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Introduction

So what constitutes a "modern" freight car? For the purposes of this book we're starting the timeline in 1960. Why 1960? For starters, that's where my earlier book, *Freight Cars of the '40s and '50s*, left off, so this book provides a natural continuation.

A better reason, however, is that although 1960 was more than 50 years ago, it was a pivotal point in freight car evolution. 1960 marks a time when cars were becoming longer and heavier. Cars with 70-ton capacity were replacing older 50-ton cars, with 100-ton cars on the horizon. Roller-bearing trucks were appearing in increasing numbers.

Changes in shipping rates were leading to development of specialized freight cars, meaning the general-service boxcar was no longer expected to carry everything. The 1960s saw the introduction or growth of jumbo covered hoppers for grain service, large bathtub coal gondolas, 86- and 60-foot auto-parts boxcars, 89-foot multi-level auto racks, 89-foot piggyback flatcars, center-beam lumber cars, and coil-steel flatcars. Tank cars were transitioning to frameless designs, larger tanks, and specialized fittings.

Car size and weight has continued to grow in the past few years, with a move toward 110-ton cars. The number of specialty cars continues to grow, while the boxcar fleet continues to shrink.

Although freight cars built in 1960 are out of service, some from the later part of the decade have been rebuilt and remain in service in the late 2010s. Car rules, which once mandated a 40-year lifespan for cars, now allow 50 years with rebuilding (more on that in Chapter 1), meaning that today you can find a mix of new cars as well as many upgraded cars from the 1970s and 1980s.

And some cars have disappeared. The 40-foot boxcar was fading away by the 1960s, as were stock cars and ice-bunker refrigerator cars (neither of which are included in this book).

Several new aluminum BethGon coal gondolas stand out in this Union Pacific train rolling across Nebraska in 2006. *Jeff Wilson*

What you'll find

The first chapter looks at how cars evolved from the 1960s through today, with a look at specific manufacturers, size and weight restrictions, and car-use rules and regulations that affect car design and operations. As modelers, this information will help you put together a realistic car fleet based on the period, railroad, and region you model.

Subsequent chapters look at specific car types, with guidelines on design, specific lading requirements, and number of cars in service. Car ownership is explained, with a look at private- vs. railroad-owned cars, the burst of shortline-owned per-diem boxcars in the late 1970s, and freight car pools such as Trailer Train flatcars and intermodal cars, Railbox boxcars, and Railgon gondolas.

Chapter 10 looks at specific components found on all types of cars, including wheels, trucks, couplers, cushion underframes, and brake components, again showing how they work and how they're used.

This book is not meant to be a complete guide to every modern freight car built. It includes information on basic spotting features and details and basic car identification, but the sheer number of cars (and variations) precludes going into excessive detail or roster information on each variation.

Indeed, there are a number of outstanding books on the market that cover specific car models. If you're looking for more in-depth information on specific cars, the bibliography on page 110 provides a good starting point.

Turn the page and we'll get started with an overview of freight cars, including car design, evolution, and manufacturers.

Acknowledgements

Thanks to the many individuals who provided photographs and information for this book, especially Tom Danneman, Cody Grivno, J. David Ingles, James Kinkaid, and Keith Kohlmann. Thanks also to the many modelers, rail enthusiasts, and historians who have authored books and articles with detailed information, statistics, and photo guides of freight cars. Their work proved invaluable in putting this book together.

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CHAPTER ONE

Freight car evolution and design

The North American freight car fleet has changed dramatically since the early 1960s. The traditional general-purpose boxcar is largely gone, replaced by an ever-increasing number of specialized freight car types, **1**. There's been growth in freight car weight limits and car size. Meanwhile, the number of car manufacturers has dropped significantly, with remaining builders producing cars on a large scale.

Most modern freight cars are specialized, designed to carry a specific lading, and unit trains (like this train of ethanol tank cars) have become common. *Jeff Wilson*

but had a unique appearance not repeated by other builders. They were 58'-11" long, 14'-8" tall, and had external side posts in a 4-3-3-4 pattern. The first order in 1960 was for 75 cars, followed by 200 additional cars (4,948-cf) in 1961-62 and 500 more (5,325-cf) in 1965. The first two orders had round roof hatches with a centered running board; the last cars were 3 feet longer and featured center trough hatches, which had become standard on all grain cars.

By the early 1960s, two companies dominated covered hopper production: Pullman-Standard and ACF. Each offered cars in multiple sizes, with several options regarding hatches, outlet bays, and number of compartments.

Both companies redesigned their cars in the early 1960s as size increased, 100-ton cars became more common, and grain transitioned to covered hoppers.

Pullman-Standard grain cars

The basic appearance of P-S covered hoppers dated back to the introduction of its all-welded PS-2 covered hopper in 1954. The car had flat sides with vertical exterior posts for strength, and was built in various lengths in two- and three-bay versions.

The key change for grain service was the adoption of a single bottom outlet gate that could dump between the rails, as opposed to earlier cars that had pairs of gates (one on each side of the center sill). The new design was termed PS-2CD, for "Center Discharge," **5**. The car still had a through center sill (a steel center sill that passed through the car), but it was angled on top to keep product from collecting atop it.

Cars of this basic design would be built until the end of Pullman-Standard in 1984, and subsequently by Trinity after it acquired P-S. Other manufacturers would also build similar cars. The key spotting features for P-S covered hoppers are the number and arrangement of vertical side posts and the height of the sides, with side sills that extend straight across the sides of the end platform.

Pullman-Standard's first true grain car debuted in 1962: a 4,000-cf version of the PS-2, which introduced the center discharge feature. The car also introduced trough-style hatches, which would become standard for grain cars (although many of these cars were also built with round hatches). These cars had tall sides and 4-3-4 post pattern.

This car was superseded in 1964 by a larger car that took advantage of the updated 263,000-pound-GRL limit: the 4,427-cf PS-2CD, 5. The early versions of this car looked nearly identical to the 4,000-cf cars, with a 4-3-4 post pattern, but the 4427 was a foot longer (50'-7") and 2" taller.

When it was realized that the tall side walls weren't needed for strength, P-S altered the design of the 4427. Starting in 1966, the low edge of the side wall was moved upward, revealing more of the angled sides of the bays, **6**. The post pattern also changed, with 13 evenly spaced side posts.

The design saved about 800 pounds of tare weight. The new cars were termed "high-side" cars, and the earlier 4427s were termed "low-side" cars.

Gravity outlet

MicroMatic (pneumatic) outlet

Hopper outlets

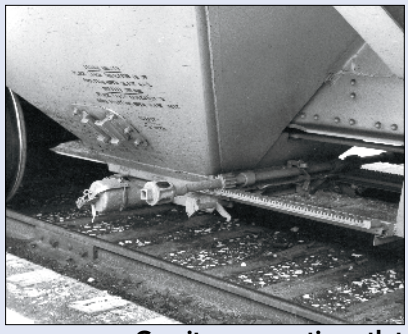
The bottom of each compartment angles toward a bay and outlet at the bottom. Early cars had pairs of outlet doors for each compartment, with a door on each side of the center sill. Starting in the early 1960s, most cars were built with single centered outlets at each location.

Outlets on each car are one of three basic types: Gravity, pneumatic, or combination gravity/pneumatic. Each has multiple variations. Grain, fertilizer, and sand cars most commonly have gravity outlets as on the Trinity car at left. Instead of doors at angles (like coal and aggregate open hoppers), these have flat plates that cover rectangular outlets. These gates use a rack-and-pinion system where a crank is turned to slide the plate out of the way, allowing the product to fall out of the opening by gravity. 24" x 30" outlets are common, but the size can vary by intended commodity.

Pneumatic outlets have horizontal pipes mounted across each outlet. On most, the hopper bottom ends in a narrower V shape at the outlet pipe; on others, like the Micro-Matic outlet on the P-S car (top right), have a boxy appearance. A hose is connected to the end of the outlet pipe for unloading, and air pressure or a vacuum is applied to force the lading out. These are used on plastic pellet cars and cars carrying easily contaminated loads such as flour, sugar, or pelletized or powdered chemicals.

A variation of the pneumatic outlet is the fluidized (or fluidized-butterfly) outlet. These apply air at the lower sides inside the outlet bay, which fluidizes the lading to make it flow more freely without having to apply internal air pressure. Yet another variation is the sparger outlet, which allows unloading in slurry (wet) form, used for many clay cars.

Combination gravity-pneumatic outlets (right) look like a standard gravity outlet, but with a horizontal pipe below the bay. They can be unloaded by either method.



Gravity-pneumatic outlet

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This two-bay, 3,250-cf car was built by Gunderson in 2014. It has a stepped sill, single-width stiffener at the roof joint, and curved notches at the ends. *Cody Grivno*

1981, and continued by Trinity when it acquired Greenville in 1986, **25**. The 3,000-cf car has 10 side posts, a drop where the sides meet the end platforms, and the slope sheets meet the ends very close to the roof. There was also a slightly larger version (3,317-cf) for clay service, which had 12 side posts.

Other builders of post-side two-bay cars included Portec, Evans, FMC, and Bethlehem.

ACF built a two-bay, 3,200-cf version of its teardrop-style Center Flow as a demonstrator in 1965, but production cars didn't appear until 1967. Common early two-bay cars included 2,700-, 2,960-, and 2,970-cf. Cars with 2,980-cf capacity appeared after 1976, with 3,200-cf cars by the 1990s, **26**.

Spotting features are the same as with larger ACF cars, including the single horizontal side stiffener on early cars, the wider corrugated seam on later cars, and a single seam on some long cars.

With the coming of 286K cars in 1995, cubic capacity has increased, with ARI still offering a similar car (with a through center sill, stepped end sill, higher side sill, and different end bracing) as with the 3,272-cf car in **27**.

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This NSC 3220 has squared-off notches for ladder mounting at each end. The sill continues straight at the end platforms. The car was built in 2006. *Cody Grivno*

By the shift to 286K cars, most manufacturers were also offering curved-sided two-bay cars, including the Trinity 3281, Thrall 3250, Gunderson 3250, **28**, and NSC3220, **29**. Most have the same basic design as the company's longer cars.

Trinity also built a 286K, 3,601-cf, two-bay aluminum car for salt service.

Plastic-pellet cars

The largest covered hoppers carry plastic (and other molding) pellets, a low-density, lightweight material used for injection-molding a variety of products. This industry has grown tremendously since the 1960s, resulting in expanding fleets of these cars.

Built by several manufacturers, plastics cars are typically four-bay cars with pneumatic outlets. They also can carry other light-density powdered, granulated, or pelletized products, and often have lined interiors to enable the product to flow more freely, or in the case of chemical pellets, protect the walls.

Among the first dedicated plastics cars was the ACF 5,250-cf Center

Among National Steel Car's latest offerings is this 6,245-cf plastics car. Note the large vertical brace centered on the end and the small notches at the top ladder rung. *Jeff Wilson*

agricultural products such as seeds.

National Steel Car began building plastics cars in 1989 with a 5,810-cf car (some are labeled 5800). The 100-ton, 67-foot car can be spotted by end cutouts that follow the slope sheet and narrow side sills compared to an ACF car. It was replaced by the 5,847 car in 1996.

The coming of 110-ton cars led to a revision of interior slope sheet angles to increase capacity to 6,245-cf, **36**. The company began offering a 6,400-cf version with the same dimensions in 2000.

Air and pressure-differential cars

Some materials don't flow as well as

This 4,180-cf, two-bay Airslide was built in 1974. The box-like cars have longitudinal outlet bays. Note the solid ends with horizontal braces and two rectangular lower cutouts. *Jeff Wilson collection*

Single-bay Airslides had open end platforms. Post-1965 cars like this 1966-built Union Pacific car had triangular end fillets, even though there was no slope sheet behind them. *Jim Hediger*

Pressureaide cars look like standard Center Flows, but with two sets of piping along the sides of the outlet bays. *ACF Industries*

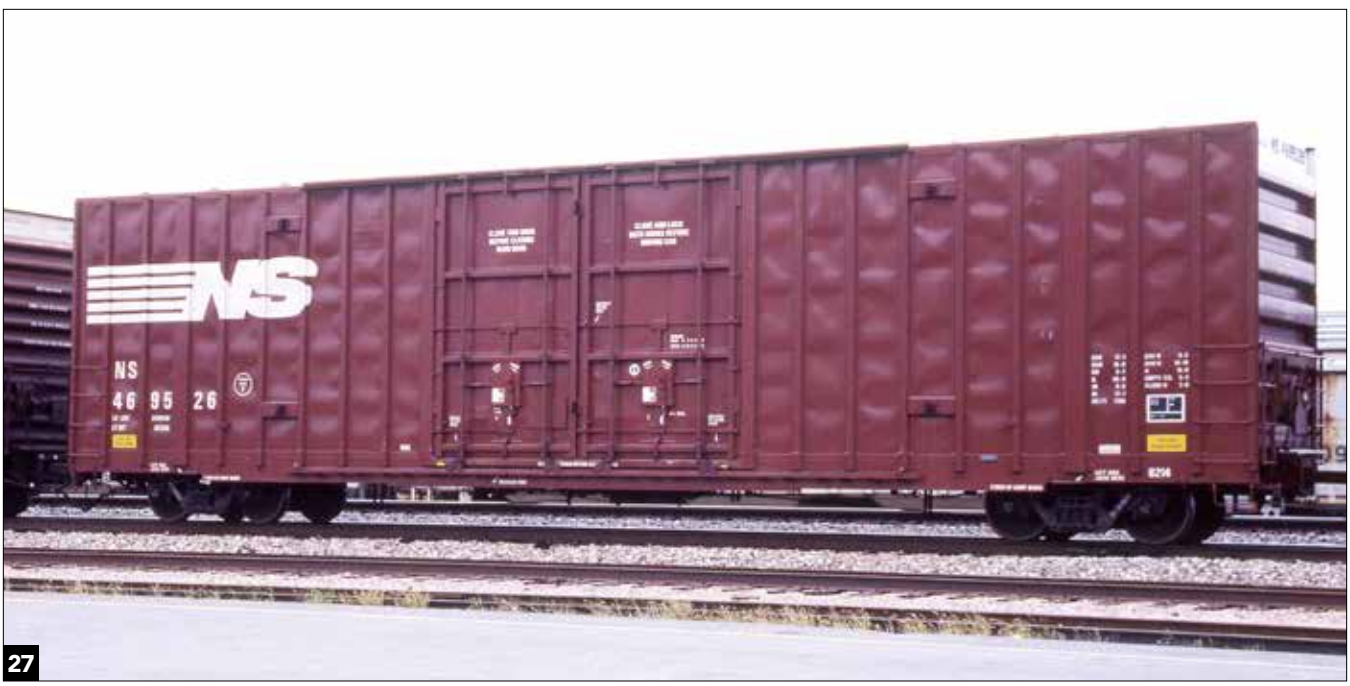
This 60-foot, waffle-side boxcar was built in the early 1970s by FMC. It has a 10-foot Superior door. It has been rebuilt and repainted by BNSF. *Jeff Wilson*

110-ton cars

The trend for new boxcars has been toward 110-ton (286K GRL) cars. As of 2018, about half of all boxcars in service are 286K cars, and all new boxcars delivered since 2001 have been 286K cars.

High-cube cars have become the de facto standard, popular for paper, auto parts, and other types of service, **27**. Along with railroad-owned cars, continuing the Railbox tradition of pool cars are two types of 286K cars managed by TTX with FBOX and TBOX reporting marks. These began arriving in 2003.

The FBOX, **1**, is a high-cube, 50-foot (Plate F) boxcar with a single 10- or 12-foot plug door on each side. They have been built by NSC, Johnstown America, Gunderson, and



Gunderson built this 60-foot (68-foot outside length), excess-height car for Norfolk Southern in 1997. It has two 8-foot plug doors. *Jeff Wilson*