



MULTIPLE COMPARTMENT *Tank cars*

BY RICHARD HENDRICKSON
.....

Steam and early diesel era ...

THE RECENT INTRODUCTION OF TANGENT'S 6,000 gallon three-compartment tank car model in HO scale has prompted much discussion on various Yahoo lists, a lot of it misinformed. A well-illustrated account covering the history and uses of multiple compartment tank cars appears to be overdue.



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Some basic tank car history

I'll start with a clarification: It's incorrect to describe multiple-compartment tank cars as "two dome," "three dome," etc. Though it's true that most cars with two or more domes are multiple compartment cars, a few single-compartment tank cars had two or three domes for convenience in loading and unloading. In the days when tanks were riveted, radial rivet rows securing the diaphragms between the tanks were unmistakable evidence that the tank was divided into separate compartments.

Many modelers seem to have the idea that tank cars were used primarily, or almost exclusively, to haul crude oil and petroleum products. Early in the 20th century that may have been true, with some qualifications. The development of internal combustion engines and their rapidly increasing use in automobiles, motor trucks, farm tractors, and such provided a growing market for refined petroleum products, and many oil refining companies purchased fleets of tank cars to bring crude oil to their refineries and distribute kerosene, gasoline, distillate, and lubricants to wholesalers.

It quickly became apparent, however, that underground pipelines were a more efficient and less costly way to transport both crude and refined petroleum, and the rapid construction of pipelines during the 1920s and '30s greatly reduced the

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petroleum industry's need for tank cars. This trend peaked during World War II with construction of, among others, the "Big Inch" and "Little Big Inch" pipelines from the mid-continent oil fields to eastern refineries.

After the war ended, tank cars were still used to deliver refined petroleum to local wholesalers but they were no longer extensively used for large bulk petroleum shipments over long distances.

Meanwhile, starting in the 1920s, tank car builders and leasing companies had been vigorously promoting rail transportation of a growing variety of other liquid commodities ranging from corn oil and molasses to alcohol to acids to many different chemical compounds. As early as 1931 the General American Tank Car Corporation published an entire book, "General American Tank Car Journeys," which identified literally hundreds of different commodities that were then being shipped in tank cars.

The typical tank car of the period from the teens to the 1950s was a single compartment car with a capacity of between 8,000 and 10,000 gallons, with a few larger cars of up to 12,500 gallons. Many commodities were shipped in smaller quantities, however, and smaller cars with tanks of as little as 2,000 gallons capacity were built for this purpose [1 & 2]. In addition, there were many shippers who wanted to keep smaller quantities of liquids separate but ship them to the same destination, and this led to the development of multiple compartment tank cars in which there were two, three, or more separate compartments within the same tank.

The genesis of multiple compartment tank cars

Some early multiple compartment tank cars consisted of separate tanks mounted on a common underframe [3], but it was

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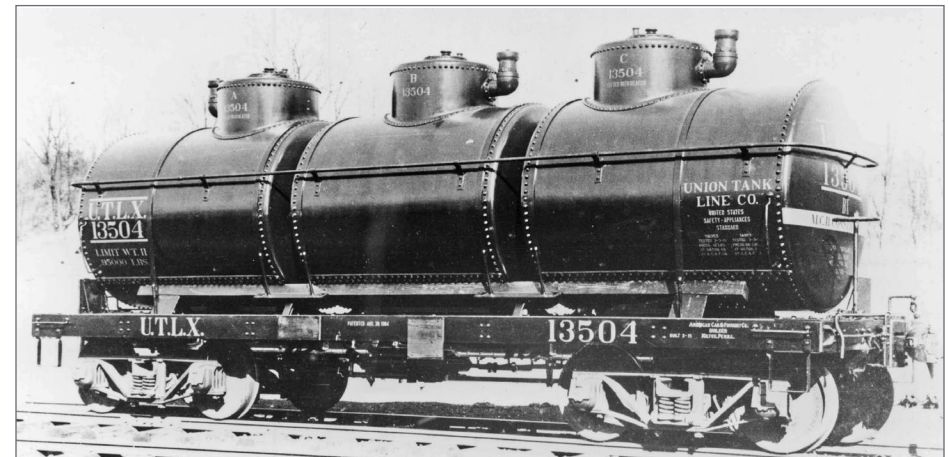
1. There were few 2,000 gallon capacity tank cars, but here is one. This acid tank car was built for the Stauffer Chemical Co. in the late 1920s and photographed at San Jose, CA in November 1956. W.C. Whittaker photo



2. 4,000 gallon tank cars were more common. This one, built by General American in January 1928, was still in revenue service when photographed at Los Angeles in the early 1970s. Note the two-horizontal-section tank, the substantial wood blocks between the bolsters and small diameter tank, and the underframe design which, with minor revisions, was later designated by GATC as the Type 30.

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quickly recognized that incorporating all of the compartments in a single tank afforded a great improvement in strength and rigidity. This was accomplished by inserting diaphragms (essentially identical to the tank ends) inside the tank, riveting them in place with air spaces between them, and placing expansion domes above each of the compartments [4].



3. Built for the Union Tank Line in March 1915 at American Car & Foundry's Milton PA tank car plant, this pioneer multiple compartment tank car consisted of three separate tanks mounted on one heavy steel underframe. It was soon realized that combining separate compartments in a single tank was a stronger and stiffer arrangement. American Car & Foundry photo, Al Westerfield collection



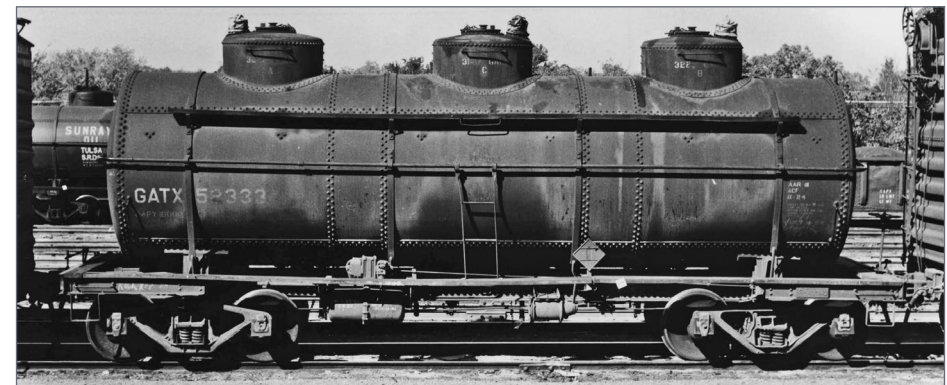
4. The Standard Tank Car Co. built this three-compartment car for the Sinclair Refining Co. in the early 1920s. Small diameter domes with elbow-mounted safety valves were common practice at that time. Note the STC underframe's distinctive bolsters. Most Sinclair cars had billboard "SINCLAIR" stenciling on their tanks, but maneuvering that large a stencil behind all the ladders on this car would have been a serious challenge.

Multiple-compartment tank cars were built in a variety of sizes from as small as 4,000 gallons total capacity [5] to as much as 10,000 gallons [6]. However, two-compartment cars were typically of 6,000 or 8,000 gallons in total size [7] and most cars of three or more compartments carried about 6,000 gallons [8].

The reaction of many HO scale modelers that Tangent's 6,000 gallon three-compartment model was too small ("cute" was one of the descriptive terms that appeared on e-mail lists) doubtless results in part from the fact that, for decades, almost the only three compartment tank car models in HO were Athearn plastic



5. Built by General American for the Cities Service Oil Co. (or one of its predecessors) in September 1928, 4,000 gallon two-compartment tank car CSOX 3906 rode on a Type 30 underframe. It was photographed at Providence RI in October 1957. Col. Chet McCoid photo, Bob's Photo collection



6. Unusually large for a three compartment car, 10,000 gallon GATX 52333 was built in August 1924 by American Car & Foundry on a Type 21 underframe. GATC certainly didn't buy it new from one of its major competitors, so it was probably acquired second hand in the 1930s when GATC purchased the tank car fleets of numerous private owners who were financially distressed by the post-1929 economic depression.

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7. Chartrand's Traffic Service of Hollywood CA purchased tank cars second (or third) hand and leased them at bargain rates. Whoever its previous owner may have been, 8,000 gallon two compartment CHAX 2821 was built by General American in February 1930 on a Type 30 underframe. Jim Gerstley collection, courtesy of Dan Smith



8. The John H. Grace & Co. owned GRYX 815 when it was photographed in the 1950s. It was built in March 1927 by the Pennsylvania Tank Car Co., a subsidiary of the Petroleum Iron Works. PTC was located right next door to the Standard Tank Car Co. in Sharon PA and installed tanks built by STC on its own underframes. Chuck Yungkurth collection

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9. This view shows a correctly scaled Tangent model next to Athearn's hugely oversize three compartment tank car model. No wonder that modelers who are familiar with the Athearn car think the Tangent model looks "too small". That Union 76 paint job on the Athearn car is entirely fictional as well. Models and photo by Tony Thompson

cars, which scaled out to more than 10,000 gallons in capacity. Though often seen on HO scale layouts, the Athearn models are grotesquely oversize and have no known prototypes [9].

In fact, by far the largest number of three-compartment cars built between 1920 and 1960 held a total capacity of about 6,000 gallons, and they were not at all rare; several thousand of them were built, and they were used everywhere in North America both by leasing companies and private owners. They carried different types and grades of motor fuels and lubricants, as well as many different industrial solvents and chemicals.

The Tangent HO scale model therefore represents the most common size of three-compartment prototype cars. Ironically, a very similar N scale model of an American Car & Foundry 6,000 gallon three-compartment tank car was introduced several years ago by Micro-Trains and I can't recall N scalers complaining that it was "too small" – but then, they didn't have anything in N scale like the out-of-scale and entirely fictional Athearn HO model to compare it with.

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A gallery of multiple compartment tank car photos

Multiple-compartment tank cars were constructed by all of the major tank car builders in the 1920s [10-13] and, in the 1930s and later, by both General American (GATC) and American Car & Foundry (ACFX). The Tangent model represents three-compartment cars built in sizable numbers between the late 1920s and the early 1940s on General American's Type 30 riveted underframes [14-19]. Similar AC&F cars were built on Type 27 underframes [20], and AC&F also built cars for Union Tank Line to Union's own X-3 design [21]. Postwar cars by both builders had welded underframes and tanks [22].



10. Built by General American in January 1926, GATX 1611 was a 6,000 gallon two-compartment car. Again, note the small diameter domes with safety valves on elbows. Oil spills like those shown here were common when cars were being loaded. This car was still in revenue service in the early 1970s when photographed at Bakersfield, CA.

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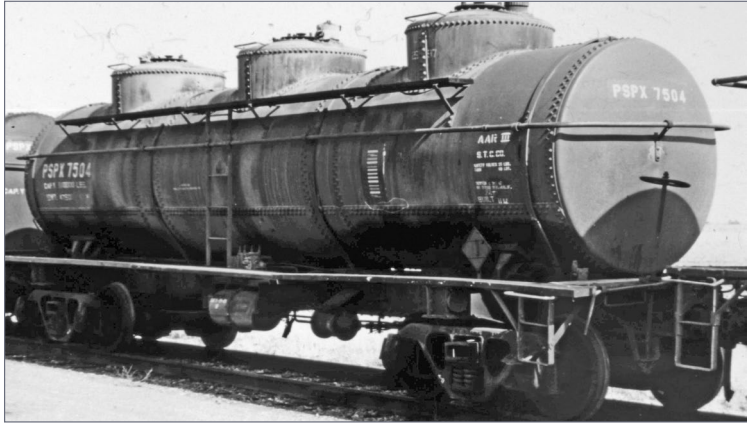


11. This 6,000 gallon three compartment car, built by General American in the mid-1920s, is seen here in the 1970s with elaborate handrails added to the dome running boards and lots of rust showing. DRDX was the reporting mark for the Duredo Co., a tank car lessor which first appeared in the late 1940s and specialized in refurbishing older second-hand cars. Duredo was a subsidiary of Chicago-based John H. Grace & Co. Lloyd Keyser photo



12. American Car & Foundry built this three-compartment 6,000 gallon tank car in May 1927 for the Cook Paint and Varnish Co. Note that, though freshly painted in the 1950s, this car still had its 5-27 reweigh date; tank cars were not required to be reweighed periodically, like other freight cars, because the shippers were charged by volume, not weight.

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13. Formerly Associated Oil Company AOX 600, this three-compartment 6,000 gallon car was built by the Pennsylvania Tank Car Co. in the early 1920s using a tank supplied by the Standard Tank Car Co. By the time this photo was taken in Avon, CA in June 1972, Phillips Petroleum has acquired the Associated tank car fleet and renumbered the cars under PSPX reporting marks. Robert A. Campbell photo



14. This is one of the prototypes for the Tangent models, a General American 6,000 gallon three-compartment tank on a Type 30 underframe. GATX 1633 was at Milwaukee WI in May 1971. Note that journal oiling was in progress, as all the journal box covers are open. Don Degner photo, J. Michael Gruber collection

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15. Built by General American in February 1929, GATX 1518 was photographed shortly after it was repainted in the GATC shops at Colton CA in August 1953. Modelers are often seduced by private owner cars with colorful paint and lettering, but the vast majority of tank cars were, like this one, "plain Jane" black with white or aluminum stenciling. Jim Gerstley collection, courtesy of Dan Smith



16. The tank was painted aluminum on GATX 1525 when photographed at Schiller Park IL in May 1968, so weathering is even more visible than on black cars. Note the mismatched trucks. Canvas covers over the domes, or safety valves, were often used when the tanks were empty to prevent the safety valves and manway covers from being contaminated. Bill Raia collection

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17. Another car owned by John H. Grace and Co., GRYX 810 was photographed on the Union Pacific in Wyoming shortly after its tank, heater coils, and safety valves had been tested in February 1972. It was loaded with a hazardous commodity, as attested by the "Dangerous" placards on the placard holders. Frank Peacock photo



18. Recently repainted, WCHX 1058 was owned by the Walter C. Haffner Co., another of the smaller tank car lessors who acquired most of their cars second hand. Built by GATC in November 1941, it was photographed at Palmer MA in October 1967.

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19. The number is illegible on this 6,000 gallon three-compartment General American car because it was in the process of being sandblasted and repainted at GATC's Colton CA maintenance and repair yard. A new wood running board had also just been installed. This car had formerly been in the service of the Crosby Naval Stores Co. of Pickayune, MS, a supplier of turpentine and other products made from pine sap.



20. This American Car & Foundry builder's portrait shows a three-compartment 6,000 gallon car built on an AC&F Type 27 underframe in April 1937 for North American Tank Line. Mechanical equipment included AB air brakes and Barber Stabilized S-2 trucks with spring planks. Hawkins-Wider-Long collection

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Three-compartment tank cars of larger than 6,000 gallons capacity were often converted from single-compartment cars by adding internal diaphragms and additional domes. This practice was especially common at General American [23] though other owners (e.g., Union Tank Line) did it as well [24]. The spotting



1936 to UTL's X-3 design. It was photographed at St. Louis MO in the early 1960s. Like many multiple compartment cars, this one had heater coils; note the uncapped outlets on the tank end. Joe Collias photo



American and American Car & Foundry immediately adopted welding for both underframes and tanks, heat-treating welded structures in huge ovens to remove stress from welded joints. Here at Hamlet NC in April 1959 is a postwar all welded GATC 6,000 gallon three compartment tank car built for the Carbide and Carbon Chemical Co. As the half-black placard indicates, this car is empty of its formerly hazardous cargo but still contains dangerous fumes. Col. Chet McCoid photo, Bob's Photo collection

21. American Car and Foundry also built this 6,000 gallon three-compartment tank car for Union Tank Line in August

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feature which always identifies such cars is that the large original center dome was left in place and the domes of the end compartments were noticeably smaller than the center dome.

Both GATC and AC&F also built three-, four-, and six-compartment insulated tank cars, many of them glass (that is, porcelain)



23. Built in November 1931 as an 8,000 gallon single-compartment car, GATX 1365 was

apparently converted to a three-compartment car less than a year later, in July 1932. Shown here as it appeared in the late 1930s, it was typical of similar conversions in that it retained its original large center dome while the outer domes were smaller with safety valves on elbows. Joe Collias collection



24. Another single-compartment car converted to three compartments was UTLX 2789, Again, the large center dome reveals

its origins as an 8,000 gallon class X-3. There was a lot of air space between the separate compartments in this tank, as evidenced by the wide space between the rivet rows securing the internal diaphragms. It was photographed at San Pedro, CA in the late 1960s.

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25. Both General American and American Car & Foundry built multiple compartment tank cars specifically to transport bulk

wine. These insulated ICC-203s with frangible disk valves instead of spring loaded safety valves were glass (i.e., porcelain) lined. Three-compartment 6,000 gallon SHPX 6326 was an example. Built in 1946, it's seen here at Fresno CA in May 1956 under lease to E. Cribari and Sons. Bob's Photo Service collection



26. Four-compartment wine tank cars were usually of about 8,000 gallons total capacity. GATX 969, built in 1937, was on lease to the Gibson Wine Co. in the 1950s with colorful Gibson stenciling on its aluminum painted tank. Jim Gerstley collection courtesy of Dan Smith

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lined for bulk wine service [25-28], and those cars were usually of about 6,000 gallons in total capacity, like the three compartment non-insulated cars. Some insulated three-compartment cars converted from single compartment cars were also used in bulk wine service [28].



27. Six compartment wine tank car GATX 410 was built in June 1939 and is shown

here just after having rolled out of General American's Sharon PA shops. Appearances are deceptive; despite its length, this car's total capacity was about 6,500 gallons. W. C. Whittaker photo

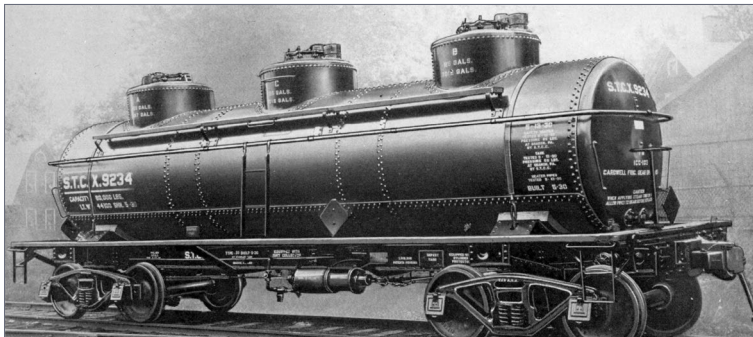


28. Some three-compartment cars that had been converted from single-compartment cars (note the larger center dome) also

had linings installed and were used in bulk wine service. Originally built in July 1930, GATX 1388, its insulating jacket painted light gray, was waiting to be loaded at Modesto CA in 1968.

The Tangent models

Tangent's first production run of HO scale 6,000-gallon three compartment tank cars includes a Standard Tank Car Co. car from the 1930s [29 and 30]. There is also a GATX car from the early '50s painted and lettered for lessor Celanese Corporation



29-30. Tangent's model of STCX 9234 is shown here along with a photo of its prototype, which was built in May 1930. The model's factory lettering is unusually sharp and complete. After the Standard Tank Car Co. was acquired by General American in 1928, Standard's tank cars survived as part of the Pennsylvania-Conley tank car line, a GATC subsidiary, until they were eventually absorbed into the GATX fleet. Tangent Scale Models photo (29) and General American photo (30).

[31] and two black GATX cars with ca. 1958 and ca. 1968 lettering [32 and 33]. The ca. 1958 model is easily backdated to the late '40s and early-to-mid '50s just by altering a few digits in the small lettering [34]. See Tangent's retail dealers or tangentscale-models.com for availability.

A pre-1945 GATX model with lines above and below the reporting marks and numbers will be in the next Tangent production run. Meanwhile, such a car can be modeled by combining Tangent's undecorated model with Black Cat's GATX decal set, the latest version of which includes the data needed for this model [35]. Black Cat decals can be purchased from larger retail dealers or, on the Internet, from Great Decals greatdecals.com or Des Plaines Hobbies desplaineshobbies.com.



31. Tangent's model representing cars leased to the Celanese Corporation in the early 1950s. Yes, the Celanese tanks really were pea green. The model has been moderately weathered and half-black "empty but hazardous" placards applied to the placard boards. Model and photo by Tony Thompson

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32-33. Tangent's models in late 1950s and in late 1960s GATX paint and lettering. Tangent Scale Models photos

The prototypes for these models were commonly seen almost everywhere on the North American rail network. They remained in revenue service from the 1930s through the 1960s and, in some cases, as late as the 1970s and '80s. At least one or two of them are appropriate on most HO scale layouts. ☑

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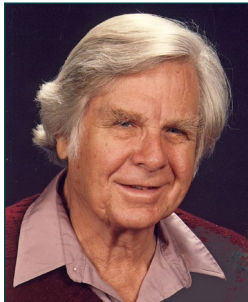
34. Tangent's late 1950s model after having been backdated by changing two digits in its reweigh date, journal repacking, and brake servicing stenciling. Light weathering, chalk marks, and destination cards have been applied. Model and photo by Tony Thompson



35. An assembled but undecorated Tangent model was painted and lettered with Black Cat decals to represent a car repainted before 1946 with lines above and below the reporting marks and numbers. Weathering includes dirty wheels with treads polished, rust stains around the tank bands, chalk marks, spillage on the domes, and rusty couplers. Model and photo by the author.

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RICHARD HENDRICKSON



Richard Hendrickson passed away on June 28, 2014; he was 83 years old. A prolific author (seven books and hundreds of magazine articles) and a prodigious researcher, he was a true expert on railroad freight cars and on his own favorite railroad, the Santa Fe. He was also a very active collector of freight car and Santa Fe photographs; his collection

of more than 30,000 images has been donated to the California State Railroad Museum in Sacramento.

In a very active life, he had driven sports cars competitively and raced International 14 sailboats, was an expert skier, and for more than 20 years had been a licensed pilot, aerobatic-qualified during many of those years, flying his own Citabria airplane.

Richard was befriended as a teenager by Santa Fe crews at Oceanside, and they even let him run steam locomotives on occasion. That initiated a life-long love of steam power and of the Santa Fe. It also led to his appreciation for prototypical model railroad operation, including one of his favorite places on the planet, the Tehachapi layout of the La Mesa Club in San Diego.

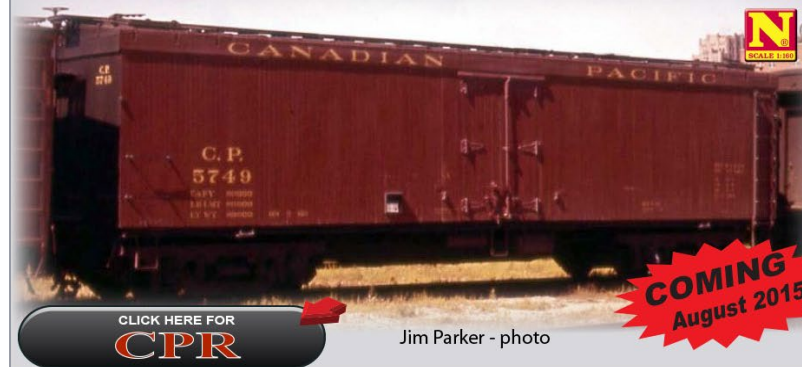
An energetic prototype modeler, he had built more than 300 very accurate freight car models, and had several more car projects on his work bench at the time of his death. He acted as a technical advisor to many model railroad manufacturers, and at one time had his own company to market kitbashed freight cars, called WestRail. Perhaps more importantly, he frequently and generously shared information, advice, and scans from his photo collection with all who asked. That may be his greatest legacy: the information and help he gave to many, many others. ■



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