The post war refrigerator car—a brief history: Pt. II

The varied needs of frozen food and fresh food shippers leads to the development of different types and sizes of railroad refrigerator cars/**Dave** and **Jennie Lambert**

RAILFAN & RAILROAD COLLECTION

A long string of loaded PFE reefers bound for eastern markets is led over the Sierra Nevada mountains by a giant SP 4-8-8-2 cab foward.

In Part I, we briefly reviewed the history of the refrigerator car, watched its agonizingly slow rate of development and the deterioration of the car fleet during the Depression and World War II. A belated attempt at standardization came from the United Fresh Fruit and Vegetable Association, a shippers organization.

Now we'll see that not only finances and material shortages hampered the railroads and car lines, but also a growing schism developed among the various shippers as to the most desirable refrigerator car type.

The frozen food shippers pressed hard for 50-foot, heavily-insulated cars with overhead bunkers. Meanwhile, the UFF&VA steadfastly insisted on the 40-foot, end-bunker, ice-activated, fan-equipped car. By 1948, the schism was complete—the frozen food people broke with the UFF&VA and sped off to pursue their own agenda.

Overhead bunkers (OH) cars loomed large twice in the annals of refrigerator car history. The Tiffany patent cars first sported an overhead bunker, but the Moore patent car of 1910 was the first claiming their OH system both scientific (a popular buzz word in the early 20th century) and economical.

The Moore patent car combined refrigeration, ventilation and heating capacity. Its construction paralleled that of a conventional refrigerator car except for its OH bunker and 1½″ of live airspace in sides, ends, floor and ceiling instead of the usual dead air (insu-

Table 6: Moore patent refrigerator cars—December, 1917

Owner	Road numbers	Number of cars
Chicago, St. Paul, Minneapolis & Omaha	8500-8598	48[1]
Chicago Great Western	30000	1
Duluth, Messabi & Northern	5009-5084	75
Duluth & Iron Range	8000-8031	32
Great Northern Railway	54895-54899	5
	54900-54999	100
Minneapolis, St. Paul & Sault Ste Marie	11000-11026	12[1]
	11179-11278	100
	70000-70198	100[1]
	Total:	473

Notes: [1] even car numbers only.

used half the ice of a conventional end bunker car to produce equal refrigeration. The Soo Line, CGW, DM&N and D&IR, cold weather railroads all, successfully ran fleets of these cars.

However, the Great Northern experienced a rockier road with its Moore patent cars. On Jan. 4, 1916, Ralph Budd, soon to be president of the GN, received a memo from his car superintendent which stated:

"The principal objections to the Moore car are the overhead bunkers, which limit the clearance and also makes (sic) the likelihood (sic) of leak-

lation) space. This live air space connected to the interior of the car by a ¾″ slot in the lining of the car about four inches above the floor, and to the icebox at the top of the car. The purpose of the live air space is to "...surround the contents of the car with a wall of cold or warm air..." depending on whether the contents are being heated or cooled.

Six hatches serviced the ice box, directly beneath the roof in the center of the car.

A "scientific" selling point for the Moore patent system claimed that it kept lading drier, hence fresher, than end bunker cars. Positive circulation, in theory, accomplished this. Warm, moisture-laden air rose in the live air space only to encounter the ice in the overhead bunkers. There, the moisture condensed on the ice and was washed away along with any airborne pollutants and obnoxious gases with the melted ice down one of four bunker drains.

These cars claimed 20 to 25 percent greater cargo-carrying space than end bunker cars with only a 1½ to 2 inch higher center of gravity. The Moore car

SMITHSONIAN COLLECTION: PULLMAN CO., PULLMAN IL, DECEMBER, 1889

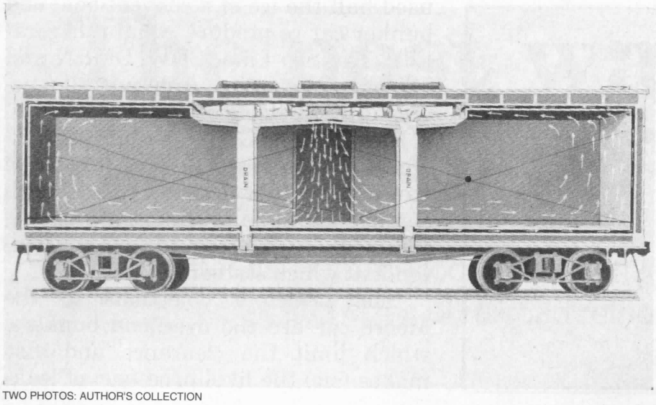
Minneapolis Stock Yards & Packing Co. No. 110 (*above*), one of ten built by Pullman in the winter of 1889, is a second generation Tiffany car. Note the unusual distance between the car eaves and the top of the car door —usually a telltale sign of overhead bunkers. Soo Line No. 11006 (*below*) was a Moore patent car. Note the six roof hatches, the heater chimney (and its hatch guard) and the underslung heater. Why this car was equipped with a signal pipe—a characteristic of passenger train equipment—is not known.

AUTHOR'S COLLECTION

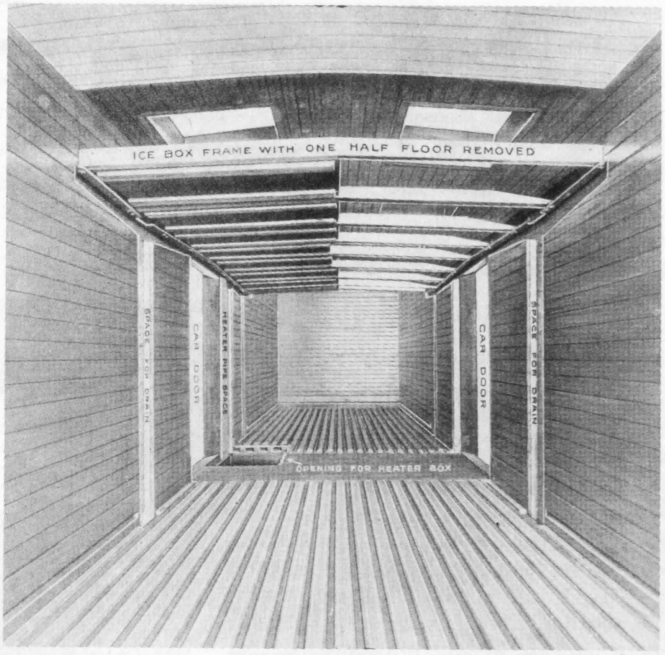
Table 7: Frozen food shipments loaded on the GN July 3, 1952

Year	No. of cars
1938	128
1939	258
1940	383
1941	509
1942	596
1943	618
1944	826
1945	955
1946	1,223
1947	1,092
1948	1,387
1949	1,684
1950	1,775
1951	2,012

The post war refrigerator car



TWO PHOTOS: AUTHOR'S COLLECTION



A schematic diagram of the Moore patent car in the refrigeration mode is shown (*above*). Cold air cascades out of the two 5″ × 22″ port holes in the bottom of the overhead bunker, displacing warm air and "malodorous gases" upward to be cleansed and cooled in the overhead bunkers. Air also circulates in the live air space. A cutaway of the Moore patent ice box (overhead bunker) showing the channels for the ice drains and the heater exhaust pipe (*right*). Note the hole for the heater box. Although not stated in the drawing, the ice box ends have also been removed for clarity.

age on the lading of the car greater. Then the center of gravity of the car is higher and more particularly so with empty cars that have ice in the bunkers."

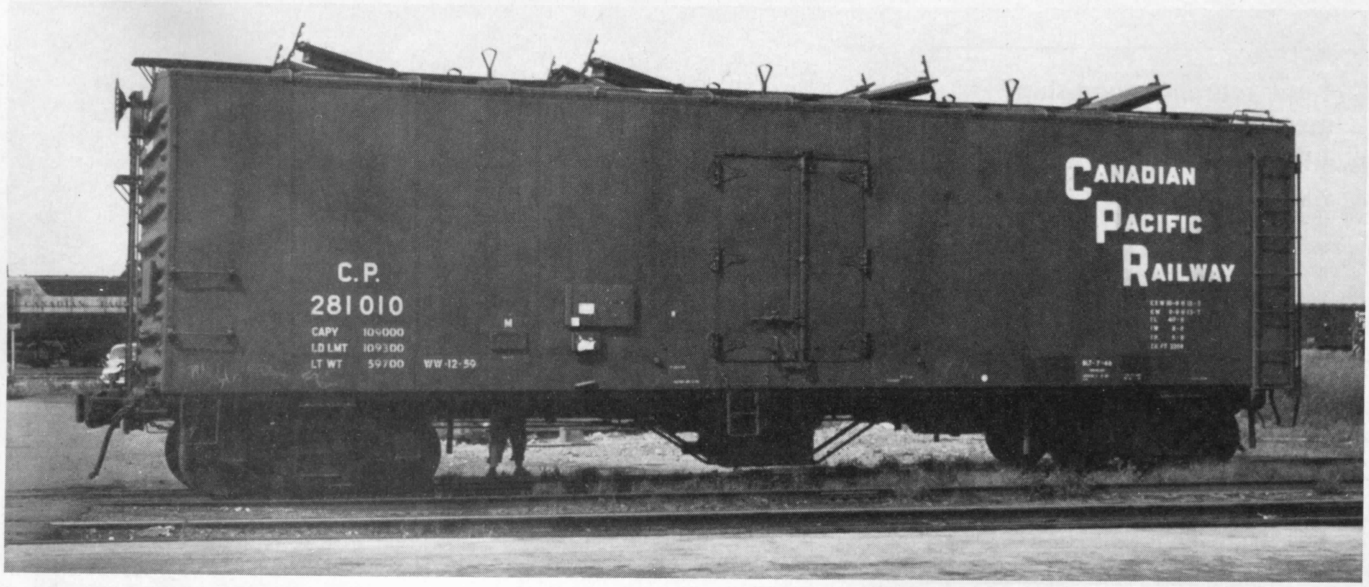
The GN complained about high moisture in the car, perforations occurring in the ice pan and generally greater difficulty in icing. By 1916, the GN was gravely disappointed with its 105 cars and declined to order any more refrigerator cars in the Moore configuration. The Moore patent cars, GN 54895-54899 and 54900-54999 eventually passed to the Western Fruit Express Company, and carried the same numbers with WFEX reporting marks, upon its formation on September 1, 1923.

By late 1924, WFE had seen all they wanted to see of the Moore system and scrapped the Moore hardware. A WFE memo written in 1939 gave the reasons for the discontinuance of the company's dalliance with the OH bunker cars. They were not as efficient as end bunker cars, were difficult and expensive to maintain, had a tendency to top-heaviness, and were prone to lading damage from leaking overhead bunkers or from condensation on the undersides of the bunkers. There the matter rested in the Associated Companies and most other refrigerator lines for the next 15 years.

Overhead bunkers, however, was an idea that would not die. In the late 1930's, American railway mechanical engineers studied the notable success of the Canadian Pacific's 50 OH bunker cars, CP 289940-289989. PFE and FGE were particularly interested. The engineers reasoned that the newer, rigid steel frame car bodies could remit some of the past sins of the

Canadian Pacific 281010, built in 1946 by National Steel Car Co. of Hamilton, Ontario, is similar to its 1930's-built sisters—the cars that rejuvenated the interest in overhead bunkers among US railway mechanical engineers. Note the eight overhead hatches and the uniquely Canadian underslung heaters. This car and its 3,000 CP sisters were all brine tank cars, fitted with beef rails.

CP RAIL CORPORATE ARCHIVES



A partial listing of AAR refrigerator car types

Class RB: Beverage, ice water or vinegar refrigerator, similar in design to a bunker refrigerator, except that it is not equipped with ice bunkers and with or without ventilating devices.

Class RBL: A car similar in construction to an RB type car, but equipped in addition with loading or stowing devices.

Class RDC: Solid carbon dioxide refrigerator. A house car equipped with insulation with or without a means of ventilation and provided with a system of refrigeration in which solid carbon carbon dioxide is the primary refrigerant.

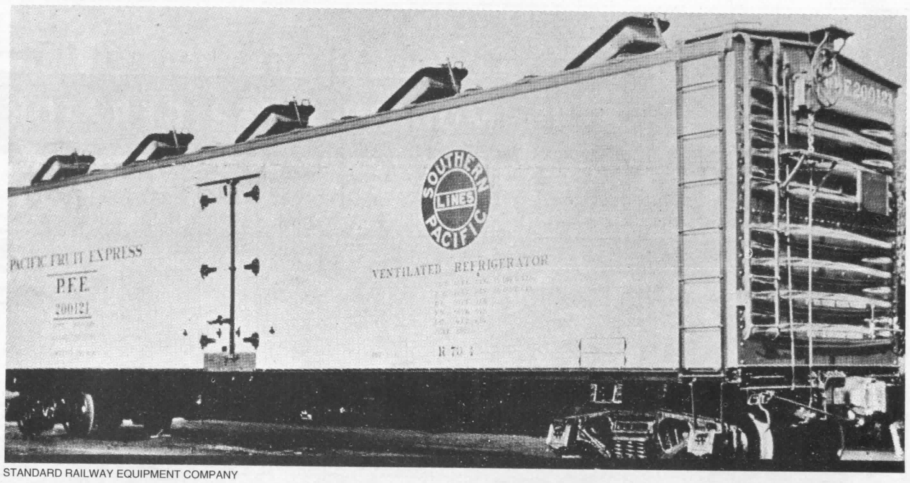
Class RP: Mechanical refrigerator. A house car equipped with insulation, with or without means of ventilation and provided with apparatus or other device for furnishing protection against head and or cold. Apparatus operated by power generated inside the car (not through car axle).

Class RS: Bunker refrigerator. A fully insulated house car equipped with ice bunkers. Designed primarily for use of chunk ice and with or without means of ventilation.

Class RSM: Bunker refrigerator, similar to RS type, but equipped with beef rails.

Class RA: Brine tank refrigerator. A house car equipped with insulation and brine-tanks. Designed primarily for the combined use of crushed ice and salt and usually without ventilating devices. Used chiefly for meats and packinghouse products.

Class RAM: Brine tank refrigerator, similar to RA but equipped with beef rails.



STANDARD RAILWAY EQUIPMENT COMPANY

PFE No. 200121 was one of five R-70-4 Class reefers turned out from PFE's Los Angeles shops in 1940. Internally, these cars closely followed Canadian overhead bunker practice. Americanized, it had steel ends and plywood sides. Five of its ten roof hatches are visible.

OH bunker configuration.

On July 1, 1941, the FGE Board gave its blessing on the construction of 700 40-foot cars (200 of which were to be OH bunker-equipped) and 200 50-foot cars, all of which were to be OH bunker cars. FGE was responding to the heat from its growing frozen food customer base, particularly shippers of frozen citrus juice concentrate. Unfortunately, the Office of Defense Transportation (ODT) forced the postponement of most of that car construction, but on October 21, 1946, FGE had 210 OH bunker cars in its fleet.

Still, problems persisted with the OH bunker configuration. It cost more and took longer to ice and service the overhead bunker cars. A WFE memo dated May 22, 1946, reported on an OH bunker car move from Mobile, Alabama, to Harlem River, N.Y.:

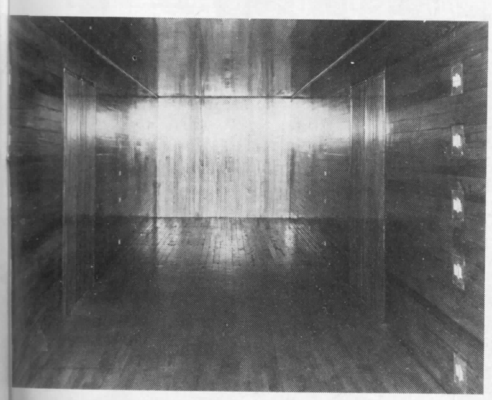
"It was observed that the time required for icing the OH bunker car was considerably more than that required for the standard, end bunker car. This was because the OH bunker car has ten bunkers with a top-to-bottom clearance of only 12-14 inches, and the ice (carefully cut to 50-pound chunks) had to be placed in the bunkers by hand and carefully pushed back under the roof of the car with a pike pole in order to utilize the available ice storage space provided by these shallow bunkers."

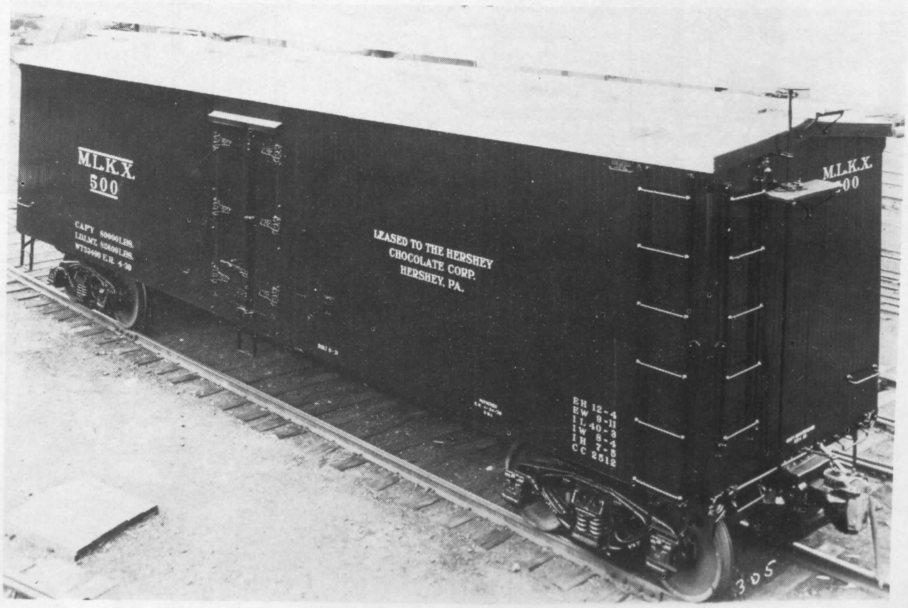
The initial icing of this car—four tons—required 24 minutes using five men; one man cutting ice and two each on the platform and at the bunkers.

The standard, end-bunker car was initially iced 3¼ tons by four men in

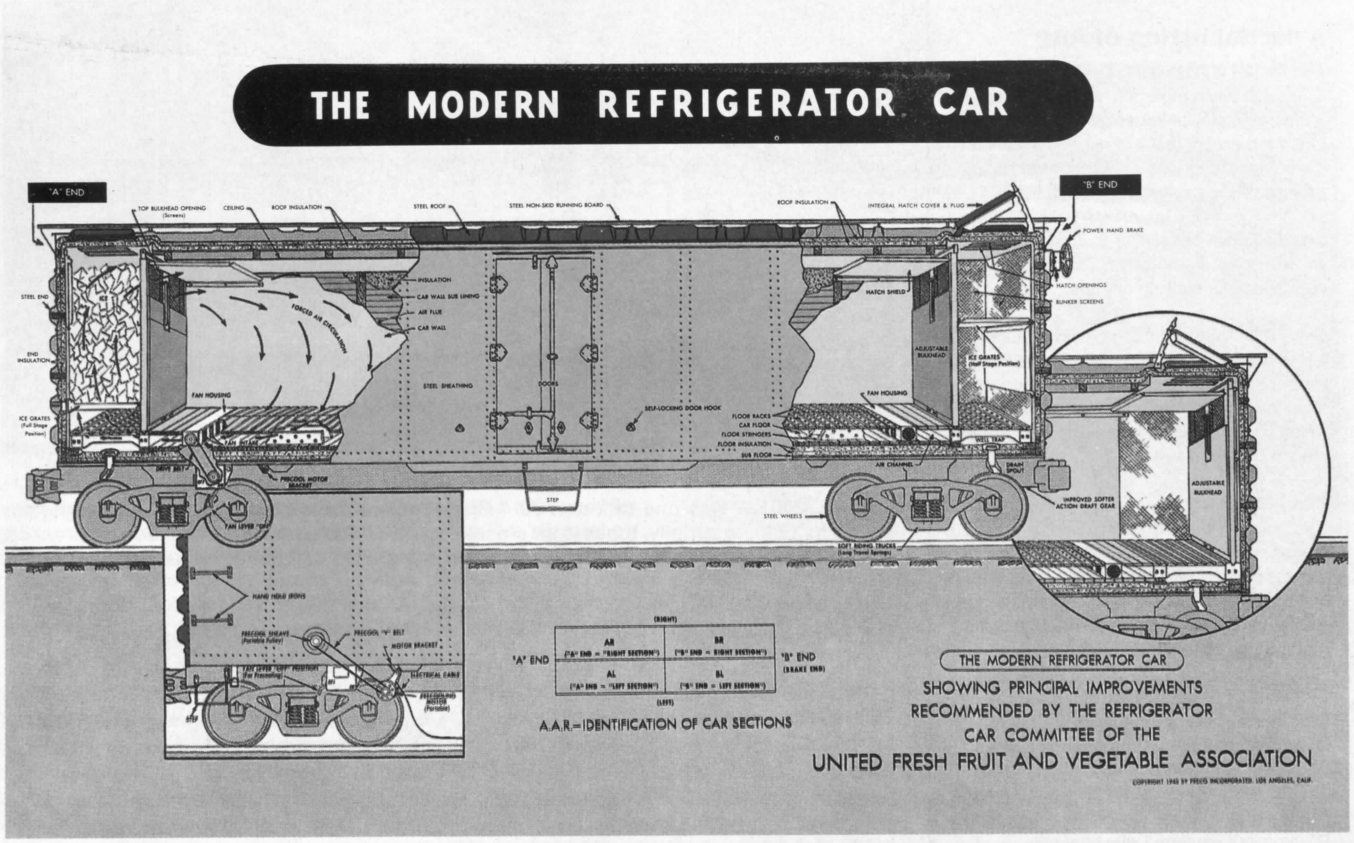
Milk Products Refrigerator Line, a subsidiary of Merchants Despatch, leased 28 cars in the series MLKX 500-528 to Hershey Chocolate Corp (*right*). Note that the ice hatches have been sealed. Originally built as a Class RS (ice bunker), it was converted to Class RB in April, 1939. Note the absence of ice bunkers and floor racks in the interior view of MLKX 500 (*below*).

TWO PHOTOS: DSI: E. ROCHESTER, NY; APRIL 25, 1939

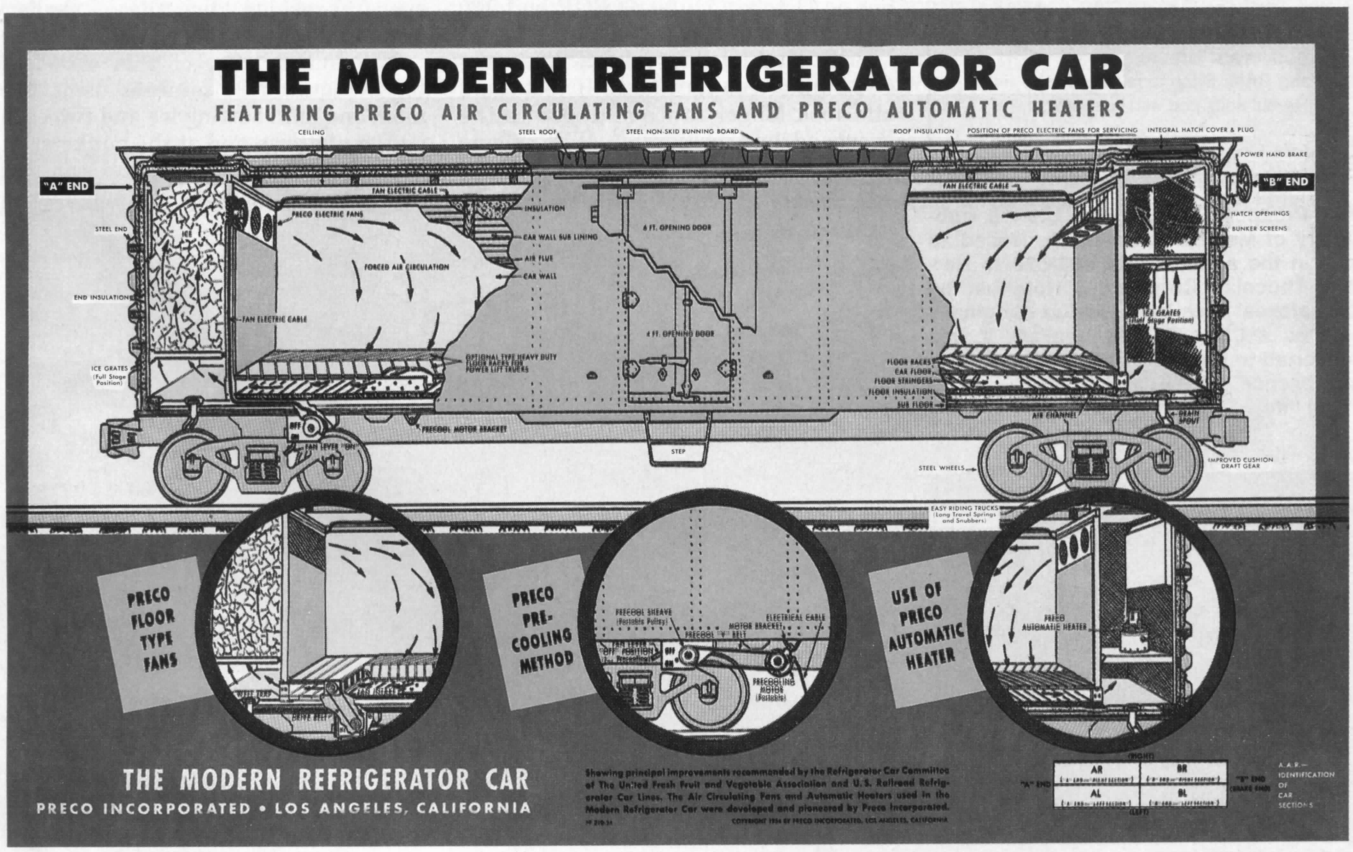




Post war refrigerator cars



These two diagrams show how the Preco fan systems work. The 1948 poster (*above*) shows the mechanical fans located beneath the floor in front of the ice bunkers, while the 1954 poster (*below*) shows electric fans mounted at the top of the ice bunker walls.



Review of the principal features of the modern refrigerator car

The following is how fresh fruit and vegetable shippers viewed the features and benefits of the modern refrigerator car (from the 1948 UFF&VA Yearbook):

1.) Standardized Dimensions: Uniform inside dimensions will make it possible to improve loading methods—to standardize containers and loading methods.

2.) Adjustable Bulkheads: make it possible to load from end-to-end without wasted space. Adjustable bulkheads give greater floor space to shippers whose perishables are shipped under top icing alone. It also assists the railroads and car lines when they handle packaged goods on the return haul.

3.) Half-Stage Icing: Pertains to cars equipped with an adjustable grate which permits movement from its normal low (full-stage icing) position to about mid-height of the bunker (half-stage icing). This allows for lower icing charges for those perishables that safely can be carried with much smaller quantities of ice.

An important additional benefit is the reduced time and cost of removing ice from full bunkers in the cold weather months.

4.) Steel Cars versus Wood: Steel has been substituted both for the car's exterior sheathing and the framing. Steel provides better protection to the insulation and rigidifies the car (allowing doors and ice hatch plugs to seal tighter).

5.) Trucks and Draft Gears: Long-travel springs and concentrically-ground steel wheels provide a much smother ride and allow for higher operating speeds.

Similarly, softer-acting draft gears give smoother action and less jarring to the lading.

6.) Insulation: The new cars have a minimum of 4-inches of insulation, greater protection from moisture and more secure attachment of the insulation to the car framing.

7.) Side Wall Flues: An additional lining in the new cars, flues are designed to keep the lading away from the side walls. They open beneath the floor racks and permit of greater cold air circulation around the lading.

This innovation makes it possible to ship perishables into extreme low temperature territories with less danger of freezing from contact with cold side walls. Obviously, the opposite in extreme hot weather conditions is also true.

8.) Improved Floor Racks: New design floor racks of both wood and steel are designed to improve cold air circulation and the load-bearing capabilities of the rack. The floor rack stringers are perforated to permit free passage of air in all directions under the load.

9.) Forced Air Circulation: Considered the greatest improvement of all, forced air circulation by means of mechanical or electrical fans is described in detail in a sidebar last month's installment.

10.) Pre-Cooling: By attaching a portable motor at the loading platform or in the field, cars may be pre-cooled.

five minutes.

Maintenance on the OH cars cost more because their bunker construction required four to five times more galvanized iron in contact with water or brine than did the standard end bunker car.

Imagine trying to focus on the demands of the UFF&VA for a 40-foot RS car in 1945-46 when you have in your files a letter from a customer like the one dated September 1, 1941, from Mr. A.E. Huff, Manager of Warehousing and Transportation for the Frosted Foods Corporation, to E.J. Roth, General Manager of FGE:

"We have definitely concluded from our study of these tests (Test Report 330-12 involving SFRD 5068, a heavily-insulated 50-ft car with Preco fans and FGE 605, an experimental 50-ft OH bunker car. Both cars carried frozen fruits and vegetables from Hillsboro, Oregon to Jersey City. The data seemed to indicate that the OH bunker car maintained a lower, more even temperature than its fan-equipped rival.) together with other tests made in connection with the use of overhead bunker cars that this particular type of car is the one actually needed in our business. We are looking at this not only from the standpoint of efficient refrigeration but also from the standpoint of the quantity of merchandise we can ship at one time."

The letter went on to say that "oversize" (that is, 50-foot length) cars were practical for run-through loads such as the coast-to-coast frozen food shipments typical of that business. What's more, this opinion "...was universally shared..." among frozen food shippers.

The car lines' own data tended to confirm this. A memo dated October 1, 1949, from the president of WFE to his counterpart at the Great Northern indicated the "...demand for 50-foot refrigerator cars suitable for handling frozen foods is increasing. Present ownership of the three companies [in the FGE pool] ...is inadequate to meet requirements... Shippers of frozen food in [Great Northern] territory object to using 40-ft cars. In other sections of the country, the preference is also for 50-foot cars..."

So, clearly, the UFF&VA was not the only heavyweight, or even the first, to makes its feelings emphatically known to its transportation supplier. During the war, these voices were muted, but shortly after the cessation of hostilities, they were back with a vengeance. The argument over OH bunkers and 50-foot car lengths vs. end bunker, fan-equipped 40-foot cars became the basis for the irreconcilable differences between the fresh fruit and vegetable people and the frozen food interests.

Table 8: Associated Companies (FGE pool) frozen food service cars—October, 1949

	Number of cars	Inside length	Heavy insulated in total
FGE	200*	50-ft.	73
WFE	100	42-ft.	100
BRE	29	42-ft.	29
Total:	**329**		**202**

*Overhead bunker cars

Most UFF&VA members were small shippers and the concerns of those members were clearly reflected in John Kelley's words and actions. Small shippers would be forced to load mixed cars or less-than-carload lots in the 50-foot cars—an obvious freight charge handicap. Hence, the UFF&VA's insistence on the 40-foot RS car.

Mr. Kelley addressed the International Apple Association Convention in Chicago on August 13, 1946. He told the apple growers that there were then about 300 frozen food shippers in the U.S. Many were small operations with tiny "hold rooms" that needed the 50-foot cars to move their product quickly. The "giant car" (UFF&VA's derisive term for 50-foot car) was not wanted by a majority of Mr. Kelley's members.

Mr. Kelley then threw down the gauntlet by concluding (remember, this is August, 1946): "...and we may therefore find it advisable to abandon our attempts to design our all-purpose car in such a manner as to satisfy the frozen food industry also."

While wringing their hands watching the fresh fruit and vegetable interests tossing barbs at their frozen food counterparts—and vice-versa-over the "standard car," railroad and car line

Post war refrigerator cars

Table 9: Cars owned January 1 of each year

American Refrigerator Transit Co.: reporting marks ART, AMRX, ARTX

Year	Class RS	Class RB	Class RSM	Total Cars*
1941	9,642	21	89	9,852
1942	9,703	31	143	9,976
1943	9,690	32	143	9,964
1944	9,650	27	141	9,917
1945	9,709	31	137	9,975
1946	9,740	30	174	10,043
1947	9,479	30	169	9,790
1948	10,455	29	162	10,761
1949	11,358	27	152	11,622
1950	10,734	58	183	11,029
1951	9,706	89	135	9,940
1952	8,987	67	297	9,297
1953	8,956	44	297	9,297
1954	8,687		297	9,588
1955	8,729	144	296	9,771
1956	8,666	144	278	9,681

Burlington Refrigerator Express: reporting marks BRDX, BHIX, FWDX, MNX, CX

Year	Class RS	Class RB	Class RSM	Total Cars*
1941	1,982			2,012
1942	2,067			2,097
1943	2,064			2,094
1944	2,053			2,083
1945	2,227			2,257
1946	2,210			2,240
1947	2,119			2,149
1948	1,987			2,018
1949	1,857			1,887
1950	1,897			1,927
1951	1,792			1,822
1952	1,971			2,001
1953	1,963		30	2,017
1954	1,659		30	1,733
1955	1,548		30	1,619
1956	1,412		30	1,482

Fruit Growers Express Co.: reporting marks FDEX, FGEX, NX, FOBX, FCEX, FHIX, CSNX, MNX, RBNX

Year	Class RS	Class RB	Class RSM	Total Cars*
1941	14,904	30	109	15,713
1942	14,935	7	15	15,770
1943	14,930	30	138	15,793
1944	14,826	30	138	15,680
1945	14,701	29	169	15,621
1946	14,582	54	173	15,587
1947	14,077	51	185	15,168
1948	12,260	47	173	13,397
1949	11,963	50	161	13,053
1950	11,621	98	272	12,860
1951	11,438	184	357	12,794
1952	11,539	?	?	11,825
1953	11,463	540	252	12,963
1954	11,090	1,019	?	12,540
1955	10,857	1,517	?	12,904
1956	10,611	1,511	?	13,053

Merchants Despatch Transportation Co.: reporting marks MDT, ABRX, BACX, ERDX, LRX, MERX, ABRX, BACX, DICX, HCX, HIDX, RFPX, APPX, DUFX, MLKX, QMRX, NPMX

Year	Class RS	Class RB	Class RSM	Total Cars*
1941	11,992	402	329	12,852
1942	12,040	342	438	13,021
1943	11,840	371	439	12,785
1944	11,645	347	439	12,564
1945	11,335	188	436	12,112
1946	10,778	156	414	11,515
1947	10,456	147	406	11,193
1948	10,022	126	395	10,744

Merchants Despatch Transportation Co. (continued)

Year	Class RS	Class RB	Class RSM	Total Cars*
1949	9,936	79	357	10,571
1950	9,101	50	331	9,741
1951	9,331	37	353	9,979
1952	8,536	250	307	9,375
1953	9,081	149	331	9,843
1954	7,274	245	361	8,236
1955	6,691	340	406	7,759
1956	6,834	373	408	7,960

Northern Refrigerator Car Co.: reporting marks NRC, NHIX, HGFX, NCGX

Year	Class RS	Class RB	Class RSM	Total Cars*
1941	3,725		147	3,968
1942	3,812	3	233	4,125
1943	3,818	1	245	4,121
1944	3,719	1	260	4,037
1945	3,621	1	302	3,979
1946	3,536		287	3,872
1947	3,867		277	4,119
1948	3,560	5	275	3,853
1949	3,321	5	272	3,606
1950	3,142	4	270	3,422
1951	3,420	2	268	3,692
1952	3,343		266	3,609
1953	3,343		266	3,609
1954	3,143		264	3,407
1955	3,192		264	3,934
1956	3,442		239	4,103

Pacific Fruit Express Co.: reporting marks PFE

Year	Class RS	Class RB	Class RSM	Total Cars*
1941	35,857	5	70	35,947
1942	36,009		78	36,102
1943	35,990		78	36,083
1944	35,823		123	35,971
1945	35,680		123	35,833
1946	35,319		172	36,521
1947	35,971		271	36,272
1948	38,940		260	39,240
1949	37,274		266	37,580
1950	38,317		232	38,589
1951	37,214		188	37,442
1952	38,355		171	38,565
1953	38,274		171	38,484
1954	38,196		53	38,425
1955	37,667		36	38,312
1956	35,645		33	36,435

Santa Fe Refrigerator Despatch: reporting marks SFRD

Year	Class RS	Class RB	Class RSM	Total Cars*
1941	14,453			14,539
1942	14,400			14,483
1943	14,381	4		14,462
1944	14,323	18		14,408
1945	14,309	16		14,408
1946	14,267			14,364
1947	14,604			14,667
1948	14,575			14,636
1949	14,500			14,514
1950	14,302			14,312
1951	14,333			14,337
1952	14,517			14,521
1953	14,806			14,824
1954	14,791			14,791
1955	14,682	300		15,018
1956	14,616	400		15,251

*Total includes other classes not listed.

management was blind-sided by the canned food and beverage industry.

Except in unusual circumstances, canned foods don't require refrigeration or ventilation. They do, however, require some protection from temperature extremes. So, the canned food and beverage folks didn't need the air circulating fans and other equipment so prized by the UFF&VA. They certainly didn't need the 50-foot heavily insulated cars favored by the frozen food industry—and objected to paying for these bells and whistles.

What they wanted was a "beer car" or insulated boxcar (AAR Class RB).

In fact, by 1946, canned goods accounted for 33% of the nearly two million car loadings that year. Early that year, the Interstate Commerce Commission found it necessary to prohibit the use of refrigerator cars for canned goods and beverages. This put the railroads and car lines in a terrible bind because on January 1, 1946, there were less than 1,800 Class RB cars in the total US fleet of 136,000 cars.

The UFF&VA applauded the decision—in fact testified at the hearings before the ruling. The UFF&VA pointed out the "physics" of the situation: The average weight of a fully loaded banana car, for example, was 12-13 tons; a canned food and beverage car was 28-34 tons! This meant that cars for canned food service had to be built with heavy duty (i.e., hard riding) truck springs and draft gear. The fresh fruit and vegetable people preached exactly the opposite gospel to the railroads and car lines: Hard riding trucks were the leading cause of damage to perishable shipments.

Mr. Kelley testified that his study shows that 63% of all claims paid over the past five years (1941-46) were for "unlocated damage". He concluded that this damage came from bouncing caused by hard riding cars.

An interesting side note to this testimony is that this same study revealed that only 8.3% of claims came from temperature failure of which a mere 1.4% were attributable to refrigeration or ventilation failure. Surely, the UFF&VA concluded, this made a compelling argument for the 40-foot end-bunker car.

Superimposed over all the confusion were devastating material shortages during and immediately following World War II. The railroads and car lines responded as best they could, and as their business intuition led.

They built new cars—at a typical cost of $8,900 per each—as fast as they could be financed and rebuilt older cars—at about $5,300 each—into either fan-equipped RS or, for considerably less, Class RB cars.

So, in spite of material shortages, intra-industry bickering, unpredictable federal intervention and mixed signals from a fragmented customer base, almost miraculous progress was being made.

John Kelley reported to the troops in the 1948 UFF&VA Yearbook that the " . . . [United] Refrigerator Car Committee of your Association has successfully completed the first phase of its work—the campaign for better refrigerator cars." As evidence, he pointed to the data in Table Four (Part I, March, 1994, RMC) and Refrigerator Car Section of the AAR Car Service Division estimates that of the roughly 134,000 refrigerator cars of all types in service on U.S. railroads, 112,000 are RS types. The remaining 22,300 are packers cars or HI (heavy insulation) types, not suitable for transporting perishables. This was a hollow victory, however, as Class RS cars were indeed a growing percentage of a smaller and smaller pie.

The same source identified 25,100 fan-equipped cars with an additional 10,000 scheduled for early delivery. The goal became 600 cars a month until 80% of the fleet became the "modern" type.

Meanwhile, the UFF&VA—ever aware that the railroads and car builders needed hand holding and encouragement—inaugurated an extensive education program for the new car users. The UFF&VA wisely advised its members that the new car features cost the owners considerable money. If not properly used, warned the educational materials, the features would be neither replaced nor included in new cars.

Specifically, the United Refrigerator Car Committee's 1948 Annual Report advised members to: "...use the fan cars as fan cars; to use stage icing when it can be used to save ice and money; to use the adjustable bulkheads when body icing, instead of bunker icing, is called for and at all times to regard these new cars as valuable adjuncts to [your] business." As the centerpiece of this education program, Preco and the UFF&VA produced the drawings reproduced here. Of all the improvements shown in them, perhaps the most revolutionary is forced air circulation.

So, the net-net of all this was that the competing demands placed railroad and car line managements between a rock and a hard place when it came to allocating their scarce capital spending among customers. As we shall see, the only clear winners were the truckers.

The frozen food business

The beginnings of the frozen food industry can be traced to the observant eye of a Labrador fur trapper, Clarence Birdseye. In 1922, he witnessed a curious phenomenon. While ice fishing, he noted with satisfaction that a freshly caught fish froze instantly in the -40 degree air. Some days later, he dropped the fish into a pail of water to thaw it prior to scaling and filleting it. After a few moments, he was astonished to see the fish flip its tail and begin swimming !

To his great credit, Clarence Birdseye realized that he had unlocked one of nature's great secrets—the preservation of food by quick freezing.

In 1924, Mr. Birdseye went into the frozen fish business. His first venture was unsuccessful because the public misunderstood what Birdseye was offering—quick freezing, not cold storage.

He hung on, however, and eventually expanded beyond fish to fruit, berries and vegetables. By 1925, he had a going concern. Shortly thereafter, the Postum Company bought Birdseye's two companies-General Seafoods Corporation and General Foods Company—and renamed the lot the General Foods Corporation. Mr Birdseye was paid $2 million for the assets of the two companies and the "Birdseye" name. In addition, he was paid $20 million for the quick freeze patents. Indeed, what Postum had recognized was that the "speed-freeze" process—the key to the whole business—produced only very small ice crystals and left food cells intact.

The phenomenal growth in the production of frozen foods is reflected in the "pack" of quick frozen peas—the largest single vegetable. In 1951, the pack was 198 million pounds—a 30% increase over the previous year and 4-½ times larger than the pre-war 1941 pack. These numbers are reflected in the traffic growth on the Great Northern shown in Table Seven.

Obviously, these kind of data put plenty of pressure on the railroads and car lines to accommodate these shippers—who, by 1951 clearly demanded mechanical refrigeration (and were getting it from the truckers)!