 1952. Shown in an example of stencil group "B." The number 1 was added in the 1980s for unknown reasons. (S.D. Lorenz)

Each year, the DM&IR had a shopping process that allowed for one-quarter of the ore car fleet to be thoroughly shopped during the winter shopping season. The DM&IR had the advantage of shutting down most ore operations when the Great Lakes were frozen over. This allowed the shops at Proctor and Two Harbors to perform annual maintenance during the winter months. AAR requirements called for cleaning and testing air brakes systems every three years; this was changed to four years in 1958. Until 1952 this was tracked by individual car numbers and tracking ore car air brake testing was a problem. Short of having to look at each car closely it was difficult, at a glance to determine when a car had received its last yearly maintenance. Making matters even more difficult was that ore dust covering the cars

all but obscured the lettering. Starting in June 1952 it was decided to add an identifying code called a "stencil group" each year to make it easier to determine what year a car was due for periodic air brake testing. Stencil group letters were established by dividing the ore car roster into thirds. DM&IR had applied for and received an exemption in 1958 for cleaning and testing the air brakes on the brand-new cars with AC brakes every five years. This allowed switch crews to identify easily each fall when switching out empty ore cars, which cars needed to be held at Proctor for movement to the car shop during the winter shopping season. Usually, most cars were completed during the November to April/

May shopping season.

When "stencil group" letters began to be applied in late 1952 the DM&IR had 5,257 50-ton cars and 8822 70-ton cars on the roster. Most of the remaining 50-ton cars were scheduled for replacement and were only used during traffic surges. This caused these cars to have, for the most part, no specific stencil group letter assigned to a group of cars and cars within one block may have any of the four A, B, C, D, stencil group letters applied. Below left is a listing of total remaining 50-ton cars and early 70-ton cars with letters known to have been applied to various cars.

The stencil groups were assigned as follows to 70-ton cars in 1970:

Numbers	Class	Total Cars	A	B	C	D
100-849	U3	89		Yes	Yes	
8405-10554	U3	159	Yes			
10555-11706	U4	118	Yes			Yes
14000-14149	U6	130				
14500-15499	U9	971				Yes
19000-19999	U10	943				Yes
20000-21000	U11	987	Yes	Yes	Yes	Yes
21001-21026	U12	26				Yes
21101-21126	U13	24				Yes
22001-22125	U14	125				
23001-23125	U15	125	Yes			
23171-23177	U16	7			Yes	
33900-34399	D	1				
34400-34899	D3	18	Yes		Yes	
39000-39699	D4	52			Yes	
41250-41399	E6	135				
41500-42299	E8	739				
42300-42749	E9/E10	432	Yes	Yes		
42750-43249	E11	483		Yes	Yes	Yes

Note D stencil groups did not start to appear until 1958-59 shopping season.

Car Numbers	Class	Stencil Groups - Total Cars in Groups							
		A	B	C	D	X	Y	Z	Z-1
23975-24163	U17				189				
24164-24999	U17	836							
25000-25149	U18				150				
25150-25499	U18			350					
25500-25999	U19		500						
26000-26499	U20		500						
26500-26999	U21		500						
27000-27499	U22			500					
27500-27999	U23		500						
28000-28332	U24		333						
28333-28499	U24			167					
28500-28999	U25			500					
29000-29012	U26			13					
29013-29499	U26				487				
29500-30499	U27				1000				
30500-30879	U28				380				
30880-30999	U28			120					
31000-32499	U29	1500							
32500-32999	U30			500					
33000-33166	U31					167			
33167-33333	U31						167		
33334-33499	U31							166	
33334-33499	U31								167
Totals		2336	2333	2150	2206	167	167	166	167

Stencil groups did vary a little over the years. When the Class U30, 32500–32999 were delivered they were placed in stencil Group B before being placed in service and later shifted to Group C as 50-ton cars were retired and testing requirements changed. Another example was 190 Class U18 cars that had been in storage in 1969 were shifted from stencil Group C to Group A. Internal correspondence on June 30, 1958 indicates that 148 cars in Class U18 were in stencil group A; these would be shifted to stencil group C by 1970. Prior to 1970 there were other instances of shifting of stencil groups because of retirement of 50-ton cars and many 70-ton cars being in deep storage during the business downturn during the mid to late 1960s. After 1970, the cars remained in the stencil groups shown above until stencil groups were discontinued in 1982. Note that cars with accident damage or extensive repairs could have the stencil group changed, but this was an exception.

For AB equipped cars the Stencil Group testing years were:

A: 1952, 1955, 1958, 1962, 1966, 1970, 1974, 1978

B: 1953, 1956, 1959, 1963, 1967, 1971, 1975, 1979

C: 1954, 1957, 1960, 1964, 1968, 1972, 1976, 1980

D: 1961, 1965, 1969, 1973, 1977, 1981

AC brake-equipped cars were delivered in 1957. Five-year testing of AC brake-equipped cars 33000–33499 were:

X: 1961, 1966, 1971 Y: 1962, 1967, 1972

Z: 1958, 1963, 1968, 1973

Z1: 1959, 1964, 1969, 1974

Years 1960, 1965, 1970 were non-inspection years for AC-equipped cars. Each testing year shown started in May of the year shown and ended on April 30 of the following year.

Intra-company correspondence on August 25, 1958 indicated that DM&IR had been notified that AB brake testing was being changed from every three years to every four years, adding stencil Group D to cover the fourth year. At the time DM&IR owned 9,821 70-ton ore cars and 3,689 50-ton ore cars. The four-year plan called for 3,377 cars to be tested during the winter 1958-59 shop season, 3,377 during 1959-60, 3,377 during 1960-61 and 3,379 during 1961-62. The first "D" stencil group cars began to appear during the 1958-59 shopping season. For unknown reasons, a stencil group B with a small number 1 was introduced in the 1980s.

A new stencil group "E" began to appear in April 1981 for Class U23 through Class U29 cars. By Dec 31, 1981, 21 Class U24, 308 Class U25, 30 Class U26, 76 Class U27 and 8 Class U28 cars had been placed in stencil group "E". The need for the new "E" stencil group was created when FRA extended the periodic air brake testing period from four years to six years on Jan. 1, 1981 on AB, ABC-1 and ABD-1 valves. DM&IR added the "E" and "F" stencil groups effective with this change. By Oct. 1982 42 Class U24, 610 Class U25, 60 Class U26, 150 Class U27 and 16 Class U28 regular ore cars had been placed in stencil group E.

Notation on November 30, 1982 DM&IR Equipment Lists states that Stencil Group tracking was being discontinued. It does not appear any cars ever received the stencil group F.

B: PAINTING AND LETTERING

Standards for information and stenciling were established in 1901 by The Master Car Builders Association (MCBA). This included the size and location of lettering but these were often ignored. Both D&IR and DM&N deviated from the 1909 MCB standard MCB-

26A which required the reporting marks on the left end of car. Both carriers placed reporting marks to the left, but the number to the right on house cars prior to 1901. This changed over time and both carriers began to paint cars with reporting marks and number to the left when facing the car. Ironically, DM&N Class Q1 4500–4699 twin open hoppers delivered in

1916 from Pullman had the reporting marks and number stenciled at the very right hand while facing the car. Starting in 1921 these began to be repainted with the reporting marks and number stenciled on the left-hand side while facing the car. Minor revisions were made over time, but these standards remained in effect until the October 20, 1920, when complete revision was made by the American Railway Association (ARA), requiring reporting marks and numbers to be displayed to the left when facing the car. DM&N again deviated from recommended practice when Class P2 3300–3399 single-sheathed box cars were delivered in 1923. The DM&N monogram and car number were placed in the left panel with reporting marks placed on the right-hand portion of the car. In 1934, the ARA became the Association of American Railroads (AAR),

and with minor revisions those standards remained in effect until today. Further revisions in the 1970s changed the Clean, Oil, Test, and Stenciled (COTS) so they had to be shown in a black and white outlined box, originally with a single box, then two boxes and later three boxes to the right-hand end of every car.

Recommended ARA—later AAR—practice starting in 1918 was for horizontal 1-inch lines above the reporting marks and below the car number. D&IR and DM&N did not follow this practice. After the January 1, 1957, Mechanical Division meeting of AAR, the standards calling for 1-inch horizontal lines above the reporting marks and below the road numbers on the side of the car were eliminated. After the merger, DM&IR applied these lines until 1967 on box cars, refrigerator cars, gondolas, open hoppers and covered hoppers.

D&IR AND DM&N PAINT

Not until the advent of color photography are we able to determine paint colors, except when they were specified on builder's orders. Freight cars, other than refrigerator cars, for both D&IR and DM&N appear to have been painted either red oxide or black. Photos of D&IR equipment by 1917 show equipment being painted black and builders' orders from this time frame specified red oxide as a base color and black for the final exterior coat of paint. Refrigerator cars appear to have been painted either yellow or white. D&IR specified red oxide for the Class E10 and E11 ore cars built in 1916.

D&IR specifications for a 35-ton box car in 1917 shows cars to be painted with a base coat of Illinois Steel Co. #550 brown followed by a second coat of paint consisting of Illinois Steel Co. #290 black. A letter to ACF specified that Class E9 ore cars be painted the same as

the 1917 boxcar specifications. D&IR specification for a proposed order of refrigerator cars in 1917 specified Illinois Steel Co. #950 yellow for side walls, fascia and doors. Illinois Steel Co. #550 brown for end walls, fascia and buffer blocks. Illinois Steel Co. #370 graphite black was to be used for all safety appliances, underframe, and grab irons, corner bands and other metals parts. Specification for a 50-ton gondola and a 30-ton flat car in 1917 showed it being painted with first coat of Illinois Steel Co. #370 graphite black followed by a second coat of Illinois Steel Co. #290 black. DM&N Class U4 ore cars show specifications to be painted Illinois Steel Co. #845 black. DM&N Class U10 ore cars 19000–19999 show specifications to builder for cars to be painted Illinois Steel Co. #370 graphite black.

No additional DM&N car order specification have been found, but it appears DM&N followed D&IR painting specifications once U.S. Steel took over both roads in 1901.

DULUTH & IRON RANGE LETTERING

The first Duluth & Iron Range monogram was designed in 1915. The octagonal monogram was designed by Algol Johnson who was the mechanical engineer for the D&IR at Two Harbors. The indian chief head was selected as having tourist appeal and could assist in increasing passenger traffic in the Lake Vermilion and Ely districts. This monogram, in various color schemes, was used until 1926 when the indian head within the circle was replaced with the words Duluth & Iron Range Railroad. At that time the "Get the Safety Spirit" was changed on the outside circle to "The Safety Spirit."

The first box cars were lettered with just D&IR reporting marks with RR below them to the left of the door and road numbers on the right hand side of the car. Around 1896 the "RR" below the reporting marks was dropped. The author has been unable to locate any freight cars or cabooses with the D&IR

indian head monogram. About 1910, the road number was placed directly below the reporting marks on the left side.

Wooden ore cars had simple D&IR lettering on the bottom side sill with the number applied to the center of the top chord. Early on it was noted that the ore dust was making numbers almost impossible to read. Two Harbors shop began to cut out raised metal numbers that were applied at the same location. Even when weathered, the standout metal lettering was still readable.

Starting in 1905, steel ore cars from 3900 up to 12499 were delivered with "Duluth & Iron Range" spelled out on the side of the car with road number below and no reporting marks. Starting in 1916, with 12500-series steel ore cars were delivered with just D&IR reporting marks followed by periods with the road numbers below. Added in 1916 was a very small stacked "Duluth and Iron Range" on the side of the cars. Some of the steel ore cars received the octagonal D&IR logo after 1915.

DULUTH, MISSABE & NORTHERN LETTERING

The Class L and N box cars, 3000-3062, purchased between 1892 and 1899, were lettered with a small arched Duluth, Missabe and Northern to the right of the door. Starting with Class N1 boxcars 3063-3072, delivered in 1903, lettering was a large stacked Duluth, Missabe and Northern to the left of the door with the road number to the right of the door on cars with left-opening doors. Cars with right-opening doors had the lettering swapped.

The stacked lettering applied to vehicle cars 3073 and 3074 had 10-inch high DULUTH, MISSABE, NORTHERN lettering. The "AND" was 6-inch high. Separation between the lettering was 8-inch. Numbers on 3073 were 10-inch high. DM&N stencils and numbers on the door were 4-inch high with 5-inch separation.

Class K refrigerator cars had a simple road

number to the left of the door with "Summer and Winter Car" lettering on the doors. The Class J cars starting with 5003 received the arched DM&N lettering to the right of the door. Starting with Class J1 cars, they received the same lettering as the Class N box cars.

Flat cars prior to 1906 were delivered with DM&N Extended Gothic centered on the car with the number placed between the far right pair of stake pockets. About 1906 the numbers were shifted to the left and were placed to the right of the seventh stake pocket counting from the right. The characters changed from Extended Gothic to Railroad Roman about 1906. Reporting marks remained in same location. On August 18, 1937 the reporting marks were moved to right of the third stake pocket and the number to the right of the fourth stake pocket.

Wooden ore cars had simple DM&N initials on the bottom side sill with the number applied to the center of the top chord.

The first steel ore cars 8000–8004 were delivered with DM&N reporting marks centered on the carbody with the number to the right of the reporting marks. Beginning with Class U1 cars starting at 8005 cars were delivered with Duluth, Missabe, (on the top line) and (on the second line) and Northern (on the third line) stacked lettering on the side of the cars with road numbers below.

The first Duluth, Missabe and Northern round monogram was designed in 1910.

Starting in 1910 a large DM&N ball monogram was introduced and this replaced the stacked lettering. This continued on all box cars until the Class P2 3300–3399 series were delivered with a small ball monogram on the left hand of the car in 1923 because of the single sheathing on this group. The large ball monogram was used on double-sheathed box cars until the late 1920s. A number of box cars were repainted with the large DM&N round logo, replacing the stacked DM&N to the left

of the door. Class U12 ore cars delivered in 1925 were the first series of ore cars painted with the 20-inch DM&N round stencil monogram, 7-inch numbers. Three-inch stenciling was used for class and capacity.

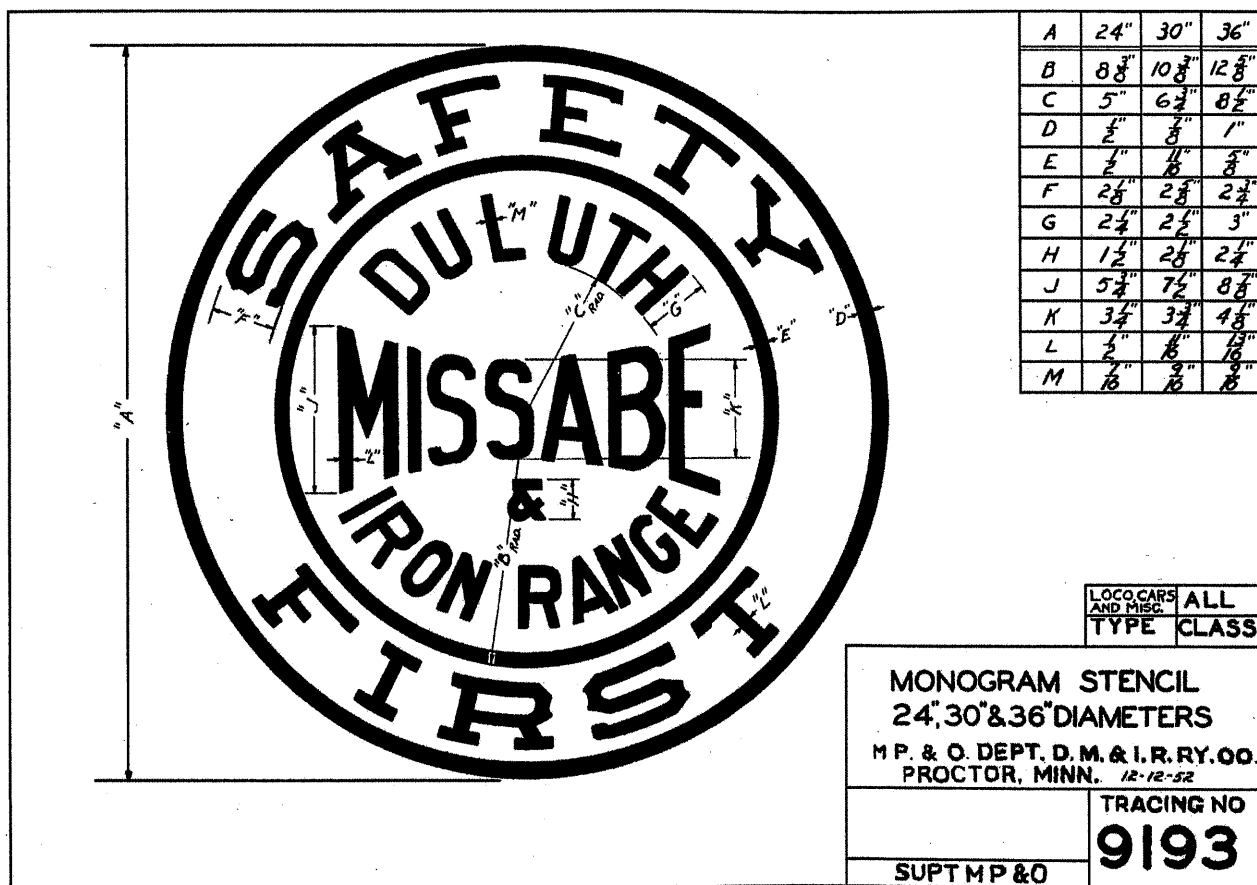
The Duluth, Missabe and Northern monogram was redesigned in 1917. A.V. Rohweder was the supervisor of safety and he suggested to F.E. House, the federal manager at the time, that the current monogram be modified using the slogan "Safety First." A new round monogram, with Safety on the top and First on the bottom of the circle encompassing the Duluth, Missabe and Northern name, was designed by Steve Raetz, mechanical engineer at Proctor. It appears that freight cars only received the DM&N ball monogram without the Safety First surrounding the ball. The color scheme was generally red and green, but sometimes black-white. It was in general use until 1937 when the D&IR and DM&N were merged into the Duluth, Missabe & Iron Range.

DULUTH, MISSABE & IRON RANGE PAINT & LETTERING

After the consolidation, George Bohannon, mechanical engineer, redesigned the monogram basically following the DM&N monogram and placing the new name in the center of the monogram. Between 1937 and early 1942 a Duluth, Missabe & Iron Range monogram was used without the "Safety First" slogan. The Safety First slogan was added in the outside circle in 1942 on new Class U19 ore cars. The monogram had various color schemes over the years, mostly green and red, but sometimes black and white and, starting in 1959, maroon and gold. Class Q5 hopper cars, 2700–2949 delivered in 1952 received a modified Safety First DM&IR monogram with much smaller Safety First, Duluth, Missabe and Iron Range lettering with closer spaced outside circles. It is unclear why the monogram was modified, but the experiment was not repeated. Initials on freight equipment began to be changed from

D&IR and DM&N to DMIR on August 21, 1937. The ampersand on reporting marks was also dropped on this date.

Ore cars were painted iron oxide brown from 1925 until the Class U31 cars were delivered in 1957. Specifications on Class U23 through U30 ore car orders specified cars and trucks to be painted with "iron oxide lamp black" paint with white paint for lettering. Class U31 cars were painted black with white lettering to identify these cars as being non-interchange-approved account being equipped with experimental AC-type brakes. This was supposed to assist in identifying the cars to keep them on line, but iron ore dust and weathering quickly turned the cars brown. Ore cars repainted at Proctor from 1955 to 1962 received the iron oxide lamp black paint. During 1959 a painting program of 70-ton ore cars was accelerated with 1,536 cars completed by the end of September 1959. Management correspondence indicated the paint color as "ore car brown." This ore car repainting program



was terminated in 1962 account cost-cutting measures caused by the economic downturn on the Iron Range. Starting in the spring of 1966 the only ore cars fully repainted were rebuilt taconite and crude taconite cars, which were



DM&IR monogram Tower, Minnesota, August 12, 2014. (D.P. Holbrook)

painted maroon with yellow lettering. Occasionally a returning leased car was painted by an outside shop and re-stencilled with non-standard stenciling but this was the exception.

The DM&IR monograms on ore cars were 24-inch diameter, 36-inch on box cars and gondolas, 30-inch on covered hoppers and cabooses.

During 1952, painting of cabooses was done every 3 to 5 years depending on type of service car had been subjected to.

Initially, DM&IR cabooses were painted yellow with black lettering and roofs. Starting in 1949, perhaps earlier, Missabe Division assigned cabooses had roofs and lettering painted maroon, and Iron Range Division assigned cabooses retained black roofs and lettering. Safety First stencil monograms were introduced with the delivery of the first extended vision cabooses in 1952. This monogram was initially located on the extended vision cupola below the windows. It was moved to below the cupola starting on February 24, 1960.



Increased car loadings of coke from AS&W at Steelton caused DM&IR to purchase 500 rebuilt 77-ton open hoppers, DM&IR 12000–12149 and EJ&E 74000–74349 series, from Penn Central. Cars were rebuilt at PC Samuel Rea shops with Bethlehem Steel-supplied kits from offset side hoppers originally owned by NYC and B&A. DM&IR 12105 former NYC 905298 rebuilt August 6, 1975, in Duluth. September 20, 1975. (Doug Buell)

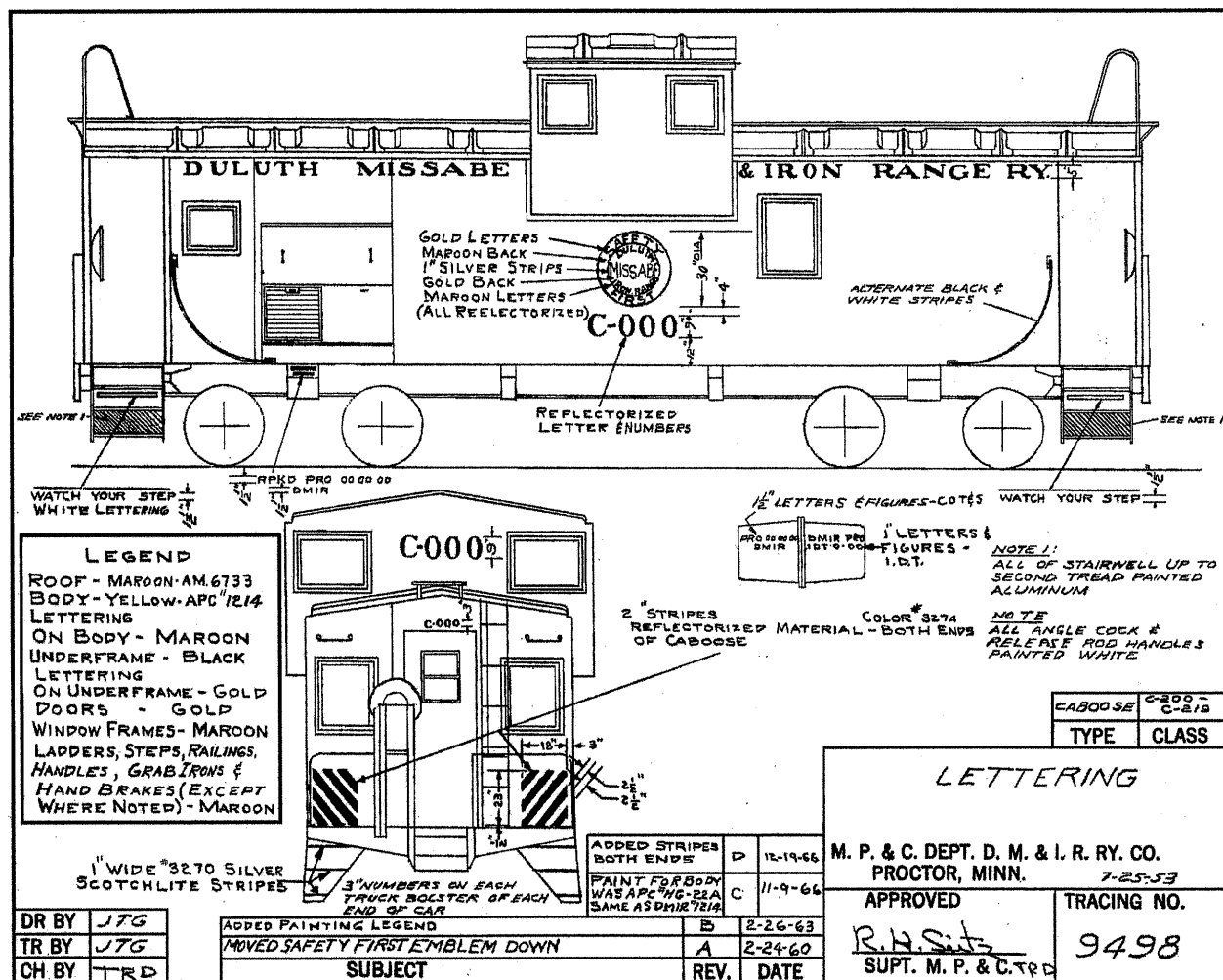
Fifty specially designed quad hopper cars Class Q2 4700–4749 were acquired by DM&N in 1937. 250 additional cars Class Q5 2700–2949 built in 1952 by Pressed Steel Car and 100 Class Q7 2950–3049 built in 1957 by Pullman Standard were acquired to protect coal movements. DM&IR 2795 is at Virginia, Spring 1962. The Class Q5 hoppers would be the only cars acquired with this distinctive monogram. (Jim Maki Sr.)



DM&IR 12030, former B&A 910089 rebuilt July 2, 1975, one of 500 triple hoppers, DM&IR 12000–12149 and EJ&E 74000–74349 acquired in 1975. All were former B&A/NYC triple hoppers rebuilt with Bethlehem Steel supplied kits at PC Samuel Rea Shops. Butler, WI August 7, 1976. (D.P. Holbrook collection)

At least two wood cabooses, C190 and C191 received the stencil monogram when rebuilt for T-Bird service in 1965. During the winter shopping season of 1959–1960 four cabooses, C-38, C-93, C-136, C-161 were painted in a lighter shade of yellow with maroon roofs

and lettering but no monograms. A limited number of cabooses assigned to Missabe Division received this paint scheme with Iron Range Division cabooses retaining the black roof and lettering. The first extended vision cabooses, C-200 through C-219 were delivered



with black roofs and lettering. Starting in early 1960, all cabooses began to be repainted into a standard yellow carbody, with maroon roofs, step platforms, ladders and lettering. This paint scheme was further modified for steel cabooses only on December 19, 1966, when safety stripes for higher visibility were added on either side of the doors on both ends. Beginning in 1954, bottom step and riser of end stairways were painted silver allowing them to be easier identified at night. In late 1960, the carbody color was AP 1214 yellow with roof and lettering being AM 6733 maroon.

The car body color was changed to APC HG-22A yellow on November 9, 1966. This yellow was supposed to be the same as AP 1214 but photos show this to be a slightly more gold shade of yellow. Version 2, maroon, gold and white Scotchlite monograms were introduced

in 1959 with the first application on cabooses in late 1960. Cabooses prior to this had the car number centered on the carbody. Effective with the application of the Version 2 monograms it was moved to be centered below the cupola. Initially in spring of 1960 all cabooses had window frames painted the carbody color. Two cabooses, C-161 and one other, were changed to maroon window frames in October 1960 for inspection during a business car trip. Not until late 1960s would this become a standard on newly painted cabooses.

On wood cabooses the Scotchlite monogram and road numbers were applied to a metal placard that was installed below the cupola on the side of caboose. On steel cabooses this was applied directly to the carbody below the cupola replacing the cupola stencil monogram. At least one caboose, C-209 when rebuilt from

SEE REF. DRC. NO. 320-6629

NOTE: ACI LABEL TO BE APPLIED TO A 103" W X 24" L X 1/2" D X 14 GA. CHANNEL

SERIES	CLASS	TYPE
4960-4969	Q4	HOPPER

1" LETTERS & FIGURES

1" LETTERS, FIGURES & SPACES

1" LETTERS ABOVE ROTARY BRAKE ONLY

BLACK LETTERS AND FIGURES ON BATTLESHIP GREY

SPRING 22 TRAVEL 12" OR 2" LETTERS & FIGURES

DMIR 0000

COTESTH. 0-00-00 DMIR

12" LETTERS & NUMERALS

DMIR T.H. IDT. 0-00-00

1" LETTERS & FIGURES RESERVOIR SIDE ONLY- NEAR RELEASE ROD

DMIR 0000

INITIALS & NUMBER ON EACH TRUCK BOLSTER ON EACH END OF CAR 1/2" OR 2" LETTERS & NUMERALS

REV	DATE	DESCRIPTION
G	8-25-69	REV LETTERING
F	5-24-68	ADDED ACI LABEL
E	10-27-67	REV LETTERING PER AAR
D	10-25-67	REV LETTERING PER A.A.E
C	11-12-59	REV STENCILING IN ACCORDANCE WITH AAR
B	7-16-59	ADDED MAKE OF JOURNAL LUBRICATOR
A	2-3-59	ADDED IDT STENCIL & AAR CL.

CEMENT	Q4
TYPE	CLASS

LETTERING

M. P. & O. DEPT. D.M. & I.R. RY. OO
PROCTOR, MINN. 6-20-52

APPROVED

TRACING NO

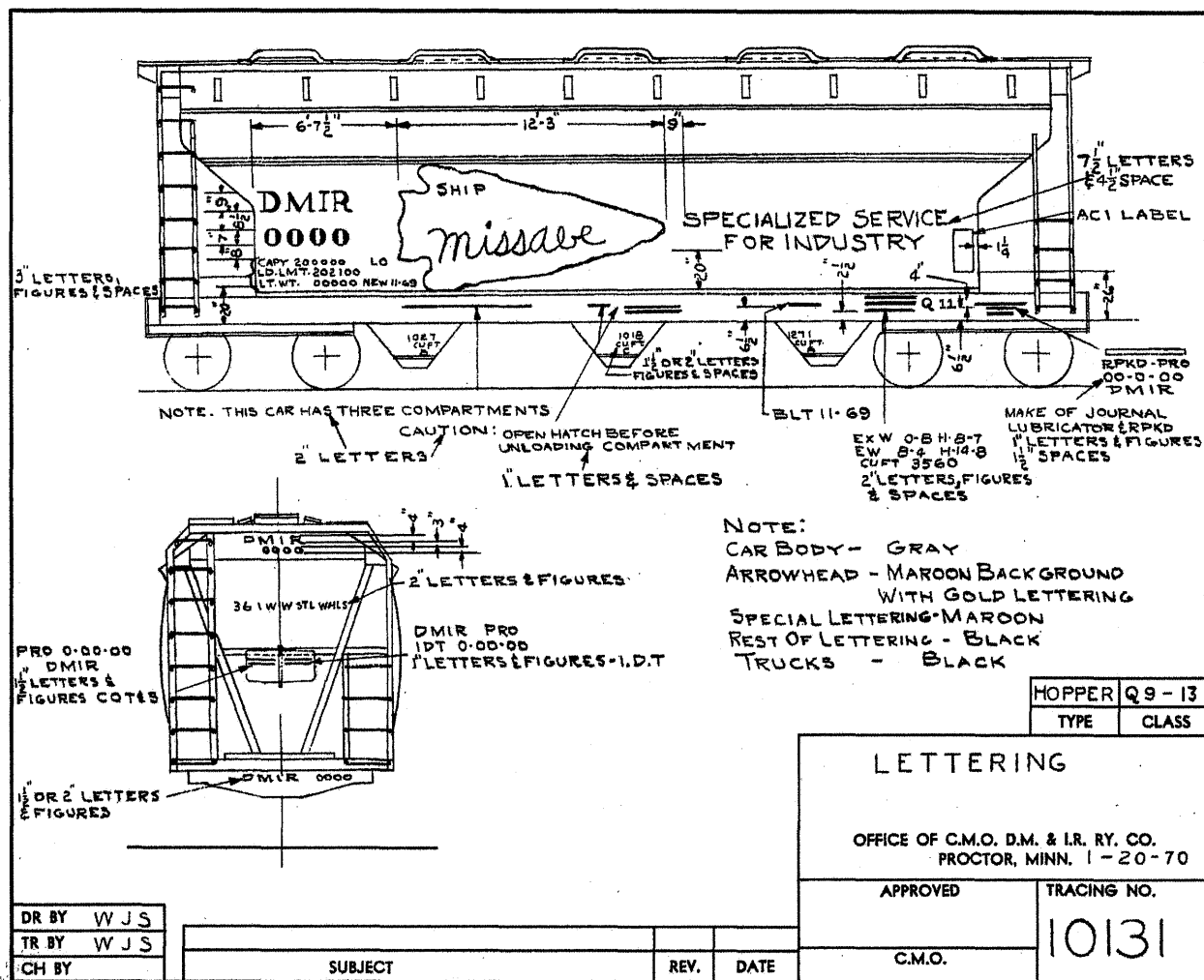
9141

extended vision to side-window caboose, had an original Version 1 variation of Scotchlite monogram. Version 2 with a yellow instead of gold center was introduced during 1969 and used on a few cabooses. Version 3 green and white Scotchlite monograms started to be applied to cabooses during the winter 1973-1974 shopping season. At the same time Scotchlite diagonal stripes were applied along the bottom edge of carbody. A large red Scotchlite placard was added to the ends of the cupola with the road number applied.

The "Arrowhead" logo was developed in 1968. A small version of this was applied on a few wood cabooses C-43, C-44, C-52, C-56, C-58, C-136, C-138, C-143, C-144, C-180, C-192, C-193 located where the car number was displayed and the number superimposed on the logo. Cabooses C-44 and C-180 when

repainted had the car number stenciled on the sides and cupola in roman lettering and it appears to be the only cabooses so lettered. Cabooses C-43, C-55, C-58 and C-138 received gothic numbers on the Arrowhead logo but retained roman lettering on both ends of the cupola. Most, if not all, other Arrowhead logo cabooses had gothic numbers on both the side and cupola. On bay windows C-204, C-205, C-218, C-219 a small version was applied without the car number. It should be noted that some cabooses retained the black roofs and lettering until being retired.

Refrigerator cars were painted yellow with black underframes, roof, ends, trucks, grab irons and appliances. The only known exception was 7063 being painted in maroon with gold Scotchlite reporting marks, numbers and a maroon, gold and white monogram.



In 1971, class Q5 hopper cars were to be painted ore car brown with white lettering except the first car, 2808, was painted maroon and gold for publicity purposes. A letter was issued on April 4, 1971, instructing shop forces to repaint the first car but all remaining cars were to be left in primer aluminum and placed in service with reporting marks and number account of a severe hopper shortages. These cars would then be shipped during the summer of 1971 as time was available. For a short period of time from April 1971 until October 1971 the Q5 hoppers rebuilt were in aluminum colors. All remaining rebuilt hoppers between 1971 and 1973 would be painted maroon with gold lettering.

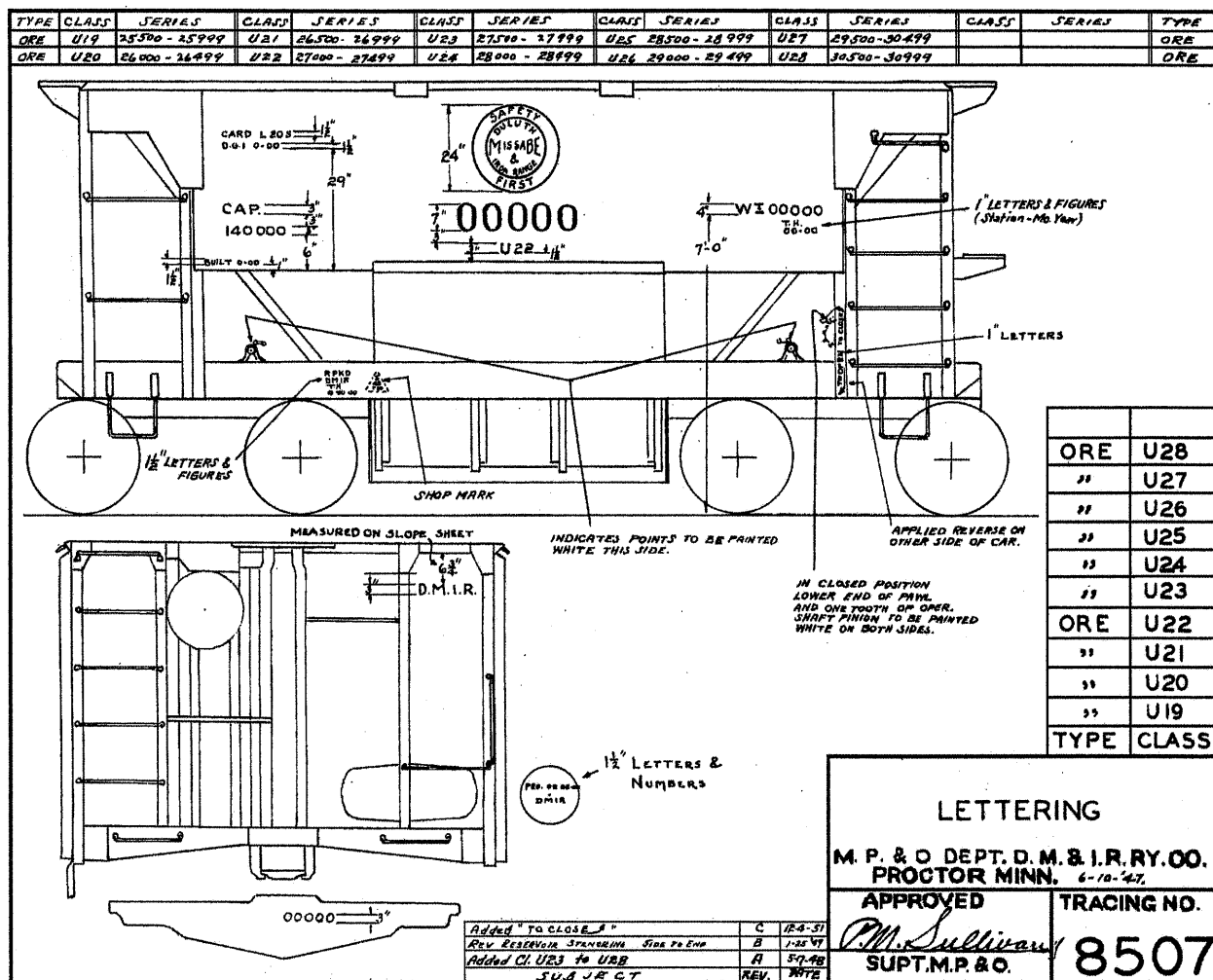
Taconite cars were not initially painted when side extensions were added. An August 19, 1965, letter to general car foreman at Proctor specified that rebuilt taconite cars start to

be painted with USSSS No. AM-6733 Maroon paint and that No. 95-014 Dulux gold paint be used for all stenciling.

The final DM&IR monogram was the "Arrowhead" logo, which was developed in 1968 and applied to Class Q9 through Q13 covered hoppers and a handful of wood cabooses and steel bay-window cabooses. Covered hoppers were delivered from ACF without the Arrowhead logo which Proctor shops applied. Logo was Dupont Maroon #88-2336 with Gold #95-014 used for the lettering on the logo.

Class V2 gondolas were delivered painted black with white lettering. Beginning in 1958, gondolas and flat cars would be painted maroon with gold lettering.

A special T-Bird logo (see photos) was applied on crude taconite service ore cars 40000-40279 instead of a DM&IR monogram.



SCOTCHLITE LETTERING AND MONOGRAMS

Scotchlite monograms arrived in 1955 with the application of a green and red monogram with white lettering and circles separating the green and red colors. It was applied to SW9s, SD9s, RSD-15' and the RDC. Unique to these applications the monogram wording was: "Duluth, Missabe, and Iron Range." This was modified in 1959 with an "&" replacing the word "and" in the monogram. All future use of the monogram on freight cars, cabooses, locomotives and MofW equipment would be this version of the monogram.

Starting in 1959 a program was set up to use a new maroon and gold color scheme for painting all work equipment and merchandise cars as painting became necessary. Scotchlite

reflective monograms, numbers and reporting marks began be used during 1959 on freight cars and cabooses although some cars did received non-reflective stencil monograms. Through October 31, 1960, 137 box, gondola and boarding cars were painted, using the new maroon and gold color scheme. White lines above and below reporting marks and numbers were no longer recommended practice after 1951, however DM&IR did not discontinue this practice until 1967. Modern portable airless spray painting equipment had been placed in service at Proctor and Two Harbors car shops for use in the car painting program.

By September 30, 1962, an additional 132 merchandise and work cars had been painted in the new maroon with Scotchlite monograms, reporting marks and numbers. Cabooses re-

ceived yellow carbodies and maroon trim. A year later found an additional 57 merchandise and 27 cabooses painted in the “new” scheme.

The Scotchlite monograms can be broken down to five variations:

Version 1 – Monograms developed in 1955 had two white outlined circles around the monogram with the center of the monogram being red and the outer band being green with all lettering in white. Company name on the monogram was: “Duluth, Missabe, and Iron Range.” Used on SW9s, SD9s, RSD-7s, RDC and former B&LE F7A/Bs. Unique on these monograms were a white “dot” on the green outer band on either side of the word “Missabe.” These Version 1 monograms had a wider white outline circles. No photos have been found showing its use on equipment other than locomotives.

Version 1a – Company name was changed by changing “and” to “&” and dropping the white dots on the monogram in 1959 with the first use on EMD SD18 locomotives and later SD38s, SD-Ms and SD40-3s. Used on freight equipment from winter 1973-74 until CN merger. This monogram was used mostly on cabooses, but was also used as a replacement monogram on 5900-series box cars, two gold-painted taconite ore cars, 52931, 52454 and MofW equipment.

Version 2 – Monograms had two white outlined circles around the monogram with the center of the monogram being maroon and the outer two bands being gold with all lettering in white. This type of monogram was used on box cars, gondolas and MofW equipment from 1959 until mid-1960s.



Version 2. Scotchlite monogram with gold border; maroon center and white circles and lettering. DM&IR 3106 Virginia, 1960. (Jim Maki Sr.)



Version 1a. Scotchlite monogram with green border with red center and white circles and lettering. September 27, 2000. (D.P. Holbrook)

Version 3 – Monograms had two white outlined circles around the monogram with the center of the monogram being orange and the outer band being maroon. Lettering in center of monogram was in maroon and the outer circle lettering was in gold. This monogram was used mostly on cabooses from 1960 until the winter of 1972-1973.

Version 3. DM&IR Scotchlite monogram with orange background and lettering on caboose C-91 Virginia, July 27, 1969. (Owen Leander)



Version 4 – Monogram matched Version 2 except the center of the monogram was changed from orange to yellow. This began to be used during late 1966 and intermixed with Version 2 monograms until the supply was exhausted.

Version 4. Scotchlite monogram with maroon border; yellow center; white circles and yellow and maroon lettering. (D.P. Holbrook collection)



Cost-cutting measures during the economic downturn on the iron range during the 1960s saw Scotchlite monograms and letter-

ing dropped from freight cars in 1968 with the above exceptions.

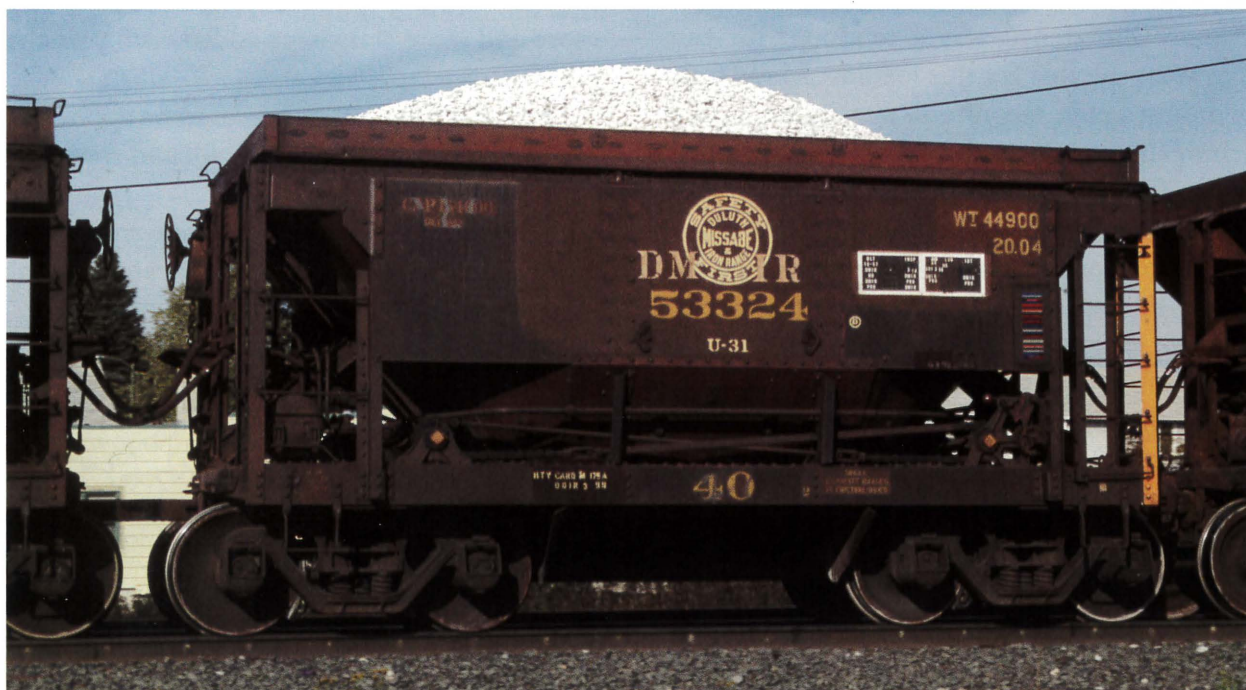
DM&IR REPORTING MARKS AND NUMBERS

Reporting marks were normally 9-inch high lettering and road numbers 7-inch high. Reporting marks and end numbers were normally 4-inch on all cars except ore cars which had 3-inch high DMIR and 4-inch high end numbers. These were normally stenciled in the upper right corner of each end including cars equipped with pulpwood racks. Photos indicate most DM&IR ore cars only received reporting marks and no end numbers.

Surprisingly, DM&N starting in 1925, and later DM&IR ore cars, had a monogram with road number below, but no reporting marks. FRA caught up with this fact by 1975 on regular ore cars and 1995 on mini-quads and required DM&IR to apply reporting marks. Main objection was that AAR Interchange

Rules required cars to carry reporting marks when used in interchange service. The delay in stenciling the mini-quads was because they were used for on-line service only until the start of the all-rail ore movement using these cars in 1995.

Solving this problem, the DM&IR stenciled DM to the left of the monogram and IR to the right of the monogram on mini-quads and most regulars had the monogram painted out and DMIR stenciled over the old monogram location. A few cars without the reporting marks are still in service in 2015. T-Bird cars rebuilt in 1976 did not have the DM&IR ball monogram but did have DMIR reporting marks above the number, complying with FRA car stenciling requirements for cars used in interchange. Ironically, none of the T-Bird cars was ever used in interchange service.



Required by AAR and later FRA rules, DM&N and DM&IR did not apply reporting marks on ore cars. FRA began to enforce the rules starting in 1975 on regular ore cars and 1995 on mini-quad sets, "DMIR" reporting marks were stenciled above the number and in some cases the monogram was painted out when the reporting marks were applied. DM&IR 53324 Proctor, October 4, 1998. (D.P. Holbrook)

DM&IR WEIGHT, DIMENSIONAL AND MECHANICAL DATA

Weight data stenciled on the left side of the car consisted of: nominal capacity, load limit, light weight and "NEW or reweigh location and date (month and year). The MCBA in 1911 agreed that the date weighed should also include the location. This was stenciled on DMIR cars in 3-inch high lettering. Reweigh locations consisted of: STN for Steelton, PRO for Proctor, D for Endion Yard at Duluth, and T.H. for Two Harbors. Dimensional data was stenciled in 1½- to 2- inch high letters.

Class lettering was normally 4-inch high letters which were placed near the lower right

corner of the car. On ore cars it was placed directly below the road number.

Iron ore was shipped as "long tons" (2,240 pounds was a long ton). Normal stenciling on ore cars showed the light (tare) weight of the car to the right-hand side of carbody. Beginning in winter 1952 the long ton decimal equivalent number began to be stenciled below the light weight shown. An example would be 15.04 long tons for a car with a light weight of 33,700. This stenciling was precipitated by the development of computers being used for figuring weights on loaded cars. DM&IR, GN and NP all adopted the decimal light weight stenciling on ore cars during the 1950s.

DM&IR ADDITIONAL LETTERING

During the mid-1950s a "CT" stencil on side of car was added to "regular" ore cars to indicate cars were "clean and tight" for shipments of special grade of magnetite concentrate that was produced for the cyclones at Pilotac. The stencil was a reminder for cars that were suitable for this loading. Made from premium grade taconite it was called "coarse grind." It was shipped to Arcturus and other mines for use as heavy media with the heavy media cyclone processing of natural ore.

Various other markings appeared over the years. "P" was located to left of monogram on ore cars for cars equipped with plywood slope sheets. A number of cars had the letter "X" placed on both sides of the monogram during the late 1950s to indicate they were being used to test how paint and lettering reacted in the infra-red thawing sheds. Initially appearing on the side sill and later to the right of the car number on the sides was a circle with a "D" inside the circle. This indicated car had tight doors. An angled slash through this logo indicated that the door seals had been removed.

A white dot or oval above the right sill step indicated the sills had been patched. A "spider" logo on the side sill indicated "supports for rear lug casting" had been repaired. Starting in 1995 white stars began to appear on the side sheet of the car. This indicated car had passed FRA inspection and was okay for service, progressively more and more stars were added each year the car was inspected.

Stencil group letters began to be applied in 1953 at the center of the side sill and were discontinued in November 1982.

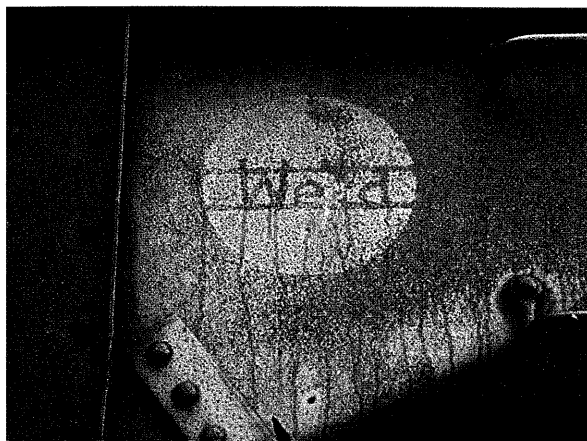
A letter "X" indicating overage trucks and wheels, and later an "R" to indicate car was overage, were stenciled on the side of cabooses, adjacent to the car number on the side of the car starting about 1985.

FRA made changes to "Clean, Oil, Test and Stencil" requirements during 1971. New stenciling required the information to be standardized in black painted boxes with white outlines in a standard location on all cars. DM&IR began to apply the COTS painted boxes on 3,100 ore cars on December 2, 1974 and completed the project on February, 23, 1977.

“WHITE BALL” AND “WELD” LETTERING

Identification of the remaining K-brake equipped 50-ton ore cars became a significant problem once train makeup compliance was a concern. Beginning in 1955, DM&IR began to stencil two white circles (balls) on either side of the car number on each side of cars still equipped with K brakes. These circles earned the moniker “White Ball” on the K-brake equipped ore cars. On July 28, 1955, 1691 50-ton ore cars were still equipped with K-2 brakes and considered “White Ball” cars, broken down as follows: 557 Class U9 cars, 540 Class U10 cars, 144 Class E9 cars, 195 Class E10 cars and 255 Class E11 cars. These stencils were applied only to 50-ton ore cars (see Chapter 2, page 74, DMIR 42421).

During 1956, it was noted that there was a problem with ore leakage (loss) at the junction of the ends of the doors with the end slope sheets. A welded extension was developed, at a cost of \$11.00 per car, which would reduce the loss of ore to a minimum. Cars rebuilt with



The white ball with two lines and the word weld was placed on 50-ton ore cars beginning in 1956 to indicate that interior side and slope sheets had been welded and slope sheet extensions added to prevent leakage of ore and taconite pellets. Cloquet, Minnesota September 26, 2002. (D.P. Holbrook)

the “welded” extension to the slope sheets had a white circle painted on the far left and right side panels with the script word “Weld” located in the middle of the circle to indicate that the rebuilding had been accomplished. This was later modified to a stenciled “welded sheets.”

ORE CAR SLOPE SHEET TESTS

The desire to reduce freezing ore in ore cars caused the DM&IR to try various solutions over the years. One of these was the application of plywood linings on slope sheets. Two cars were converted during September 1965. AFE 10033 for \$1035 was approved on October 12, 1965, for the application and testing of plywood on end sheets of ten additional ore cars. Cars 33087, 33123, 33129, 33155, 33161, 33352 had $\frac{3}{8}$ -inch thick plywood installed and cars 33017, 33056, 33107, 3319, 33147, 33371 had $\frac{3}{4}$ -inch thick plywood installed. The plywood was tested with various coatings. Car 33155 with fuel oil, 33129 with graphite lubrication, 33087 with brown ore car paint, 33123 with epoxy paint, 33161 with anti-freeze, 33056 with 30 percent calcium chloride solution, 33139 with diesel lubricating oil,

33017 with Chemcote, 33147 with coal spray oil and 33107, 33352, 33371 with no coating. To indicate their test status a letter “P” was stenciled on both sides of car to the left of the DM&IR monogram.

On November 3, 1965, Mr. Halley (chief industrial engineer) reported that plywood end sheets installed on 70-ton ore cars showed no appreciable wear. The cars dump easily but this is partly due to favorable weather conditions.

Application of rubber belting to one standard ore car 33154 and one high-side taconite car 533309 to improve dumping was completed on Nov 5, 1965 under shop order 3354. Rubber conveyor belting was applied to ease the unloading of these cars during freezing temperatures. Rubber belting was also applied, in later years, to many of the T-Bird crude taconite service cars, as described in more detail in Chapter 4.

STEAMING AND INFRARED THAWING OF ORE

Discharging iron ore from ore cars was forever a problem. Coarse ore emptied through the bottom doors was not a problem; however, fine ore was subject to "bridging," causing the load to be stuck in the car. Car punchers were employed on the ore docks with long metal bars that were used to poke at the loads from the end platforms in the hopes of encouraging the load to discharge into the dock pockets. This was even more of a problem as washing plants developed on the iron range. These plants would wash the impurities out of the ore, but the ore still had a watery mix when loaded. Crews called these "mud, jelly or flat top" cars indicating the smooth almost level appearance of the loads. These were even more difficult to poke at and unload.

All of these cars were subject to freezing temperatures during the winter months causing the loads to become frozen in the cars. Steam lines were in place at both Proctor and Two Harbors that allowed steam engines to be

hooked up to these lines to provide steam and lances were hooked up to the steam lines and placed through the side lance openings on the ore cars to unthaw the ore. The first ore steaming facilities at Two Harbors, with 75 car capacity, were constructed in 1917.

A later development was a three-car infrared radiation thawing building built at Two Harbors in 1957. This building was replaced in 1960 with a two-track building with a capacity of 36 cars. A similar, smaller shed, was built on Dock 5 in Duluth during 1964. Once thawed the cars would be moved direct to the docks for unloading. Close clearances within the shed caused Class U14 and U15 50-ton ore cars to be removed from ore service because they did not fit inside the building. During 1961 requests were made to place these cars in coal service to eliminate the problem. The Duluth shed was removed in the early 1970s and the Two Harbors shed removed in 1979. By this time shipping of natural ore had declined and the need had passed for thawing.

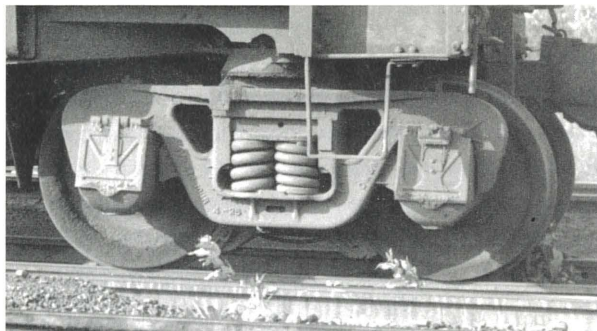
C: MECHANICAL AND AIR BRAKES, TRUCKS

The majority of freight cars in the United States built after 1910 were equipped with 5-foot 6-inch wheelbase trucks. The first wood ore cars, flat cars and box cars built for D&IR were delivered with 5-foot 4-inch wheelbase arch-bar trucks. D&IR would develop their own arch-bar truck and call it "D&IR Standard" in diagram books. DM&N Class P 200-379, Class Q 380-399 and Class O 400-1200 wood ore cars were delivered with 5-foot 6-inch wheelbase arch-bar trucks. Class R 1201-1400, Class S 1401-2000 and Class T 6000-7699 were all built with 5-foot 4-inch wheelbase arch-bar trucks. D&IR and DM&N ore cars trucks would remain 5-foot 4-inch wheelbase until DM&N Class U5 12000-12099 and D&IR 11400-11499 were delivered in 1910. All future ore cars would

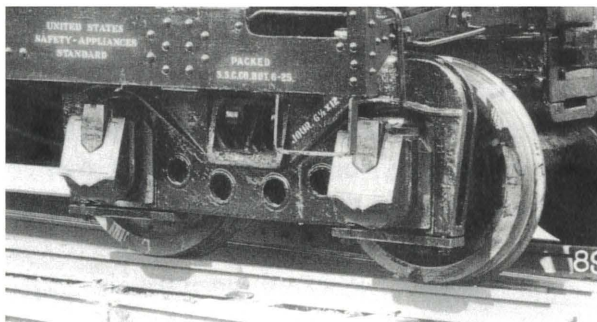
ride on 5-foot wheelbase trucks. A few ore cars would be delivered with unique 4-foot 2-inch wheelbase Pflager and Verona trucks. DM&N Class U13 21101-21126 and Class U16 23171-23175, former STDX 171-175, were built with Pflager 4-foot 2-inch wheelbase trucks. DM&N diagrams indicate two of these cars, 21102 and 21108, had "Special Pflager" trucks but author has found no further details. Two DM&N cars, Class U16 23176, 23177, former STDX 176, 177, were built with Verona 4-foot 2-inch wheelbase trucks. Class U14 and U15 were built with Dahlmen 2-level trucks, Class U17 with National B1, Class U19 with Buckeye and almost all other 70-ton ore cars would ride ASF Spring Plankless or ASF A3 Ride Control trucks. Many of these would later be modified with roller-bearing inserts.

ARCH-BAR TRUCK REPLACEMENT

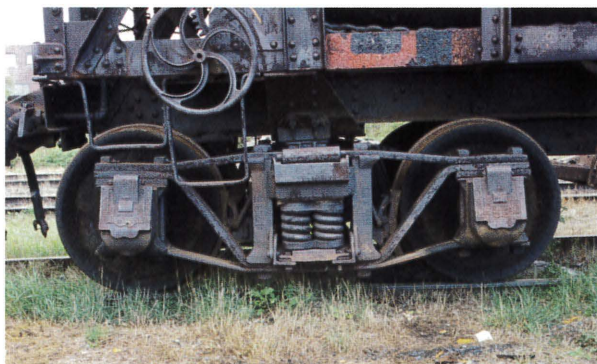
On December 31, 1939, arch-bar trucks were prohibited except for six months on returning empties. Total prohibition on arch-bar trucks in interchange service was July 1, 1940. At that time many DM&IR cars still had arch-bar trucks. It should be noted that AAR allowed arch-bar truck-equipped cars to be acceptable in interchange from owner for



Verona truck on STDX 23177. (Standard Steel Car Builides photo, D.K. Retterer collection)



Pflager truck on DM&N 21126. (Bob's Photo)



Arch-bar truck under former DM&N Class U5 ore car. Cloquet, Minnesota, September 26, 2002. (D.P. Holbrook)

loading or unloading within the same terminal switching district in which the interchange occurred. This allowed DM&IR to continue to interchange arch-bar truck-equipped ore cars to GN, NP and SOO within the confines of the Duluth and Superior Terminals.

AAR began the process to outlaw arch-bar trucks in interchange service during 1931. DM&IR was concerned about making this change and a letter was issued on April 3, 1936, requesting information on car requirements for interchange to determine how many cars needed to be converted. On that date DM&IR had 1,281 interchange cars that were affected. Prior to this letter, on April 15, 1935, a decision had been made to not convert arch-bar trucks on flat cars or refrigerator cars for interchange service.

On May 27, 1937, a total of 10,917 ore cars were on the roster with 6,015 equipped with arch-bar trucks and 4,902 with cast steel side frames. Replacement Andrews U-section side frames were purchased and conversion from arch-bar to Andrews U-section side frames started July 1, 1937, at the rate of seven cars per day. This initially included DM&N: 47 Class P box cars, 97 Class P1 box cars, 55 Class Q gondolas, 26 Class V1 gondolas; D&IR: 25 Class H gondolas and 100 Class G gondolas. It was determined that 454 cars would remain with arch-bar trucks and be restricted to on-line service only. A letter from Supt. Motive Power and Cars to C.E. Carlson president on February 28, 1938, specified that these were D&IR: 78 Class F box cars, four Class M stock cars, 113 Class I flat cars and eight Class R refrigerator cars; DM&IR: 44 Class V flat cars, 158 Class V1 flat cars, 11 Class Y flat cars and 38 Class J1, J2, J3 refrigerator cars. Ore cars and cabooses were not included in this list; they were not interchanged.

Many of these cars would remain in on-line service into the 1970s with arch-bar trucks. Cars that retained arch bars began to be stenciled "For On-Line Service Only." Duluth & Northeastern, since the late 1930s, waived the overage requirement for cars interchanged to their railroad and DM&IR continued to use

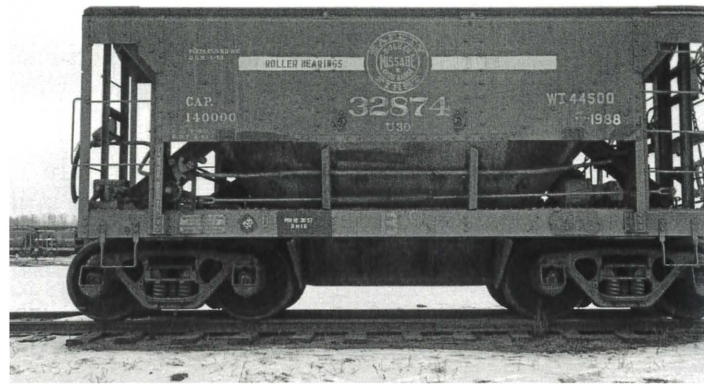
arch-bar equipped cars for pulpwood shipments to D&NE into the early 1960s.

By January 1, 1935, cars with wooden underframes were outlawed in interchange service. Any remaining D&IR and DM&N cars of this type were either retired before this date or remained on the roster, restricted to on-line service only.

ROLLER BEARINGS

In 1955, Superintendent of Motive Power and Cars Robert H. Seitz recommended the installation of roller bearings on 20 ore cars to test reliability and the reduction in hot boxes associated with solid-bearing trucks. Twenty sets of Timken Roller bearings were ordered on September 11, 1955, for application to 20 ore cars on AFE 7923 at a cost of \$18,150. Car numbers were: 32531, 32547, 32552, 32591, 32611, 32699, 32740, 32771, 32778, 32782, 32791, 32811, 32814, 32824, 32833, 32840, 32841, 32874, 32896, and 32951.

The installation of roller bearings was completed on March 26, 1956. At the time of installation all cars had white stripes painted on either side of the DM&IR monogram and the left stripe had the words "Roller Bearing." The



Timken roller bearings were placed on 20 of the 1953-built Class U30 70-ton ore cars by March 1956. The roller bearings were inserts into standard sideframes that retained the journal boxes but lacked the lids. Worried about carman oiling these cars, distinctive white stripes were applied on either side of the monogram with the words ROLLER BEARINGS in the left stripe to make these highly visible to mechanical and operating department employees. This paint scheme would be retained when all were rebuilt with sideboards for taconite service and repainted in maroon and yellow. (Basgen photo, D.P. Holbrook collection)

cars when rebuilt retained journal box covers and the stripes and lettering were applied to assist carmen when oiling solid-bearing cars so they would not oil the roller-bearing cars.



Twenty ore cars were equipped with Timken roller-bearing wheelsets in late 1955. They received distinctive white stripes on either side of the monogram with the left stripe lettered ROLLER BEARINGS to assist operating department in identifying the cars. All were rebuilt for taconite service in 1964 and 1965. Repainted maroon with gold lettering, the stripes were retained as shown on DM&IR 52531 at Rainy Jct. Yard, Virginia, July 27, 1969. Stripes were removed when cars were repainted with T-Bird logos or rebuilt as part of mini-quad sets. (Owen Leander)

Beginning in September 1964, these cars began to be rebuilt to high-side taconite cars and during the rebuilding they were painted maroon with yellow lettering and retained the distinctive stripes and ROLLER BEARINGS lettering with the stripe color changed from white to yellow. Initially, the rebuilt taconite cars had the number 5 added to the original numbers, creating a six-digit reporting number. This process was discontinued in late 1966 when the first number 5 was eliminated and the number 3 was changed to 5.

K BRAKES TO AB BRAKES CONVERSIONS

Air brakes were essential for operation of the heavy tonnage ore trains on DM&N and D&IR. ICC reported in 1887 that the D&IR was the first railroad to completely equip all the locomotives and cars with automatic air brakes. By 1890 a common ore train was 50 35-ton capacity cars with about 2,500 trailing tons. K brakes were recommended practice by Master Car Builders in 1913 and made standard practice in 1917. Wood cars of the period were averaging a fully loaded to empty weight ratio of 2:1. Steel cars were 3:1 to 3.5:1 gross to tare loaded to empty weight ratios. These ratios led to the development of empty/load braking equipment during the 1919-1921 period.

D&IR and DM&N both adopted the empty/load braking systems. Longer train operation of 100 or more cars by 1920 was possible, but the K brake system did not provide a satisfactory system on these longer trains. The ICC proposed specifications for a new braking system in 1924 with development and road testing on SP in 1929-31 and PRR during 1932-33. The new AB brake system eliminated the violent slack action associated with the operation of 100-car trains. AB brakes were required on all newly built cars effective September 1, 1933, and on newly rebuilt cars effective January 1, 1937. The elimination of K brakes became a focus in the early 1950s.

This was an inopportune time for DM&IR

because iron ore tonnage was increasing and a large part of the equipment roster still had K brakes. K brakes would be banned in interchange service January 1, 1954, but DM&IR would file multiple applications for an extension with ICC over the 1953-1956 period.

In 1953, the DM&IR had 2,890 50-ton ore cars equipped with K brakes. An ICC order of August 3, 1953, in docket 13528, Investigation of Power Brakes, extended the time limit for application of AB brakes to DM&IR 50-ton ore cars to December 31, 1954. During 1954, 69 of the 50-ton ore cars were rebuilt with AB brakes.

On November 3, 1954, application was made to the ICC requesting permission to use 1,500 of the K-brake equipped 50-ton ore cars in ore service until December 15, 1956. Five hundred were to be used in short transfer movements in trains of 60 cars or less at a maximum speed of 25 mph and 1,000 cars to be used in regular service. It was planned to retire the remaining 1,321 cars not equipped with AB brakes by December 15, 1956. As of July 28, 1955 there were 557 U9, 540 U10, 144 E9, 195 E10 and 255 E11-class 50-ton ore cars still equipped with K brakes.

The ICC issued an order to supplement, docket 13528, dated April 11, 1955, granting the DM&IR permission to use these cars in ore service *only*, and then in trains not exceeding 100 cars in length, until December 31, 1955. Faced with a growing shortage of serviceable equipment, the DM&IR ordered 500 sets of second-hand AB brake in May 1955 (on AFE 7822 at a cost of \$143,000) and another 500 second-hand sets in August 1955 (on AFE 7861 at a cost of \$136,500).

The anticipation that ore tonnages for the 1956 ore-shipping season would be as least as great as 1955, and because new ore cars could not be built and delivered before the fall of 1956 or the spring 1957 (due to a steel shortage) caused the DM&IR to look at the 50-ton ore car situation. It was decided to install AB brakes on 800 of the "strongest" of the remaining 50-ton K-brake equipped ore

cars (on AFE 7925 at a cost of \$426,400). By the 1956 ore shipping season approximately 3,300 50-ton ore cars were equipped with AB brakes. This included 424 old-style cars: Class U3 8405-10554 Class D 4400-4899, Class U4 10555-11704, and 86 Class U4 100-849, 4-door cars for use in other than ore service.

It was thought, however, that this installation would not provide an adequate ore car supply to mining companies during the 1956 season, nor would it result in the desired efficiency in ore operations. An additional application to the ICC was made in late 1955 for permission to use the remaining 706 50-ton K-brake equipped ore cars, from April 1 until November 1, 1956, on an emergency basis in trains of less than 100 cars in non-interchange service, until additional AB brake application could be made. The 680 remaining K-brake equipped cars were outlawed on November 1, 1956, and further relief from the ICC order was not forthcoming. K-brake equipped cars continued to be used MofW service after that. During the 1956-57 winter shopping season 375 of the remaining 680 K-brake equipped cars were converted to AB brakes.

These efforts were anticipated to relieve some of the tight car supply during the 1957 season, due to the fact that the 500 new Class U31 ore cars, 33000-33499, would not be delivered until the fourth quarter of 1957 and not available for the 1957 ore shipping season.

CAR SHOPPING

Normally ore was shipped starting on April 1 and continuing through November until freezing temperatures caused shipping to be discontinued. During 1952, this left an average of 83 working days on which to complete necessary repairs on 5,000 50-ton and 9,000 70-ton ore cars. Repairs were broken down into the following three categories:

Light repairs, including the repairs to air mechanism to all the 50-ton cars and to one-third the ownership of 70-ton cars.

Light repairs, but not including repairs to air mechanism to two-thirds of the 70-ton cars.

Repairs to either 70-ton or 50-ton cars which have been wrecked or badly damaged.

Item No. 1 was mandatory and had to be completed. Repairs listed in Item 2 which had been completed every year since the acquisition of the 70-ton cars, could be dispensed with during the winter months if necessary and provisions made to complete mandatory item during the normal ore shipping season. Item 3, which comprised the smallest number of cars, was completed to the extent possible.

Repairs to ore cars were apportioned to cars in categories 1 and 2 for repair at Proctor to one car to be repaired at Two Harbors. All category 3 repairs were always done at Proctor. To compensate for this, all major repairs to commercial, work equipment and passenger equipment was done at Two Harbors. Cabooses in service on the respective divisions during the summer months were repaired during the repair season at the shop of the division on which they were in service.

During 1952, winter ore car repairs comprised: clean and test air brakes, repack journal boxes on 50 percent of cars, necessary truck and body work. Seasonal ore car repairs comprised: repacking journal boxes on 50 percent of cars, greasing dumping mechanisms and hand brakes, necessary truck and body work, adjust piston travel.

During the winter shopping season of 1958-59, ore cars shopped at Proctor or Two Harbors were being stenciled on side sills with a "star" insignia with the figure "S" "59" and either "T.H." or "Pro" to indicate the point from which shopped. Cars shopped for seasonal repairs were stenciled on side sills "59 P" to designate cars shopped at Proctor and "59 T.H." for cars shopped at Two Harbors.

As of 1952, merchandise cars were shopped for heavy repairs as follows:

Class V, V1, K, K1, K2, K3, V and Y every 8 to 12 years; Class Q, G1, G2 and V1 every 12 to 15 years; Class P, P1, F, F1, M, P, J1, J2,

J3 and R every 15 to 20 years and Class H, H1, Q1, Q2, Q3, Q4, P2, F2, V2 every 20 to 25 years.

Cabooses were shopped for extensive repair (not rebuilding) at 15- to 20-year intervals.

During 1963 lading strap anchors were applied to 37 interchange flat cars in order to comply with modified AAR requirements. In 1965 safety door hangers were applied to 100 DM&IR interchange box cars to comply with requirements of the AAR

Early in 1975, the Code of Federal Regulations, Part 215, Title 49 had the following changes made affecting the DM&IR:

Clean, Oil, Test and Stencil (COTS) information, called Consolidated Stencils, were to be applied to 3,100 ore cars during 1975 with the remaining ore cars, commercial cars and cabooses required to be completed by December 31, 1976, required by paragraph 215.11(c). These stencils consisted of a black-painted box with a white outline that contained all the COTS information.

Ore car repacking would go from a 48-month to 30-month cycle. The 30-month cycle was contingent on journal boxes being stabilized. Required completion date was December 31, 1978, per paragraph 215.97.

Waiver Stencils. During the changeover it was necessary to stencil every ore car with a waiver explaining lack of repack date compliance. Required completion date was December 31, 1975

Caboose wheel change-out. Wooden cabooses with wheels dated prior to 1927 had to have the wheels replaced.

These new requirements caused many problems for the mechanical department. The 48-month repack period had been standard since lubricator pads were adopted nationally in the late 1950s. The four-year interval had been selected by DM&IR to coincide with the air cleaning date and incorporated into the winter ore car shopping program for many years. By following that procedure, it had only been necessary to repack one quarter of the

ore car fleet each winter. The captive DM&IR ore car fleet had made it possible to use the 48-month repack, although special agreements had been necessary, when cars moved off line. These new FRA standards caused the BN to refuse ore cars in interchange with repack dates over 24 months old. DM&IR was granted a limited waiver on January 24, 1975, that was valid until December 31, 1978.

AC AIR BRAKES

At the time the order was placed for Class U31 ore cars, further development in the AB brake systems was under way. The updated AB control valve was introduced in 1955, and classified as an "AC" brake system. The AC system incorporated diaphragm-operated piston, rubber "O" rings, and spool valves that replaced slide valves wherever possible. The AC system performed the same function as the AB valve. The weight of the removable portions was reduced by 40 percent. Except at two locations, spool valves with rubber seal rings replaced the AB slide valves. The speed of a release on the air brakes on 150 cars was reduced from 50 to nine seconds.

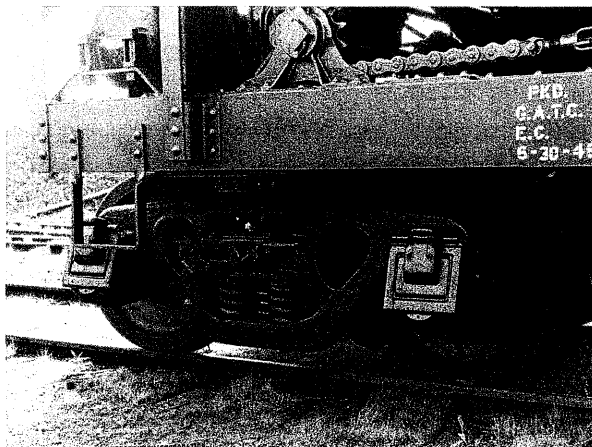
This eliminated ring leakage and friction variables and were used first in conversion kits for the AB portions and finally in the ABD-1 service portion. When the new parts were used in the emergency portion, the entire valve was designated the ABD control valve (which was interchangeable with the AB valve). This made it possible to accelerate air brake releases, more positive response to pressure changes and more consistent operation.

The AAR began looking in 1955 for a controlled environment to test the newer AC brake system. At the same time as the AC brake system was developed, high-friction COBRA composition brake shoes were introduced in North America.

What better a controlled environment than the iron ore railroads of Northern Minnesota? When Erie Mining began purchasing their

freight car fleet they also committed to become the "test bed" for the Westinghouse AC brake system. All equipment delivered to Erie Mining was equipped with AC brakes, including cabooses. At the same time, DM&IR elected to receive the 500 U31 class ore cars with AC brakes. Additional railroads participating in the test include the Great Northern, with 50 cars equipped with the AC valve, and the Rock Island, with 50 "Covert-A-Frate" flat cars.

During July of 1957 evaluation tests began on Erie Mining. The combination of the AC valve and the pressure-maintaining feature on the Erie Mining locomotives did away with the use of retainer valves and permitted a given brake pipe reduction to be held constant for a long period of time. The test train consisted of five engines, 92 loaded taconite cars and three cabooses. The cabooses were all equipped with a speedometer and an air gauge that indicated brake pipe and brake cylinder pressures. Records were distributed throughout the train to indicate draw-bar action. At the time of Erie Mining's startup the roster of AC-equipped equipment was 389 pellet cars, 5 cabooses and 4 diesel fuel tank cars of 22,000-gallon capacity. At the time, these ACF tank cars were the largest welded tank cars in the world.



ASF A-3 Ride Control trucks on Class U26 ore car. Note the L-shaped empty-load sensor attached to the end of the bolster, allowing the automatic adjustment of the braking capacity based on the empty or load status of the car. (GATC photo, D.P. Holbrook collection)

What made the AC brake unique at the time was that it was *not* permitted in interchange service. Air brake cleaning and inspection at the time of delivery was on a four-year basis. ICC waived these requirements and allowed DM&IR to do the cleaning and inspection on AC cars on an every five-year basis. The remaining AC-equipped cars were converted to standard AB brake assemblies between April 1972 and May 1973.

EMPTY-LOAD BRAKES

DM&IR was an early proponent of empty-load brakes with the DM&N Class U12 95-ton ore cars delivered in 1925 being the first cars equipped. Empty-Load brakes were made necessary when the loaded to empty weight ratio exceeded 4.2 to 1. It provided for a braking force that manually, and later automatically, changed depending on if the car was loaded or empty. Without the system cars would have sufficient braking power when empty, but insufficient when loaded. Later versions incorporated a device which measured spring deflection on the trucks to determine if car was loaded or empty.

By February 1935, 309 cars were equipped with empty load brakes. All ore cars constructed after 1935 were delivered with empty-load brake systems.

Development and testing of composition brake shoes showed that the empty-load brake systems were no longer needed. Cost Authority 6001 was approved October 20, 1966, to equip 2,399 70-ton ore cars with single-capacity brakes and composition brake shoes. During the conversion these cars were changed from empty-load brakes to single-capacity brakes. Once the conversion was completed a stencil, reading, "Single Capacity Brake, E1-friction Shoes" was applied on the side sill directly below the load cylinder on both sides. This was accomplished during the normal winter shopping program.

Cost Authority 6003 was approved on August 4, 1967, for the same modification to an

additional 1,786 70-ton ore cars.

Cost Authority 6007 was authorized on July 15, 1968, for replacement of cast-iron brake shoes with Cobra heavy-duty composition brake shoes. Cobra shoes were introduced in 1956 and it eliminated the need for 12-inch cylinders on 90- to 100-ton cars, clasp brakes on freight cars and empty-load braking systems; it also extended wheel life with fewer thermal problems. Cars involved were 473 Class U26, 954 Class U27, 363 Class U28 and one Class U31 car, a total of 1,791 cars. By the early 1970s, DM&IR had eliminated empty-load brake systems.

PLAIN BEARING LUBRICATORS

DMIR was an early tester of lubricator pads to replace waste packing in plain bearings. By late 1955, 12 types of journal lubricator pads were being tested on 1,517 ore cars and 120 hopper cars. These included pads from Abasco, Acme, Centra-Feed, Crown, Journa-Pak, Hennessy Miller, Premier, Rollins, Southland, Unipak and Wikit. Hennessy type pads were unsuccessful and discontinued in 1956. Lubricator pads were installed on Class Q7 2950-3049 open hoppers and Class Q8 4970-4989 covered hoppers, and when delivered from builder, AAR had mandated that journal box lids on these cars be painted yellow to allow easier identification by carmen, rip tracks and mechanical department of cars equipped with lubricator pads.

By 1960 DM&IR had equipped 2,400 cars with lubricator pads and all cars were completed by November 1961. AAR issued a directive mandating that all waste-packed bearings had to be changed to lubricator pads no later than January 1, 1962. On September 22, 1965, a program was instituted for replacement of Acme lubricator pads which were no longer approved by the AAR. An accelerated winter repair program was begun on December 9th to replace the Acme pads with 1,320 sets in-

stalled through December 28, completing the changeover.

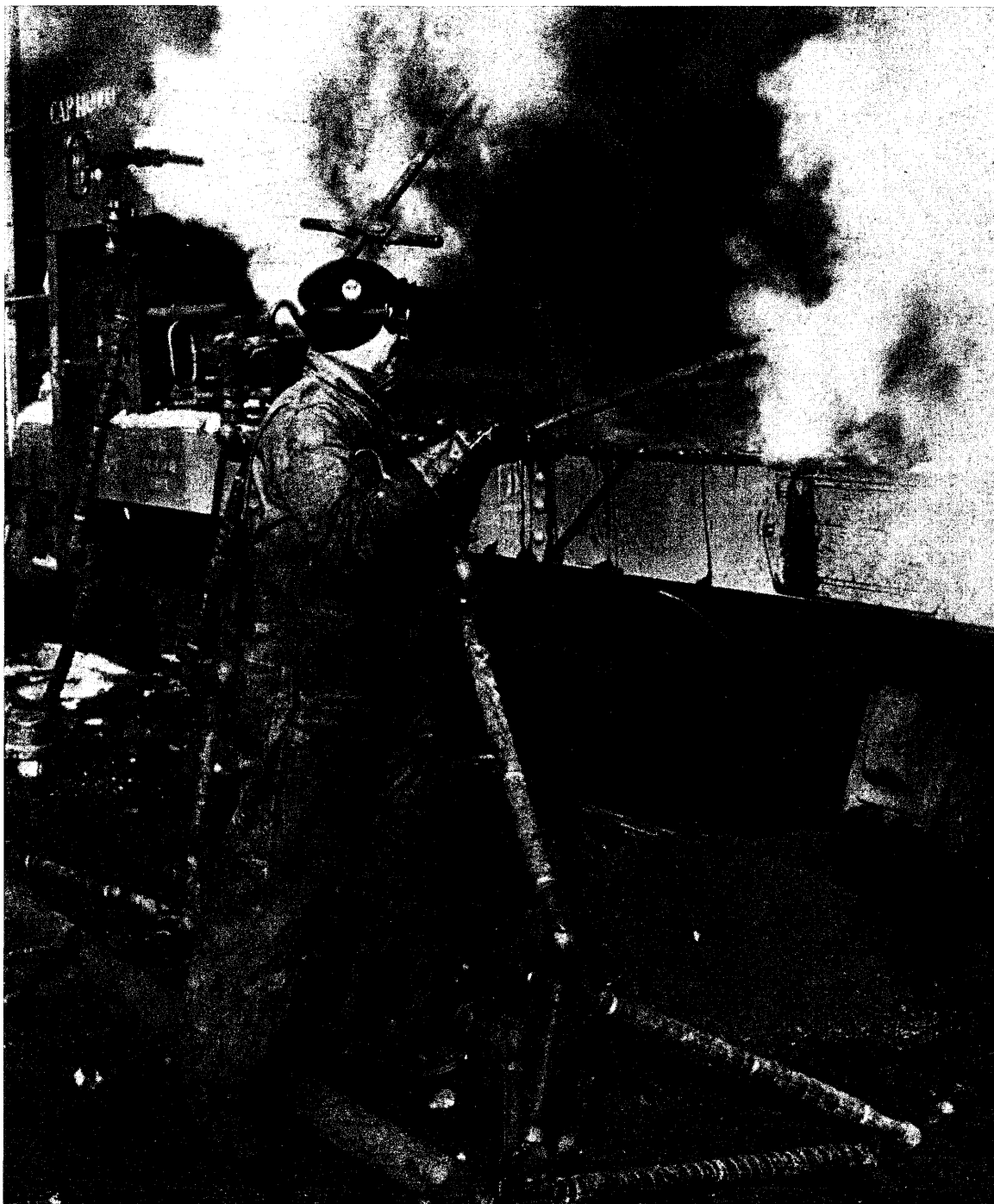
PLAIN BEARING TO ROLLER-BEARING CONVERSIONS

The first conversion from plain or solid bearings to roller bearings took place with the 30 70-ton steel ore cars converted in 1956. By 1986 the maintenance of solid-bearing cars was becoming an expense that could be avoided. Cost Authority CA-6147 was approved on September 24, 1986, for the modifications of 260 ore cars from solid bearings to roller bearings. Timken provided gauges, jigs and technical assistance at no charge to the DM&IR to assist in the conversion.

As of June 1986 there were a total of 1,716 mini-quad cars in pellet service with 6 x 11-inch solid-bearing wheelsets. Journal boxes had to be oiled every 15 days and lubricator pads changed every four years. The conversion was accomplished by modifying the existing side frames to accept roller-bearing inserts. The project was started in 1987, and by January 1989 720 cars had been converted (280 T-Bird, 429 Mini-quads and 11 side-dump cars). National Transportation Safety Board (NTSB) recommended in late 1988 that modified plain-bearing boxes that had been converted to roller bearing be prohibited in interchange service. The conversion program was terminated in 1989.

LOW TO HIGH AIR HOSES

All D&IR ore cars were delivered with high-mounted air hoses. DM&N initially received ore cars with low-mounted air hoses, but during 1903 DM&N moved low-mounted air hoses to high-mounted locations to make it easier for crew members to couple them together. Trucks on ore cars stuck out past the ends of cars, making the space between cars very narrow with insufficient space for crew members to connect air hoses. After 1903 the high-mounted air hoses on ore cars became standard. ■



In the days of steam thawing of frozen ore loads, workmen had to insert a steam lance into a hole in the side of the ore car. It was a labor-intensive and demanding job. This photo was taken at Proctor, before rushing the thawed loads to the dock. (DMIR photo, Richard Laurens collection)

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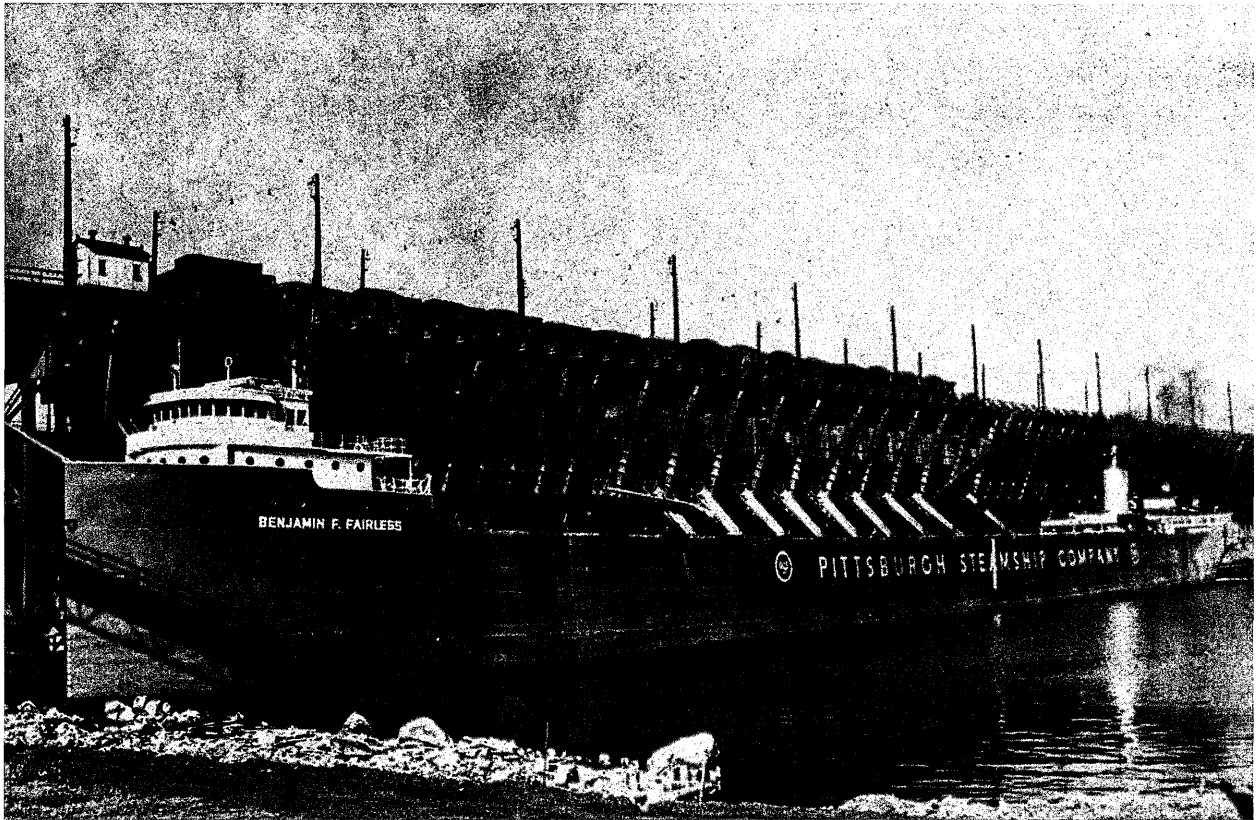
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Here is one more view of the No. 2 ore dock, with a classic Lakes ore boat, the *Benjamin F. Fairless*, alongside. Loading chutes are down as cars on the dock discharge ore. As the large lettering on the ship's side proclaims, the *Fairless* was part of U.S. Steel's Pittsburgh Steamship Company fleet. (Wayne C. Olsen collection, courtesy Richard Laurens)

The text of this book is set in a modern digital version of Caslon, the widely used face designed by William Caslon in London about 1720, and one of the great typefaces of the Western world. The version used here is Adobe Caslon, created for Adobe Systems by Carol Twombly in 1989, faithfully following the original Caslon specimens at the St. Bride Printing Library in London. This is widely regarded as the finest digital Caslon.

The titling face is Evogria, a strong, assertive and highly visible font designed by Situjuh Nazara specifically for headlines, posters and other display applications. It first appeared about 2004. He has designed dozens of free and commercial typefaces in the last decade, under the name 7NTypes.

U.S. History / Railroads

DULUTH, MISSABE & IRON RANGE EQUIPMENT, 1883-2004

Daniel P. Holbrook

As with any railroad, the freight and passenger equipment of the Duluth, Missabe & Iron Range was the lifeblood of its work. The railroad is famous for its traffic in iron ore, but there were other major parts to its traffic also, such as pulpwood. The fleet of cars of the company, its operations, and the history behind it, are the focus of this book. But the car fleet only makes sense in terms of the industries the railroad served, and a rich trove of information on that subject is here too.

The author presents more than 350 photos and graphics, most never before published, to show the appearance of a wide variety of these cars. The company traffic information also fills a gap in our knowledge of railroad history, having no prior presentation at this level of detail.

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