

'Streets for O-Gauge **MODEL RAILROADS**

A Guide to Operable Model Roadways
on O-Gauge Toy Train Layouts



H Lee Willis

'Streets for O- Gauge Model Railroads

**A Guide to Making Operable
Model Roadways Work Well on
O-Gauge Toy Train Layouts**

H. Lee Willis

Downloadable version

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Cary, NC

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Preface

In 2004, I returned to O-gauge railroading after several decades of working on other scales. As I planned the new train layout I hoped to enjoy into my retirement, I decided it would be fun to add operating cars and trucks to run alongside my toy trains. Moving road traffic would provide more activity for friends and visitors to watch and enjoy, and most important, create interesting, fun projects and model-making opportunities for me. I tried slot cars, and they nearly worked out, but they did not quite do everything I thought was needed on a model train layout.

I discovered K-Line's new SuperStreets product line quite by accident while visiting my local hobby shop. I bought a ready-to-run set and within a short time determined it was just about everything I wanted: no-hassle roadway that one could fit onto a layout in and around existing train tracks, and durable, trouble-free vehicles that would run at realistic scale speeds for hours on end. I quickly added more road and vehicles to that first set and fit SuperStreets in among my toy trains, layout accessories, and scenery. I was hooked.

That layout lasted only two-years – just enough time for me to realize all its shortcomings and decide how the next layout would be so much better. It was also enough time for me to learn, sometimes through bitter experience but often through deliberate, studied experimentation, about 'Streets and how to make it perform the way I wanted. Despite my enthusiasm – then and now – my second layout included far more

train track than 'Streets roads. After all, it was a *toy train* layout. But despite a nearly two-to-one ratio of track to roads on my layout, I think 'Streets accounts for at least half the fun. It is, frankly, a bargain from a bang-for-the-buck standpoint.

Regardless, I have continued to operate and experiment and have learned a lot about 'Streets and how to use it in the past ten years. This book is my attempt to share what I have learned with fellow model train enthusiasts. I hope readers will find this book interesting and useful and that they will build their own versions of 'Streets on their layouts.

This book focuses on the basics: what 'Streets is, what it is not, where it has quirks and strengths, and how to fully utilize it on a layout. A companion volume, *Modifying and Scratch-Building 'Streets Vehicles*, discusses pushing beyond what the manufacturers offer to make modified and scratch-built vehicles including buses and tractor trailers. In determining what goes in this volume and what goes in the other, I used two simple tests. First, if it is needed for or helps improve the use of the standard commercial products, I have included it here. Second, if it involves any disassembly and cutting of a vehicle body or chassis, or soldering in new parts inside vehicles, it goes in the other book.

'Streets, spelled with an apostrophe in front of the word *Streets*, is the term I use to refer to both K-Line's original SuperStreets product line and its current reincarnation, E-Z Streets from

Williams by Bachmann. Whatever else 'Streets is, it is surely unique in decade years on the market. It was never sold by more than one company at a time, but it was sold in turn by three different companies: K-Line, its creator; Lionel, who marketed it from 2007 to 2011; and now Williams by Bachmann.

But regardless of who makes it and what it is called—SuperStreets, E-Z Streets, or 'Streets—it is perfectly attuned to the spirit and needs of O-gauge model railroading. It has added a lot to my model railroading experience, and I hope that in some small way this book helps others find as much from it as I have.

H. Lee Willis
September, 2014

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'Streets: An Overview

1

'Streets is a system of operating toy cars, trucks, buses, and streetcars made to be compatible with O-gauge model train layouts. It has been manufactured and marketed since 2004 under two product names: SuperStreets™ (K-Line, K-Line by Lionel) and E-Z Street™ (Williams by Bachmann). 'Streets roadway, power supplies, and vehicles are sized and designed to fit well on O-gauge toy train layouts and to operate in ways that toy train enthusiasts, old and young, intuitively understand and prefer. Most importantly, a circle of 'Streets "track"—its model roadway—will fit inside the tightest circle of O-gauge toy train track; 'Streets does not compete for the same space on a layout as the toy trains but fills in otherwise unused areas (Figure 1). It was designed so it is easy to *add* to an *existing* toy train layout.

Beyond the ease with which 'Streets layouts, several features that 'Streets provides match the needs of most model railroaders very well:

- Any type of roads, from simple single-lane loops to very complex over-and-under multilane highways, can be built and operated (Figure 2).
- 'Streets can be powered and controlled using standard model train power supplies—either DC supplies intended for N and HO or AC supplies as used for O-gauge.
- Trucks, cars, buses, and trolleys that run on 'Streets are easy to operate, require little maintenance, and run for hours at a time without problems (Figure 3).



Figure 1: A loop of 'Streets roadway fits nicely inside a loop of O-27 track on this simple carpet layout, leaving room for buildings and accessories.



Figure 2. 'Streets roadway has been blended into the Main Street on this model train layout and augmented with parking lanes and sidewalks using techniques covered in Chapter 7.



Figure 3: A sample of what runs on 'Streets roads. From the left: K-Line by Lionel step van, Williams by Bachmann trolley, Williams by Bachmann police car, small two-axle K-Line diesel locomotive, Williams by Bachmann Ford panel van, Atlas trolley, K-Line by Lionel vintage truck, K-Line by Lionel shorty school bus.

A BRIEF HISTORY OF 'STREETS

'Streets was introduced as SuperStreets™ by MDK Inc. (K-Line) in 2004–2005. The first vehicle offered was a panel van that actually predated SuperStreets. Prior to 2005, it had been offered by K-Line as a track inspection vehicle (Figure 4).

By late 2005, K-Line catalogs listed a wide variety of roadway sections, turnouts, operating crossings, transition road pieces, and nine types of cars and trucks in a wide variety of colors, along with several ready-to-run (RTR) sets. Many of the road pieces and five of the nine vehicle types never made it into production, but those that did, particularly RTR sets, sold well.

Around that time, K-Line ran into several business woes that resulted, after protracted legal wrangling and negotiation, with its being bought by Sanda Kan, the owner of Bachmann and Williams, in an arrangement that licensed some K-Line products to Lionel for several years. Among those was SuperStreets.



Figure 4: The K-Line REA express van was among the earliest 'Streets vehicles offered, in 2004. The Bachmann van from 2013 no longer has an e-unit as those first-year K-Line units did, but it has better-looking wheels.

Table 1-1: 'Streets History

- 2004 K-Line announces its new SuperStreets™ product line.
- 2005 'Streets products are first available in stores. K-Line catalogs list a wide range of 'Streets products.
- 2007 SuperStreets passes to Lionel under a legal agreement with K-Line and Sanda Kan, owner of Bachmann.
- 2008 SuperStreets appears on store shelves and in Lionel catalogs as K-Line by Lionel products.
- 2011 All SuperStreets license rights pass to Sanda Kan.
- 2012 'Streets reappears as the WBB E-Z Street™ product line—all *fully* compatible with earlier SuperStreets.
- 2013 WBB introduces its first new 'Streets products in eight years—its sedan.
- 2014 'Streets turnouts finally promised by end of year. RTR sets return to catalog after a four-year absence.

From 2007 through 2010, Lionel sold SuperStreets as part of its K-Line by Lionel (K-LbL) catalog offerings. Perhaps because Lionel knew it did not have long-term rights to 'Streets, it invested little in new 'Streets products and sold only what K-Line had offered, with one exception. That was an RTR kit that packaged Lionel's streetcar/trolley with a loop of road, emphasizing that streetcars and trolleys could also run on 'Streets road.

Despite doing no new-product development, Lionel boosted the popularity of 'Streets tremendously because its market reach put the product line in many more stores and hobby shops than K-Line ever had, and its brand name gave many people confidence to try the new product. At many shops, including those near the author's home, K-Line-by-Lionel's SuperStreets was among the most popular O-gauge product lines during the years 2008–2010.

When the license agreement to Lionel expired, Sanda Kan made 'Streets part of its Williams by Bachmann (WBB) product line, renaming it E-Z Street™. The WBB catalog for 2012 listed only the basic road pieces that K-Line had offered and the panel van, then available in four different colors and variations. Notably absent were RTR sets. It took nearly a year for those listed products to reach stores, during which time interest in 'Streets fell as in-stock items at stores and websites were depleted and it became difficult to find some 'Streets products.

But Williams by Bachmann began to invest in new E-Z Street products. It improved the one vehicle it had carried over, the panel van—by fitting it with upgraded center rollers. In late 2013, WBB brought out the first *car* made for

'Streets, a 1:48 generic sedan. More importantly, that sedan was on an all-new adjustable-length metal chassis that would both make different future vehicles easy to produce. In its 2014 catalogs, Bachmann announced perhaps the most long-awaited 'Streets products: left and right turnouts, promised since 2005, but now scheduled for delivery by the end of 2014.



Figure 5: Although cars were listed in the K-Line 2005 catalog, they were never produced. This Bachmann sedan from 2013 is the first car actually produced for 'Streets. It's available in police and taxi models, as well as in several colors as a normal sedan, and as part of RTR sets offered by Williams by Bachmann in 2014.

EASY-TO-USE ROADWAY

'Streets cars and trucks run on special roadway made specifically for them as well as on traditional O-27 track and modern FasTrack, Atlas, MTH, Gargraves, and other brands of three-rail track. They fit on but do not run on two-rail O-gauge track.

Roadway sold by K-Line, K-LbL, and WBB is identical except for color. Any company's roadway and vehicles will fit and work together flawlessly with roadway pieces and vehicles sold by any other company. 'Streets road is essentially O-gauge ($1\frac{1}{4}$ -inch gauge) three-rail track with a plastic road surface added so that it looks like a paved road. Metal rails are built into the asphalt-colored plastic, with two narrow but deep grooves running along the inside edge of each outer rail so that the flanges on the vehicles' wheels can fit onto the rails (see Figure 6a). Wheels and center pickups run only on the rails and never actually touch the plastic.

'Streets road pieces are available in several different lengths of straight section and in two types of curved pieces. These can be fit together to make a wide variety of roadway layouts. All 'Streets road pieces are a single-lane wide. Two are put side by side to make a two-lane road. Two different diameters of curve—D-21 and D-16—"nest" one inside the other to make a two-lane curve (see Figure 7). Specialty roadway pieces include railroad crossings, intersection pieces, reversing-loop Ys, and other pieces made so that 'Streets can be set up in conjunction with model trains and assembled into complicated and interesting road configurations.

Chapter 2 discusses 'Streets roadway in much greater detail.

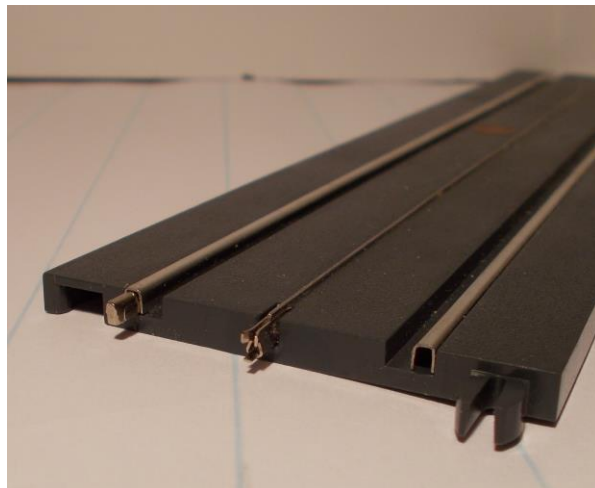


Figure 6a (above): All road pieces fit one-to-the-other by using symmetrical sets of locking tabs (right side in photo above) and outer rail electrical pins (left side) with an insertable center-rail clip in the middle of each end. Thin grooves, or slots, are cast into the plastic along the inner edge of the rails, so flanged wheels will fit on them.

Figure 6b (below): Close-up of the small center rail clip in the photo above, little more than $\frac{1}{16}$ inch wide and $\frac{1}{2}$ inch wide, which fits into a recess molded for it at each end of the center rail on every roadway piece. It must be carefully seated—pushed in fully—to establish good center-rail connectivity between roadway pieces.

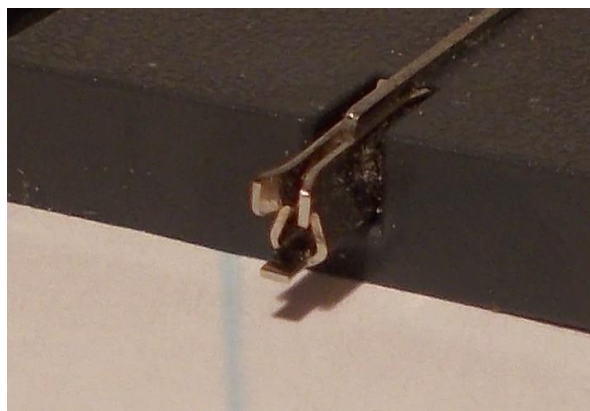




Figure 7: Two-lane roads are made by setting up road pieces side by side, using nested curves of different diameters made for this purpose.

RELIABLE, DURABLE VEHICLES

'Streets cars, trucks, and buses are roughly 1:48 to 1:43 scale and modeled rather realistically, but in some cases they do not have small details like louvers and side marker lights.

Available trucks include a 1934 Ford stake-bed truck, a 1900-ish generic panel van, and a modern delivery step van. All three have been produced in dozens of colors and with business logos for everything from plumbers to bakeries to dozens of other companies. An available school bus is actually scale in width and height and very accurately rendered in those dimensions, but it's ridiculously short (necessary so it can negotiate the tight curves). Only one car is available, a generic sedan that looks a bit toylike. However, the author has come to appreciate its styling—it is cleverly designed so that it fits well into train layout themes for any time frame from the 1950s through the 1990s.

Like most O-gauge equipment, 'Streets vehicles are built with “play” in mind—simple to operate and for the most part very durable. Motors and

gears have been selected for speeds that work well on toy train layouts. Vehicles travel at scale speeds of from 25 to 90 mph. A few TMCC versions were made, but the vast majority operates only in the conventional manner—to vary speed, vary voltage to the road.

All 'Streets cars, trucks, and buses have a rectifier wired to the motor. They run on AC or DC power from 0 to 18 volts, and regardless of the polarity when running on DC, run only forward. Chapter 6 will show how to remove the rectifier—a popular modification—so that while the vehicle will then run only on DC, reversing polarity will make it back up, increasing the fun of operation.

Chapter 3 looks at the vehicles in more detail. Chapter 6 covers maintenance and repair. Chapter 7 covers simple ways to customize vehicles, create new types, and vary the look a lot, which do not require extensive work or advanced modeling skills. Given that only five basic types of vehicle were produced for 'Streets, that becomes a priority for many.

WHAT TO KNOW: ROADWAY

'Streets roadway is set up and installed much like toy train track. Model train hobbyists will have no trouble understanding intuitively how to use it. However, there are several important differences from train track that one should appreciate before jumping into a 'Streets project. The following points are covered in Chapter 2 but introduced here for emphasis:

Use 2½-inch straight connectors. Owners *must* understand why there are three different 2½-inch straight pieces and how and when to use each properly (Figure 8). Using one when another should have been used is the most frequent mistake made with 'Streets.

Screw it down. Roadway pieces are light and have a large surface area, and their plastic edges tend to slide across, not bite into, bench top and carpet. For this reason, curved sections will sometimes slowly “migrate” or pull apart during operation unless screwed down. Road pieces have built-in mounting holes to secure them to the layout if this becomes an issue (Figure 9).

Use more frequent feeder wires. 'Streets' outer rails resemble those in tinplate track but have a narrower and shallower cross section, while the center rail is a thin piece of the same metal; there is less metal to conduct electricity. Furthermore, on average, the road pieces are only about half the length of toy train track pieces, so there will be twice as many junctions between pieces around a loop of any length. Smaller rails mean smaller connectors and clips between sections, and more junctions mean more opportunities for electrical joints to fail. For this reason, owners should anticipate feeding power to a few more locations around a 'Streets road loop than they would were it toy train track.

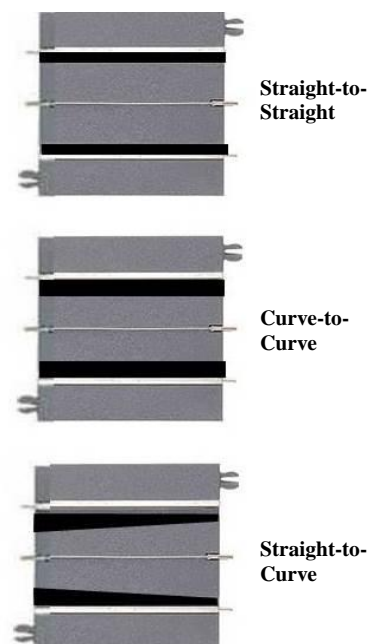


Figure 8: A confusing aspect of 'Streets is the three different 2½-inch straight sections and the reason for their differences. Using one where another is required is by far the most common mistake made when setting up 'Streets – leading to “clunky” operation. Chapter 2 explains their correct use.

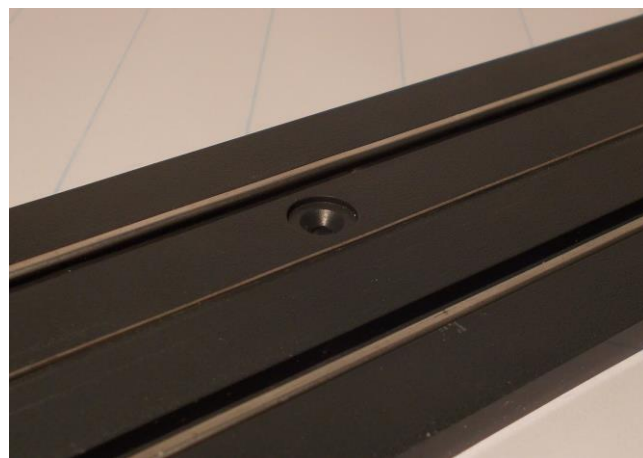


Figure 9: 'Streets roadway pieces have a mounting hole built into them to take a number-four taper-head screw. The pieces slide so easily that it is often necessary to screw pieces to the bench top, particularly curves.

Think through and plan power supply needs.

'Streets vehicles will run on AC or DC power and have very modest power needs, so nearly any toy train power supply made since WWII will provide enough power to operate them. But some do *much* better than others. Owners should think through what they need so they do not buy units that give unsatisfactory operation or spend more than is necessary.

Power supplies like that shown in the upper left of Figure 10 were sold in several case-color-knob combinations under a variety of brand names, including AHM, Bachmann, and Life-Like. They were included with K-Line and K-Line by Lionel RTR sets. Their 7-watt output is enough to run three vehicles, their 0–16 volt range matches 'Streets needs perfectly, and they cost as little as two dollars at swap meets, etc. However, they are definitely *not* recommended. Despite having a continuously rotating knob, the unit in the upper left of Figure 10 produces only eight discrete voltages. As the knob is turned, a contact inside the case moves over a series of electrical contacts, selecting voltages that are roughly 2, 4, 6, 8, 10, 12, 14, or 16 volts. Since 'Streets vehicles only begin to operate smoothly when operated at 4 to 5 volts and are running beyond highway speeds at 12 volts. This means owners have a choice of only three to four realistic speeds at which to operate vehicles.

By contrast, “premium” power supplies that list for \$100 and up provide control of voltage to within $\frac{1}{2}$ or even $\frac{1}{10}$ volt – to within less than 1 scale mph speed. However, most of the higher price of “premium” power supplies goes to buy additional capacity, not just finer control of voltage. Most owners want a *separate* power supply for each lane of each 'Streets loop, and even \$100 per lane loop can eat up cash that could be put to good use elsewhere. Owners will

seldom want to run more than four cars per lane loop (about 15 watts), but they will need several power supplies—one for each lane loop. Thus, what is wanted for 'Streets is a combination of good voltage control in a unit of modest power output rating at a very low price. In addition, owners who have a choice may wish to select DC rather than AC power. 'Streets vehicles and many trolleys run just as well on either, but DC gives an owner the option to remove the rectifiers later on so vehicles can be backed up.

Chapter 2 will discuss these and other power supply and track issues in much more detail, while Chapters 4 and 5 discuss planning and setting up 'Streets roadways, respectively.



Figure 10: Ubiquitous starter-set power supplies that look anything like those in the upper left should be avoided due to their very poor voltage control. Low-price units are available that provide exceptionally fine voltage control while supplying all the power-output capacity needed for a 'Streets loop. Among them are the Bachmann Power Pack (upper right), the Railpower 1370 (lower left), and the Tekpower 1308 (lower right).

WHAT TO KNOW: VEHICLES

'Streets vehicles can be expected to provide years of trouble-free operation, but owners should keep the following points in mind:

Some center pickups are a weak point. Soon after the introduction of SuperStreets, K-Line switched to tiny spring-steel spring-arm center rollers on all its vehicles (Figure 11). Lionel continued using those same center pickups, installing them on all but the very few TMCC vehicles it produced. They are the Achilles heel of vehicles fitted with them, delicate and prone to snag and bend. Once bent, are they difficult to adjust back. (WBB changed to much better rollers for all its E-Z Street vehicles).

Clean the wheels and pickups often. 'Streets vehicles have fewer wheels than most toy locomotives, only two tiny center rollers, and not a lot of weight to hold it all down, making electrical contact somewhat less than perfect. Furthermore, most owners want to run them at scale city speeds, which means just 5 to 7 volts—voltages at which dirt or tarnish can easily interfere with smooth electrical flow. Uneven running, stuttering, and even stalling can result from amounts of grime that a toy locomotive operating at 10 or 11 volts would just shrug off.

Don't store vehicles on their wheels. All 'Streets vehicles except the sedan use a copper finger-spring for electrical contact to the front axle. During operation, the weight of the vehicle forces this spring up through about half or more of its permitted range of travel. Given enough time, the copper *will* fatigue and weaken, and the vehicle will begin to run roughly due to weak electrical contact. The spring will need to be readjusted. That requires disassembly and intricate work (Chapter 6 explains how).



Figure 11: Tiny, spring-steel center rollers are delicate and prone to snag.

Unless a vehicle is mishandled, it takes hundreds of operating hours for the spring to fatigue like that. That sounds like enough for many years of operation, and it is. But when a vehicle is stored with its wheels *standing* on a shelf, its front weight is continuously resting on and bending that spring, and it *will* fatigue badly in as little as three months. To avoid this, vehicles can be stored on their side, or if the owner is concerned about marring paint, on small pedestals (Figure 12).



Figure 12: Bottle caps like this from an ibuprofen container make great pedestals. Stored with its front axle off the shelf, this truck will not fatigue its copper finger spring.

What Will It Take to Get Started?

The easiest and quickest way to get started with 'Streets is to buy a ready-to-run (RTR) set, which will cost less than \$200 through online retailers. However, it is often possible to buy the needed roadway pieces and vehicles for less than the cost of an RTR set, and most owners will want to expand almost immediately, both to a larger loop and to two lanes with at least one vehicle running in each direction. Table 1-2 below lists items that can be purchased for around \$500 that make a good starting point for

'Streets (roadway comes four pieces to a package). The roadway pieces listed permit construction of a wide range of two-lane loops as long as 17 feet around and will permit a new owner to get a feel for the possible variations he or she could use to fit the layout as well as experiment with different types of roads. The vehicles are the most popular types. The two power controllers permit independent control of speed in each lane and can power two to three cars each.

Table 1-2: Recommended \$500 "Starter Set" for 'Streets

Item	Prod. #	Number	Price	Cost
Circle and half of D-16 curve	260	3	\$15	\$45
Circle and half of D-21 curve	261	3	\$14	\$42
Twelve 10" straights pieces	267	3	\$19	\$57
Four 5" straight pieces	266	1	\$8	\$8
Eight 2.5" straight pieces	263	2	\$14	\$28
Eight curve-to-curve 2.5" straight	265	2	\$14	\$28
Two dozen curve-to-straight 2.5"	264	6	\$14	\$84
Connector wires	270	3	\$5	\$15
Panel van	42723	1	\$60	\$60
Sedan	42726	1	\$50	\$50
Extra rail clips	269	1	\$5	\$5
Power controllers	44212	2	\$38	<u>\$76</u>
				\$498

Prices were those found in an Internet search of model railroading retailers on the day the table was written.

What's Available: Track and Power

2

'Streets road resembles toy train track in many respects. Curved, straight, and special sections are available so that a hobbyist can create road loops to fit on to a layout (Figure 1). Those pieces have been carefully designed as to length, etc., so they fit together modularly—put pieces together in any reasonable pattern, and most often, when a loop is completed, the final piece needed will be one of standard length, etc. Road pieces made by K-Line, K-Line by Lionel, and Bachmann are compatible with one another although of slightly different colors of plastic road surface. Regardless of whether they were actually made from the same molds (Bachmann pieces still have K-Line product numbers molded into their underside) or not, all 'Streets road sections of any one type (e.g., 5-inch straights) are identical to one another and fit together perfectly regardless of manufacturer.

All 'Streets roadway pieces have certain features in common, regardless of type:

- All are made of plastic with metal rails.
- All are single-lane pieces. A two-lane road requires two single-lane pieces side by side.
- All lanes are $2\frac{3}{8}$ inches wide.
- All have three O-gauge rails running along the center piece that are made of stamped sheet metal about .25 mm thick.
- All have locking section connectors and an outer-rail plug on each end, arranged so they will physically and electrically plug together.
- All are symmetrical in use. Turn a straight section 180 degrees, and it looks and fits the same. Rotate a curved piece 180 degrees and it fits identically, but now it curves in the other direction.



Figure 1. 'Streets roadways have been fit onto this layout made by the Smoky Mountain Model Railroaders club in Waynesville, NC. Thanks to Sam Hopkins for the photo.



Figure 2: The underside of a 10-inch straight road section shows features common to most 'Streets road pieces. Reinforcing ribs can be seen, as can a circular reinforcement ring around the hold-down screw mounting hole. Metal tabs from the topside pass through the plastic to hold the rails firmly every two inches or so. Two metal connector plates run across the piece and will fit to the connector wire sets on either side. Small cutouts are provided so wires can be run underneath the sides (green arrows).

All pieces are the same— $\frac{3}{16}$ of an inch thick and hollow underneath with reinforcing ribs for mechanical strength (Figure 2). The metal rails are held in place with metal tabs that pass through the plastic to the underside, where they are bent over. These provide places where one can solder connecting wires, etc., if needed. Larger straight sections and curves have metal plates fitted underneath to connect the outer rails electrically. Most but not all have thin removable tabs (arrows, Figure 2) on the sides so wires can be run underneath while they remain flush on the bench top. Finally, all have a center-rail clip at the end (Figure 3).

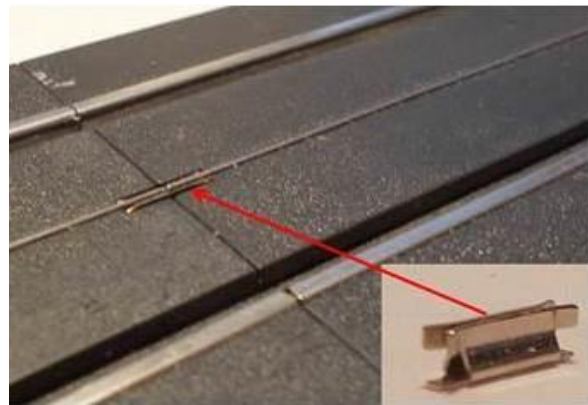


Figure 3: Center-rail connector clip.

Most 'Streets track pieces have at least one hole through the road section to accept screws that will hold the section firmly in place on a train layout's bench top (Figure 4). These holes are recessed into the road surface and reinforced for strength from underneath. Tapered-head brass wood screws, size #4 by $\frac{3}{4}$ inch, work well—the head goes far enough into the recess to be below road grade. Small manhole covers go over the hole once the screw is in place, fitting over and hiding the screw head.



Figure 4: Small manhole covers fit into recessed mounting holes, into which #4 tapered-head screws fit well.

Curved sections are 45 degrees (eight to a circle) and available in two sizes that nest one inside the other to form adjacent lanes of a two-lane road (Figure 5). The tighter curve has a full-circle diameter from outside road edge to outside edge of $16\frac{3}{4}$ inches, with the diameter across the inside of the outer rails being $15\frac{5}{8}$ inches and the diameter of the center rail being $14\frac{3}{8}$ inches. It is referred to as a D-16 curve. The outer curve has an outside-edge-to-outside-edge diameter of $21\frac{1}{2}$ inches, with the diameter between the inside of outer rails of $20\frac{3}{8}$ inches and a center rail diameter of $19\frac{1}{8}$ inches. It is referred to as a D-21 curve.

Straight road is available in 10-inch, 5-inch, and $2\frac{1}{2}$ -inch sections (Figure 6). The 10-inch sections have a provision for a feed connector to be attached on either side of the track. An adjustable-length section is also available that the author avoids using. When nonstandard pieces are needed, it is best, and quite easy, to just make them oneself (Chapter 5 covers this).

There is a 90-degree intersection piece that is $2\frac{1}{2}$ inches to a side (Figure 7). Four are required for the intersection of two, two-lane roads.

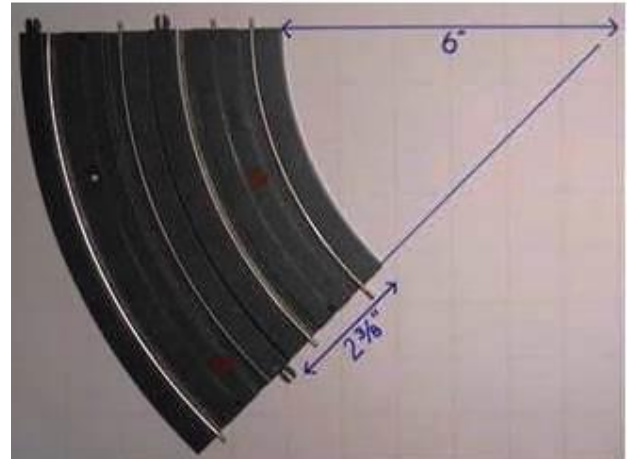


Figure 5: D-16 curves nest inside of D-21.

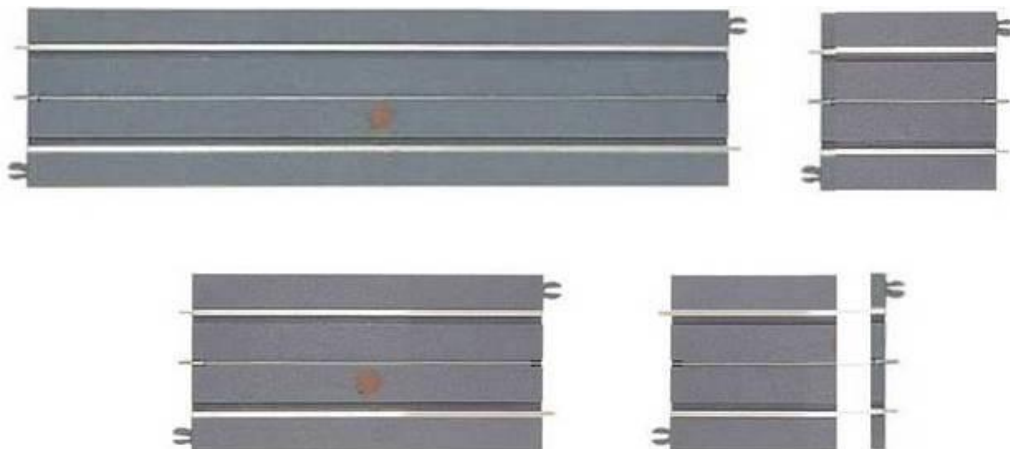
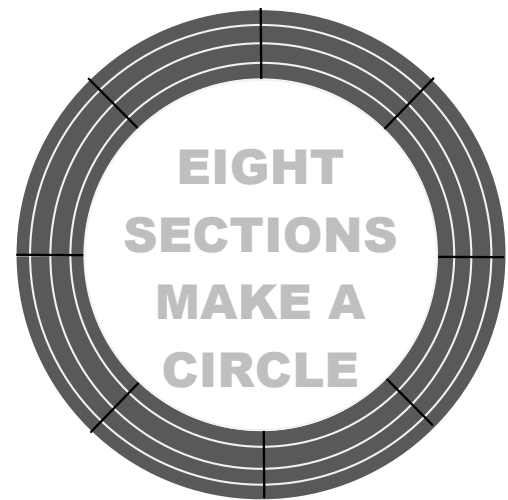


Figure 6: Straight sections are offered in 10-inch, 5-inch, and $2\frac{1}{2}$ -inch lengths, as well as an adjustable length.

Special road sections include the intersection crossover (Figure 7). This piece is more complicated than might be expected, in two ways. First, the outer rails of the two intersecting roads are electrically connected, but the center rails aren't; separately controlled loops can intersect. Second, this piece is $2\frac{1}{2}$ inches wide in both directions, so it matches the length of the short straight section. Thus, it is not quite symmetrical. In each direction, one margin (the distance between the outer rail and the edge of the piece) is $\frac{1}{8}$ inch wider than the other. Two crossover pieces are needed for a two-lane road, and four are needed for a two-lane road intersection with a two-lane road. The sides with the narrower margins must go in the interior of the intersection.

Other special pieces include track crossing pieces for tubular, FasTrack, and K-Line's track system.

The Y-track piece (Figure 9) is the closest thing to a turnout available in 'Streets. It forms a 90-degree angle between its Y arms and has D-16 curves on both sides of the trunk. The straight sections of either arm have been sized so that one Y and six D-16 curves complete a full reversing loop circle.

As produced, the Y section switches, or flip-flops, each time a vehicle passes from one of the two arms of the Y into the Y's base. Looking at the Y shown at the right, a vehicle traveling clockwise through the Y would exit through the base and set the switch so that the next car traveling into the Y would turn right and go around the loop counterclockwise. This flip-flop activation ensures that each time a vehicle returns to the reversing loop, it takes the other way around that loop.

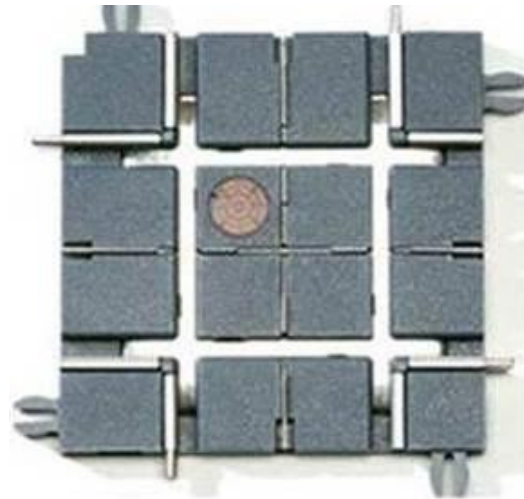


Figure 7: Crossover (intersection) piece.

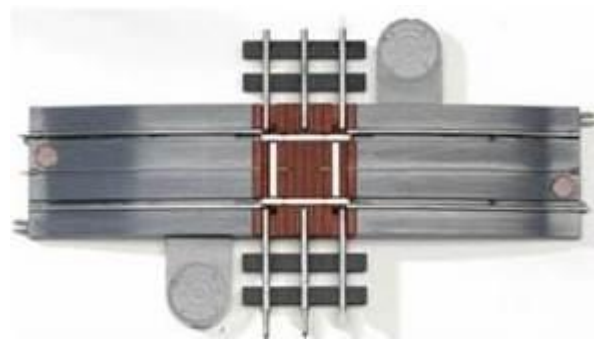


Figure 8: A grade crossing.

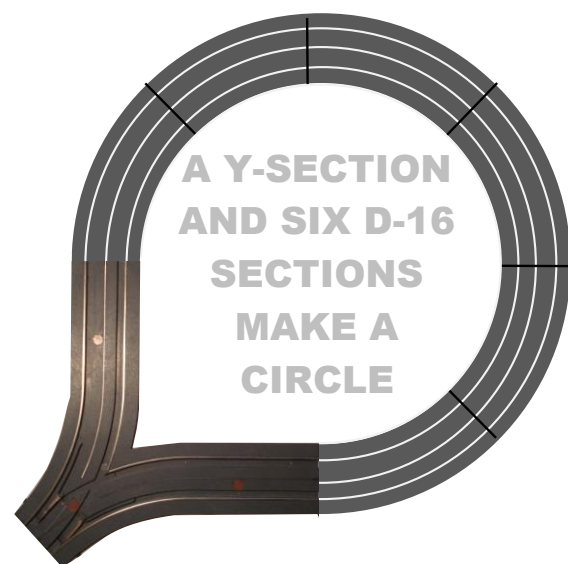


Figure 9: The Y-section.

The Y can be manually switched by operating the tab on the switch mechanism to the left or the right. It can be turned into a remote switch by attaching a two-way solenoid or a switch motor to the tab arm (Figure 10). When converted to a remote switch, the Y still does not fulfill every switch purpose a modeler might want. It is not feasible to convert one side to a straight road. However, the arms can be cut anywhere above the white line shown in Figure 10. Trimming it on those lines turns it into a 45-degree piece that can be used to make two parallel lanes that have center rails only $2\frac{3}{4}$ inches (outside edges $\frac{3}{8}$ inch apart).

The grooves or slots alongside the rails provide space for the wheel flanges to fit down inside the rails. These grooves are different widths on straight and curves, as shown in Figure 11. The 2.5 mm-wide groove of the straight sections provides sufficient room for flanges to fit alongside the rail when going straight. But 'Streets vehicles have fixed axles, so as they pass through a turn, they do so with their flanges at an angle at which they don't fit flush alongside the outer rail but across the groove and thus require more width than on a straight section—the groove must be wider to accommodate the flanges sliding through the curve at an angle. The fitting problem is always worse on the inside groove than on the outside. The inner groove shown in Figure 12 is barely sufficient for the wheels shown.

The greater the diameter of a wheel, the longer the flange that sticks down into the grove; thus, the groove must be wider to accommodate it. The nearly $\frac{1}{4}$ -inch width of the groove on curved sections provides enough room for any of the wheel sizes used in 'Streets vehicles, as well as for trolleys, etc.

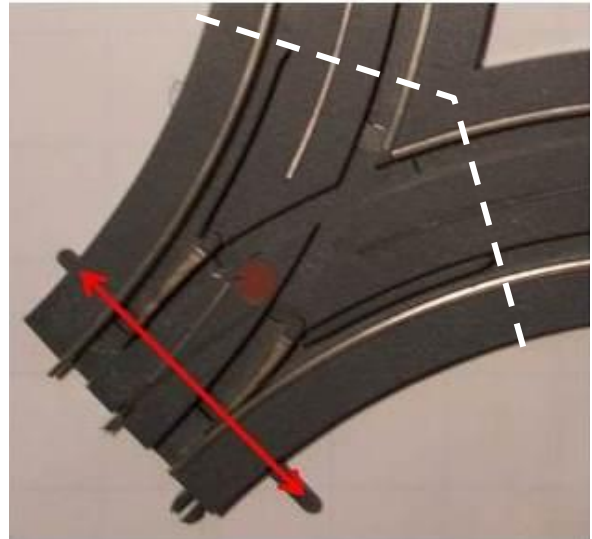


Figure 10: The Y-section can be operated manually (red arrow) and trimmed to a shorter piece (white lines).

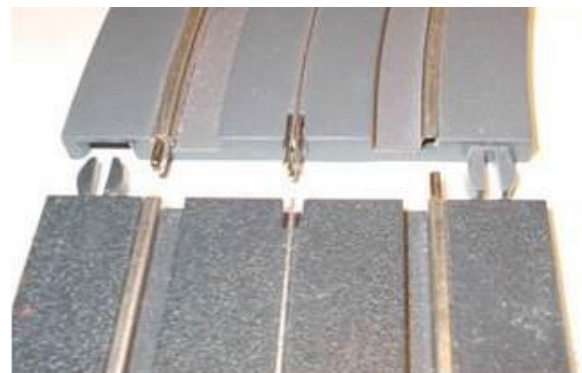


Figure 11: Grooves on straights are 2.5 mm wide; on curves, 6 mm.

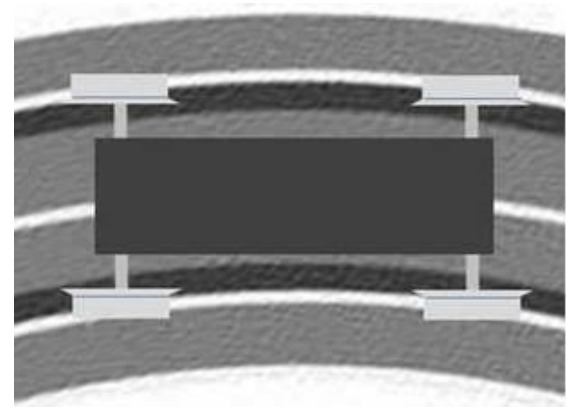


Figure 12: Flanges in grooves on a curve.

2½-inch connector pieces. The shortest straight sections (2½ inch) are called *connectors* by the manufacturers. Three types are available, with different widths of flange grooves (Figure 13). They are intended for different uses, and each type must be used in the places intended for it, and not others, or vehicles will not run smoothly.

Straight-to-straight connector sections, as they are called, have a narrow groove (2.5 mm) like the 10-inch and 5-inch straight sections (Figure 13). They can be used only between two straight sections.

Curve-to-curve connector sections have the wider 6 mm grooves of curved sections (Figure 13). These sections are used if a short straight section is needed between curve sections, and elsewhere, as will be discussed below.

Straight-to-curve, or transition connector sections, have a groove that changes width, from 2.5 mm at one end to 6 mm at the other end (Figure 13). They are designed to be placed wherever the road changes from curve to straight to make a smooth transition from wide to narrow grooves. If they are not used in those places, the flanges from a vehicle traveling out of the curve into the straight will hit the edge of the narrower groove, as shown in Figure 14. At best, the vehicle will clunk loudly and bobble when this happens, but most often, it also jumps off the rails and stops.

Transition connectors are intended to be used everywhere the road changes from straight to curve or vice versa. However, if traffic in a lane will be moving only in one direction, they can be left out of places where a vehicle will travel *from* a straight *into* a curved section because there is nothing for the car or truck's wheel flanges to "clunk against" as it passes from the

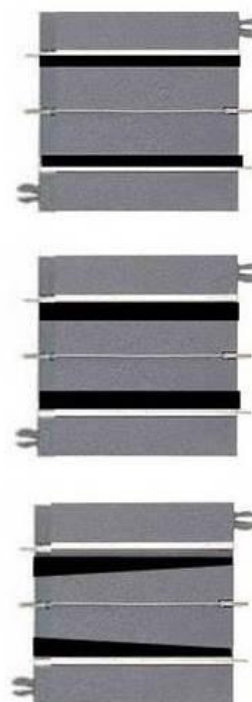


Figure 13: Top to bottom: straight-to-straight, curve-to-curve, and curve-to-straight connectors.

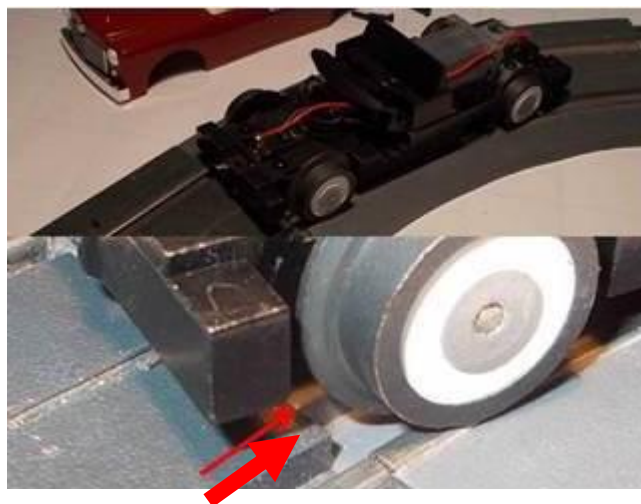


Figure 14: Flanges will hit the edge of the road when leaving a curve into a straight unless a transition piece in place. The lower photo shows the front wheel about to do so (at location pointed to be red arrow).

narrower to the wider groove. However, the author has seen a few cases where longer wheelbase vehicles (the step van) run into problems as shown in Figure 15. As the vehicle works its way well into a curve, the rear axle pivots and the flanges run at an angle to the straight and bind in the narrower groove. The problem is worse the longer the wheelbase or the larger the wheels are. Most vehicles will not derail, just run roughly for a second or two.

Straights between curves. Anytime a straight single section of $2\frac{1}{2}$ inches is needed between curves, there is no choice but to use a curve-to-curve connector with its wider groove. However, a 5-inch straight between two curves can be done either of two ways: with two curve-to-curve connectors, so the whole length between curves is a wide groove, or as back-to-back transition pieces with their narrow ends connected. Most people think the constant width groove looks a bit better, but often the decision depends on what pieces are on hand.

A $7\frac{1}{2}$ -inch straight between curves could be made of three curve-to-curve connectors in a row, again making the entire route of wide grooves, or as a straight-to-straight connector with transition pieces on each end. A workable but strange-looking third alternative is back-to-back transition pieces (with the narrow ends meeting) and a wide-groove curve-to-curve connector on one end.

Laying out roads with transition connectors in all the right places is not complicated, but it takes some additional thought and planning compared to laying out train track. Even the pros get confused at times. In K-Line's 2005 second edition catalog, a picture of an RTR set on page 3 has the transition pieces reversed, with the narrow-groove end attached to the

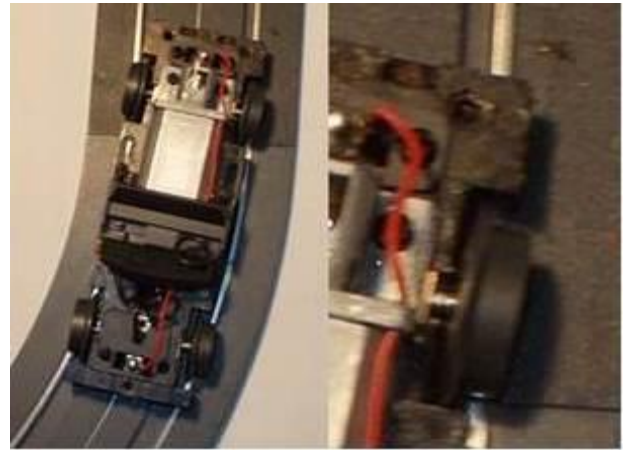


Figure 15: This stock WBB sedan chassis has traveled from a straight into a D-16 curve without a transition connector in place. Its rear wheels are still in the straight's narrow groove and are actually binding slightly because they are twisted at an angle compared to the track.

curve. Several years later, Lionel made a similar mistake in its catalog.

Many road system configurations require more transition pieces than might first be thought. A simple oval requires four, but a plan with more twists and turns might call for many more (Figure 16). It is common to run out of transition pieces when laying out a 'Streets loop because the number needed was not correctly anticipated and not enough were ordered. It is a good idea to set up a trial "carpet layout" version and test a vehicle on it before starting construction on the layout.

Other 'Streets track products that were produced include packages of additional center clip pins, manhole covers, track to 'Streets road connector pins, hookup wire, and dog-bone and figure-eight expansion packs, guard rails, etc. Table 1 lists roadway pieces that have been made.

TABLE 1

Streets Road Sections And Product Number By Manufacturer			
Road sections shown in red were never produced although listed in catalogs.			
Road Section	K-Line	Lionel	WBB
D-12 curve	K-0801		
D-16 curve	K-0802	K-21430 K-21432(8)	00261(4)
D-21 curve	K-0803	21284(4)	00262(4)
2.5" straight to straight		K-25566(4)	00263(4)
2.5" curve to curve	K-0810	K-21282(4)	00265(4)
2.5" straight to curve	K-0811	K-21261(4)	00264(4)
Adjustable straight		K-22598	
5" straight	K-0812	K-21433 (4)	00266(4)
10" straight	K-0813	K-21431 K-21434(8)	00267(4)
10" straight- insulated		K21571	
10" conversion to O-track	K-0815	K-21284	
10" conversion to Fastrack		K-21264	
Crossover	K-0821	K-21286 K-21266(4)	00267(1)
Double crossover	K-0822		
Y-track	K-0823	K-21287	
D16 left turnout	K-0833		
D16 right turnout	K-0834		
Grade crossing - O gauge	K-0814	K-21283	
Grade crossing - Fastrack		K-21163	
Operating grade crossing	K-0846		
Guardrail -10" straight		K-22470	
Guardrail -D-16 curve		K-22534	
Guardrail -D-16 curve		K-22536	
Barricade		K-22379	
Tubular track conversion pins		K-21288	00272
Steets connctor pins	K-0848	K-21289	00269
Hookup wire	K-0849	K-21290	00270

1

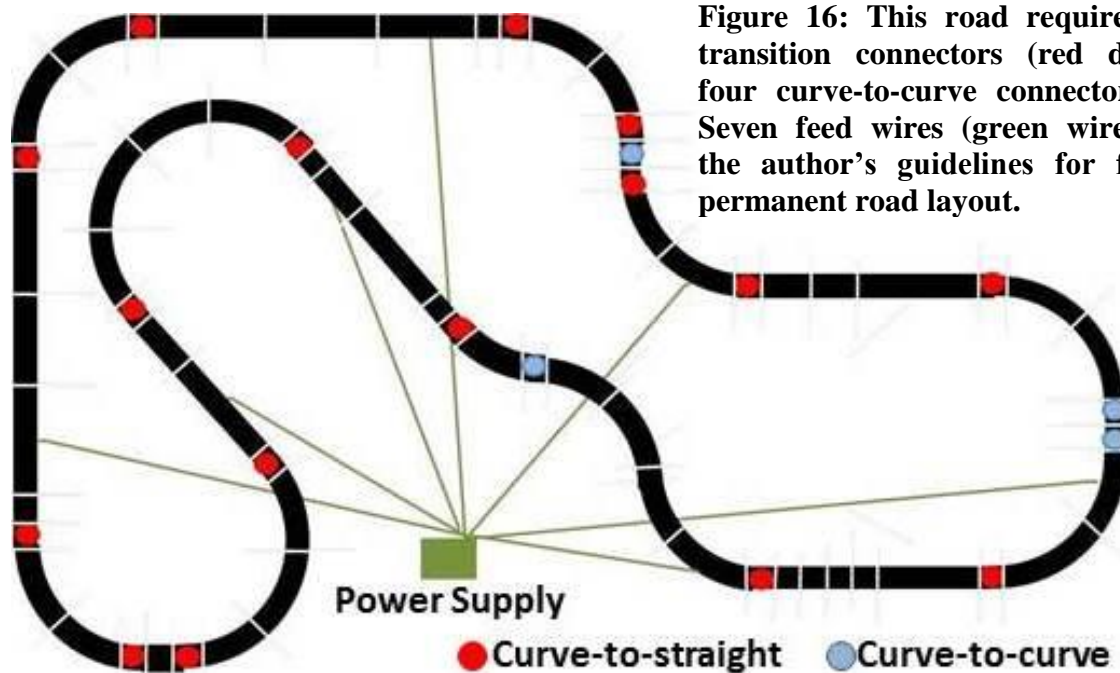


Figure 16: This road requires sixteen transition connectors (red dots) and four curve-to-curve connectors (blue). Seven feed wires (green wires) follow the author's guidelines for feeding a permanent road layout.

Items that were listed in catalogs for years but never produced include most notably the D-16 left and right turnouts (switches). The sasquatches of 'Streets, these are greatly sought after, and more than a few people swear they have seen one or know someone who has, but nobody can actually find one. Both K-Line and Lionel advertised them in their catalogs. Those listings, and perhaps most of all the downloadable templates on Lionel's website that give exact dimensions of all pieces including the turnouts, have convinced some hobbyists that the turnouts were produced. However, they never were, although in early 2014, Bachmann announced D-21 switches would be in stores by the end of 2014.

Just as intriguing are the D-12 curves originally listed by K-Line, which would have nested inside the D-16 curves, providing three radii of curve. Beyond giving a bit more flexibility, a three-lane city street would have been fun—a trolley down the middle and traffic lanes on either side. They were never produced.

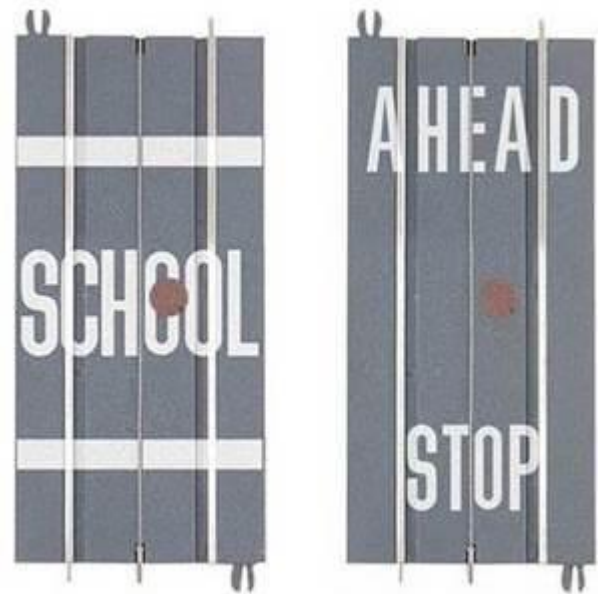


Figure 17: K-Line and K-Line by Lionel offered various pieces marked as RR and school crossings, etc. They were otherwise identical to standard road section pieces.

Electrical Connections. The rails in 'Streets roadways are similar to traditional tubular toy train track, but narrower and shallower. There is about half as much metal to conduct power than in tubular O-gauge toy train track, and that means a slightly less capable system to convey current around a road loop. Fortunately, the vehicles have very modest power needs—most draw less than three tenths of an amp—so they don't put a lot of electrical stress on the rails. Still, while 'Streets roadway does an adequate job if care is taken in setting it up and connecting pieces, it is best to make certain care is taken in setting it up and connecting pieces.

If electrical problems develop in a 'Streets roadway loop, particularly intermittent or hard-to-find ones, they are likely to be in the center-rail junctions between road sections. Care must be taken to place each center-rail connector properly between each pair of road sections and seat it fully. The center clips must be installed with the open part of their "U" cross-section at the top (Figure 18). They will fit upside down, in which position they will make center rollers clunk lightly as they go over them (and probably shorten their lifetimes) and can work loose rather quickly.

Even when connections are done well, electrical connectivity of the center rail can be weak if made through a dozen or more junctions. For this reason, it is recommended that feed wires be determined not on the basis of road distance but by the number of roadway piece section junctions. A useful rule of thumb is to have feed points no farther apart than eight feet or ten junctions, whichever comes first. Feed wire does not have to be larger; #24 wire is more than adequate.

- Rule of Thumb -

Provide electrical power feeds no farther apart than eight feet or ten road junctions, whichever comes first.



Figure 18: Unfortunately, it is easy to insert the center clip upside down. It will fit and work for a while in that incorrect orientation, but it will eventually work itself loose, often simply disappearing, and occasionally by snagging a center roller. The correct orientation is with the open side of the clip up, so that the bottom of the U-shaped piece fits under the rail.

Power Supplies. Standard 'Streets vehicles require only three or four watts and operate just the same on either AC or DC power, so just about any toy train power supply one can find can provide both a type of power that will work and enough of it to run one or two vehicles. However, inexpensive toy train power supplies (those under \$20), including those provided with K-Line and K-Line by Lionel RTR sets, do not provide especially fine *control* of voltage.

“Upgraded” power supplies that provide much finer and better control of voltage can be found in the fifty-dollar list-price range. Nothing more than a lower-end model—in the fifty-dollar list-price range—is necessary. Power supplies in this price range usually control voltage to within a fraction of a volt and have sufficient capacity to power from four to ten vehicles—usually more than one wants to run at one time on a single loop.

A *separate power supply* for each lane of each two-way street is recommended so that cars going in both directions can be operated separately. A layout with two, two-lane loops will be most satisfactory with four separate controllable supplies, etc. Therefore, a power supply budget is best devoted to buying more power supplies rather than a few larger capacity units.

Control practicality. The author prefers power supplies with a knob that moves through at least 300 degrees to something like the Lionel CW-40 or CW-80. While a CW's throttle lever moves through 135 degrees, it reaches 16 volts (and goes no higher) at only 85 degrees. A rotating knob (Figure 17) provides about four times the practical precision in controlling power.

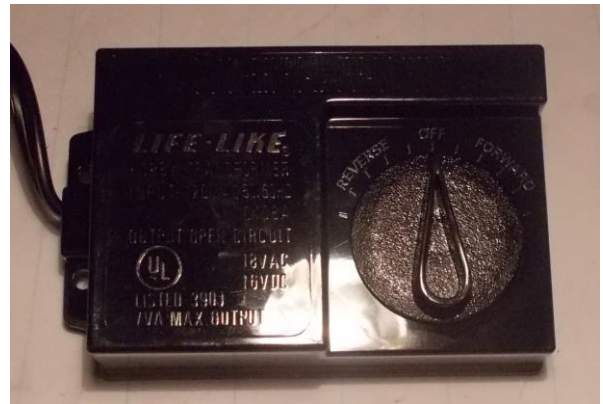


Figure 19: This Life-Like® power supply above was included in an RTR sold by K-Line. Although it has a knob/lever that rotates continuously, as that knob is turned through its full range a connector lever inside the case moves across a series of contact points to select from only eight distinct voltage levels: roughly two-volt increments from 0 to 16 volts. The author tested three of these units, and all gave about the same results: the increment of the voltage steps varies from about 1.7 to 2.4 volts. Apparently they are rather imprecisely made. While inexpensive, these give very limited control of vehicle speed in the range where most owners want to operate them. The diagram below shows the approximate speed a 'Streets vehicle will run in scale mph at each voltage increment.

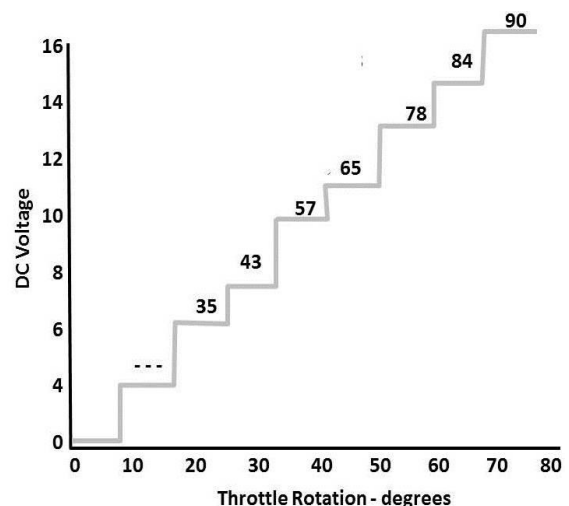




Figure 20: Three of the power supplies the author uses to run his 'Streets loops. From left to right: a Lionel CW-80, a Tech III, and a Tekpower 1803. All control voltage in particularly fine increments, the Tekpower to within one-tenth of a volt.

Variation of duty cycle rather than voltage variation. Higher-end power supplies do not actually vary the voltage to control speed. Instead, they vary duty cycle. To get 10% power, the supply sends brief pulses—maybe just a millisecond each—of 18 volts DC to the roadway and spaces them nine milliseconds apart. This is a 10% duty cycle (one millisecond of power every ten milliseconds). Doubling the power makes the pulses two milliseconds long, etc., up to continuous for full power. This “trick” can be done with DC (Tech, MRC brands) or AC (Lionel CW, ZW-L). The advantage it provides is better tolerance of dirty track and marginal wheel or roller-to-track connectivity along with superior low-speed response. Low voltages—3 to 4 volts, as required for slowest-speed operation—sometimes will not “break through” marginal roller-to-rail contact patches. Pulses of 16 to 18

volts are much more likely to—16 volts does not provide four times the oomph to push through a momentary high-impedance poor contact as compared to four volts, but rather sixteen times the power (power is proportional to voltage squared). The pulses also “get the attention” of motors in a more dependable and linear way.

Think about DC. There is no discernable difference in vehicle performance or lifetime when running a 'Streets vehicle on AC or DC. The sole advantage of AC is that the power supply can also double to run standard AC-only O-gauge locomotives. But DC power supplies have their own advantage.

Eventually many owners want to remove the rectifiers from their vehicles. While they then will run *only* on DC, they will back up if polarity is reversed, which is fun.

What's Available: Cars, Trucks, and Trolleys

3

Cars, trucks, and buses sold for 'Streets were specifically designed to run on 'Street roads. They will also run on most O-gauge train track without any problem, although some will stall on switches because the short distance between their pickup rollers means they cannot bridge the dead spot on the switch. Power provided can be either AC or DC, 0-18 volts. These vehicles require only 3 to 5 watts each, so even a small power supply is sufficient to run several at once. The vast majority of 'Streets vehicles run conventionally. They do not have e-units but do have a rectifier installed in line with the motor.

As a result, they run only forward if run on AC or DC power of either polarity. Speed is fairly proportional to voltage, with minimum scale speeds of from about 25 scale miles per hour (4 to 5 volts) up to ~90 miles per hour (18 volts).

In addition, many O-gauge trolleys and a number of smaller units such as speeders, clown cars, and track inspection and maintenance vehicles will run on 'Streets even though they were not designed specifically for that purpose. Some locomotives will too, including Plymouth switchers and short four-axle diesels.



Figure 1. Various 'Streets trucks make their way along Main Street on the author's layout while a K-Line Plymouth switcher pulls a bobber caboose down the street. The cop has decided to give the loco the right of way.

Generic Panel Van

- Roughly 1:50 scale. Die-cast model body.
- Uses either a pre-'Streets metal or the plastic 'Streets chassis.
- Produced from 2004 through 2014.
- E-unit track inspection version available before SuperStreets
- Lionel released TMCC version 2010.
- The only 'Streets vehicle without an interior and a driver. Opaque plastic windows.
- WBB version has the best center pickups of any 'Streets vehicle.



Length = 110 mm Width = 45 mm Height = 47 mm Wheelbase = 67 mm Weight = 7.8–11 oz.

The only vehicle produced through the entire 'Streets period, with slight variations in components and fittings, the panel van has been made by K-Line, K-Line by Lionel, and Williams by Bachmann. K-Line sold it as a track inspection vehicle in various railroad liveries long before 'Streets was a product line: catalogs showed it operating on train track (Figure 2). That version had black anodized train-like wheels, an F-N-R e-unit, and working headlights and light bar. At 11 ounces, it weighs twice what some later 'Streets vehicles weigh. K-Line subsequently deleted the e-unit, changed it to the plastic chassis and added car-like wheels with hubcaps, reducing its weight to 7.8 ounces and its price by about 40%.

Most versions have one traction tire, which may be on either side depending on the production run. A few have none. All versions of the van have a projecting tab cast on the rear bumper (Figure 3). Some early models have this drilled so the panel van can tow a trailer, which it does very well, as will be discussed more in the trailer-towing section of Chapter 7.



Figure 2: The original panel van (2004) had a metal chassis and train-like wheels.



Figure 3: A tab on the rear bumper is/can be drilled to provide a place to hook a trailer.

1930 Ford Truck

- More representative than scale.
- Two-piece die-cast body with plastic trim and a plastic rear stake-bed load area.
- Interior with driver and front windshield but no side windows.
- Uses a narrow version of the plastic chassis with a slimmer motor.
- Longest wheelbase of all 'Streets vehicles.
- The lightest 'Streets vehicle by far and somewhat challenged for traction and electrical connectivity as a result.



Length = 127 mm

Width = 43 mm

Height = 45 mm

Wheelbase = 80 mm

Weight = 5.5 ounces

The vintage truck was among the earliest K-Line vehicles, its casting derived from an existing toy sold by several die-cast companies and by K-Line as part of its K-Line Kruisers. Its SuperStreets plastic chassis was designed to fit this die-cast body, not the other way around. It fits into and screws onto the body in the same way the original die-cast toy chassis did.

In original die-cast form, that toy truck had opening doors (Figure 4), but when produced for SuperStreets, they were molded shut. The K-Line catalogs in 2004 and 2005 used K-Line Kruiser toy trucks placed on SuperStreets track for all photos, with the seams of their opening doors clearly showing. This gave many people the impression that SuperStreets versions with opening doors were produced, but to the author's knowledge, none were. However, the original non-powered toy truck with opening doors can be found at swap meets and online auction sites. Ten minutes of work cutting away a bit of metal from the frame and snipping a piece of the interior's seat out allow the body to slip right on the SuperStreets chassis (Figure 4).

Early 'Streets versions came with some sort of load—tires, propane bottles, barrels, pallets of Quikrete—but later versions had an empty load bed. There seems to be no pattern to the traction tires used. The author has versions with none, two, and a single traction tire on the left or on the right wheel.

Although it would have been simple to vary the load and purpose of the truck by substituting a van box or other rear section for the plastic stake bed, this was never done. However, it is a popular “light-bash” option for many hobbyists, as will be discussed in Chapter7.



Figure 4: This unpowered version was part of the K-Line Kruisers product line.

Delivery Step Van

- 1:48 model of Morgan Olson P-1000 delivery step van body (Fed-Ex, etc.).
- Longest and heaviest 'Streets vehicle.
- Uses an extended plastic chassis
- Produced from 2005–2010. Size of wheels used varied during that time.
- Offered as a TMCC version in 2009–2010.
- Plastic cab interior with driver.
- Plenty of room inside for addition of aftermarket control and sound boards.



Length = 131 mm Width=51 mm Height=65 mm
Wheelbase = 80 mm Weight = 12.9 ounces

The Morgan Olson P-1000 and its big brother P1200 are fixtures on American streets, fitted with either Ford or Freightliner underpinnings. While this 'Streets version takes slight liberties with tiny details, features such as molded-in rivets along the rub strips on the sides, marker lights, and side- and rear-mounted mirrors make it more of a model than some 'Streets vehicles.

An unpowered Fed Ex die-cast model of this truck was offered as a K-Line Kruiser in 2005. Catalog photos of the first 'Streets version show it was clearly a mock-up using that body, fitted with rubber-tire-on-plastic-hub wheels similar to those on the 'Streets bus, but production versions came with steel wheels instead. Two sizes of wheels were put on this truck during its six-year production period—the van and truck sizes discussed later in this chapter.

Versions were produced with and without a traction tire. At nearly 13 ounces, this vehicle weighs enough that it does not need traction tires to run well. The author prefers those without because of the improved electrical connectivity they have compared to those with.

The version of the standard SuperStreets plastic chassis used in this delivery truck is extended front and rear and at the sides, making it both the longest and widest chassis available for 'Streets, with a wheelbase 1 mm longer than that of the adjustable sedan chassis at its maximum. That size, combined with its truck-size wheels, makes it a favorite for many bashing and die-cast truck and bus conversion projects (Figure 5).



Figure 5: This Ertl/Lionel 1950 Chevy REA truck has exactly the same wheelbase as the 'Streets step van discussed here. It makes for a particularly good-looking, if very difficult, conversion.

School Bus

- 1:48 scale except for length.
- Shortest wheelbase and largest wheels of any 'Streets vehicle.
- Produced from 2005 through 2010.
- TMCC version never offered.
- Windows all around, driver, and full interior with three rows of seats.
- Short wheelbase makes it a good runner through D-16 curves and very good at climbing steep inclines.



Length = 102 mm Width = 49.5 mm
Height=66 mm Wheelbase = 62 mm
Weight = 9.7 ounces

In many ways, this is the ugly duckling of 'Streets vehicles. The diecast body is an accurate scale model in width and height, but despite that accuracy and detail in modeling and paint, it looks more toy than model because of its short length. First offered in K-Line's 2005 Volume II catalog, it was based on a Sunnyside-Superior pull-back-wind-up toy. That toy bus had essentially the same body, windows, and interior as this SuperStreets model, but with an opening hood and operating street-side warning arm, features eliminated for 'Streets.

This bus has the largest-diameter wheels of any 'Streets vehicle even if it does have the shortest wheelbase. Its wheels are a bit larger than scale and contribute to a toy-like appearance. Accurately molded rubber tires fit onto realistic plastic wheels attached to the metal wheels that actually fit the rails, giving this bus by far the widest track of any 'Streets vehicle (Figure 6). The metal wheels to which the hubs are attached are only the width of the metal rails, but they are sufficient to do their job. The rubber tires can be removed and the bus will run without them, but it looks strange when doing so.

The attached rubber tires lightly touch the top edge of the outer rails and act somewhat like traction tires.

The SuperStreets shorty bus was offered in several colors and types besides the original actual school bus, including a Ringling Brothers circus bus and a prison van that had painted metal gratings and bars on the windows.



Figure 6: The bus's rubber tires are mounted on plastic hubs attached to metal wheels that are only a little wider than the roadway rails.

Generic Sedan

- Roughly 1:48 size car has features of many 1950s through 1980s sedans.
- The only car ever produced for 'Streets.
- Uses the metal 'Streets chassis.
- Produced by WBB from 2013.
- Has clear windows and interior for only the front half of sedan, but no driver.
- Construction is the opposite of all previous 'Streets vehicles: heavy metal chassis, lightweight plastic body.



Note: sedan comes with no driver—author added that shown here
Length = 117 mm Width = 42 mm Height = 37 mm Wheelbase = 68 mm Weight = 7 ounces

The first new vehicle produced for 'Streets since 2005, the Williams by Bachmann (WBB) sedan was the first car produced for 'Streets, the first vehicle with a metal chassis, and the first with a plastic body.

The car is not a model of any particular real automobile but has features of many different sedans. It is about the size of early 1950s full-size sedans or late 1970s midsize cars. Available in several colors as a plain family sedan, it is also offered as a taxi or police car (Figure 7). The body looks a bit toylike due to its rather rectangular bumpers, overly square lower body, and unrealistically thick A pillars. But it is a car, looks good running on 'Streets roads, and has a very clear generic styling that allows it to blend into nearly any era or theme of a model layout.

WBB designed and manufactured a completely new chassis for the sedan, with two unique features. First, it is metal, meaning it is heavy enough on its own to overcome the spring pressure of its center pickups and set itself firmly on the rails. For that reason, this all-metal chassis will run by itself, without a body on it.

All previous 'Streets vehicles, which used a lightweight plastic chassis, needed die-cast metal bodies to provide enough weight to run. Second, the chassis has an adjustable wheelbase. It can be shortened or lengthened by 20 mm. No doubt WBB did this so that future vehicles can be varied as to size, but it makes the sedan a perfect platform for many diecast body conversion projects.



Figure 7: Police and taxi versions are offered, as well as several private sedans.

'Streets vehicles never produced but advertised included some very appealing offerings. In its 2005 Vol. II catalog, K-Line announced seven 'Streets vehicles. Just two—the delivery step van and the school bus—made it into production. The other five—all fire and police vehicles—never were produced and were dropped from subsequent catalogs. They were:

- A 1982 Camaro police cruiser (Figure 8)
- A Ford 350 Ambulance
- A Ford F-350 police or fire panel van
- A Chevy Blazer utility vehicle
- A Chevy Blazer tow truck

The F-350 van is puzzling since K-Line already offered another van with light bar in 2004. It could have been repainted and offered at a lower cost than this new body. Regardless, none of them ever made it into production (Figure 9).



Figure 8: This NYPD Camaro was shown in K-Line's 2005 Vol. II catalog but never put into production. The author made this car by bashing K-Line products in production at the time, in much the same way K-Line probably made the mockup for those catalog photos.



E-350 Ambulance



Fire Dept. Wrecker



Police Van



Police Utility Vehicle

Figure 9: In its 2005 Vol. II catalog, K-Line offered these SuperStreets vehicles in both fire and police versions. None were ever produced.

Speeders, track maintenance, inspection vehicles, handcars and clown cars will run on 'Streets too (Figure 10). In fact, just about any two-axle O-gauge unit with a wheelbase less than four inches will run on D-21 or D-16 track—they have wheelbases about as short as vehicles designed specifically for 'Streets. All of these units are popular as additional running units on 'Streets layouts. In fact, some have been shown in catalogs running on 'Streets road (K-Line's Speeder in its 2005 Volume II) or have actually been offered as SuperStreets-associated products (Lionel's track speeder in its 2007 K-Line by Lionel catalog).

Trolleys. Many but not all O-gauge trolleys will run on D-21 curves. A very few will run on D-16, too. Lionel packaged its Birney trolley in a SuperStreets RTR set with D-16 curves in its K-Line by Lionel catalogs. It slows quite a bit in D-16 curves but makes it through. Most four-axle trolleys that will not make it through D-16 can be easily modified to do so by opening up the swivel angle of their trucks (Figure 11).



Figure 11: Most trolleys run through D-21 curves but only a few can handle D-16. This Atlas trolley runs well through D-16 but has had its truck swivel limiting screws removed, which required disassembly.



Figure 10: Track speeders and clown cars run fine on 'Streets roadways and are very popular with kids of all ages.

Williams by Bachmann advertises its Peter Witt trolley as “negotiates D-21 curves”—it runs nicely through them but has problems on D-16 curves. WBB’s Peter Witt, MTH’s PCC, and Atlas’s trolley run on D-21 but not D-16. With larger trolleys, “stick-out” on curves can be an annoying problem (Figure 12). It is best to measure and plan for it when laying out the roadway rather than find out later that there are clearance issues.



Figure 12: This Atlas trolley overhangs the outer edge of the road by about $\frac{7}{16}$ inch on D-16 curves and overhangs in the inner edge of its lane by about $\frac{1}{4}$ inch. Some trolleys overhang more. See also Chapter 4, Figure 2.

ALL O-gauge locomotives and rolling stock will fit onto straight 'Streets road sections. The gauge is correct, and the grooves alongside the rails in the roadway sections are deep enough for the flanges on most any locomotive or freight or passenger car. However, most locomotives and passenger cars, more than a few freight cars, and many cabooses cannot make it through D-21 or D-16 curves.

Most very short two-axle locomotives will run on 'Streets roads. All models of Porter and Plymouth switchers the author has tested run fine through both D-21 and D-16 curves.

Among larger two-axle locos, the RMT BEEP is probably the most notable model that will run on 'Streets. While large (for 'Streets), its actual wheelbase is only just slightly more than that of some stock 'Streets vehicles such as the vintage truck. Unlike 'Streets cars, trucks, and buses, BEEPS and many other small locomotives run

only on AC, so anyone desiring to run them on 'Streets will have to use only an AC power supply.

Many short four-axle diesel switchers will not only run on 'Streets but run on it better than much smaller two-axle units do. Their swiveling trucks give them an advantage in making it through curves. The RMT BANG is an example. It runs through D-21 curves nicely. RMT's Budd car will make it through D-21 also but has rather extreme overhang problems.

Very often, the only reason a trolley or small locomotive or freight car will not go around a D-16 or D-21 'Streets curve is that its trucks cannot swivel to enough of an angle to fit the curve. In some cases, modification can open up that swivel angle so they can. Modified in this manner, the Bang as well as other O-gauge diesels in that size category can make it through D-16 (Figure 13).



Figure 13: Just because you can...should you? This RMT Budd car (left) and Bang (right) will pass through the author's downtown loop. The BANG has been modified to increase its trucks' swivel angles so it will pass through D-16 curves as well as D-21. The Budd car is stock and makes it through D-21 and some D-16 curves, but only with great difficulty. While they both run on 'Streets curves, they are a hazard to everything around them as they do. On the left, the WBB sedan in the foreground is about to be knocked aside as the Budd car sweeps around the D-21 curve, and the BANG on the right side typically snags on a few parked cars unless they are moved well away from the edge of the 'Streets roadway's.

Table 3-1: Vehicles Produced for 'Streets Roadways or That Will Run on It

Vehicle	K-Line	K-LBL	WBB	TMCC	D-21	D-16	Comments
Generic Panel Van	K2629-01 to -10 and K2625-XX				Y	Y	Pre-dated 'Streets. Has F-N- R e-unit and operating lightbar and headlights
Generic Panel Van	K899-119 to -123	6-21154, 6-21278, 6-21279, 6-21517, 6-21569, 6-21570, 6-21679, 6-21706	42721 - 42724	Lionel 6-22501	Y	Y	Only vehicle type produced by all three manufacturers.
Vintage Truck	K899-101 to -118	6-21270, 6-21295, 6-21296, 6-21297, 6-21543, 6-21658, 6-22235, 6-22523			Y	Y	
Delivery Step Van	K899-130 & -131	6-21455, 6-21456, 6-21552, 6-21577, 6-22267, 6-21651, 6-21656,		Lionel 6-22510	Y	Y	Slows more than others on D-16 curves
School Bus	K899-126	6-21262, 6-21549, 6-22206, 6-22249, 6-22638			Y	Y	Slows least on D-16 curves
Camaro	K899-139						Never produced
Ambulance	K899-119						Never produced
Wrecker	K899-133 & -136						Never produced
SUV	K899-132 & -135						Never produced
Police van	K899-137 & -138						Never produced
Sedan			42725 - 42725		Y	Y	
Birney Trolley		6-21149 & similar			Y	Y	Handles D-16 but runs best on D-21
Speeder (enclosed)		6-21169 & similar			Y	Y	
Speeder (open) or clown cars		6-21649 & similar			Y	Y	
Early era insp vehicle				As Lionel 6-38800	Y	N	Will not run on Streets without modification.
Station wagon inspection		6-28440 & similar			Y-N	N	Binds on tight curves
Dodge wagon inspection		6-18484 & similar			Y	N	May require modificaiton to widen swivel angle of lead and trailing axles
Handcars - any manuf.	various from several vendors				Y	Y	
Plymouth Switcher	Lionel 6-22624 & similar				Y	Y	Handles D-16 but runs best on D-21
Porter 0-4-0 switcher	Lionel 6-21320 & similar				Y	Y	Handles D-16 but runs best on D-21, overhang an issue
Atlas Trolley	Atlas 1008108A and similar				Y	N	Mods needed for D-16, overhang can be severe
Williams Peter Witt			23910 and similar		Y	N	Modification can make it run on D-16
MTH PCC	Railking version 30- 5122-1, and similar models				Y	Y-N	Mods may be needed
RMT Bang	See RMT (Ready Made Toys) website				Y	N	
RMT BEEP, BEEF					N	N	Won't run and can't be modified: wheelbase too long.
RMT Budd					Y	Y-N	Very tight on D-16
Lionel 0-4-0 Shifter	6-11380, etc.				Y	Y	Runs well but but looks silly doing it, severe overhang
Lionel Percy	6 - 18177, etc.				Y	Y-N	
Track maint., etc.	various from several vendors				?	?	Some do, some don't.

Planning 'Streets Roadways

4

This chapter addresses important aspects of building 'Streets roadways, including the characteristics of basic road topologies that have to be considered when planning layouts. It reviews pitfalls to avoid and gives tips for designing a fun, dependable roadway system.

Summary of Key Concepts

Loops. 'Streets roadway is nearly always set up as loops, so that vehicles can run continuously. One can build "linear" roads where a vehicle can go only so far before running out of road, but since stock 'Streets vehicles cannot be put in reverse, why?

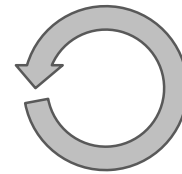
Two-Lane Roads. Many people elect to build two-lane roadways, using the D-16 curves nested in D-21. In reality, these are two separate roadway loops set up to look like a single two-lane loop, with traffic in both directions.

Topologies. The two basic topologies distinguished here are the oval and the dog bone. Both are, technically, loops. A dog bone has just had its two side straights brought together as two lanes side by side. The distinction is often important to a model railroader, as will be discussed later.

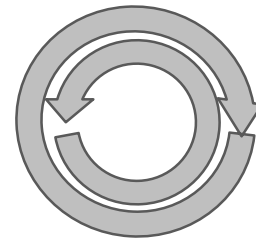
Using the Third Dimension. When on straight roads, 'Streets vehicles can climb slopes of up to 17% (two inches in one foot). It takes thinking and experimentation to use the third dimension well and fully. But beyond the fun that over-and-under roads provide and the added interest that routing a road through mountains and hillsides can bring, it provides an owner with a lot of additional flexibility in fitting 'Streets roadways onto a layout well.

USEFUL CONCEPTS

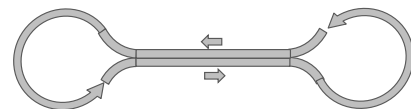
Loops provide continuous running.



Two lanes look more realistic.



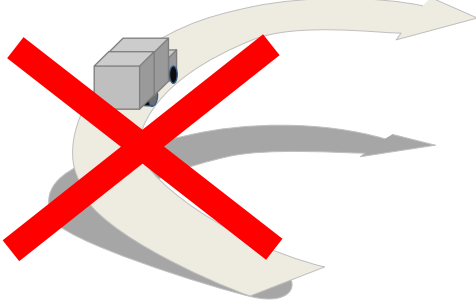
A "dog-bone" loop can create a two-lane road from a single loop of track.



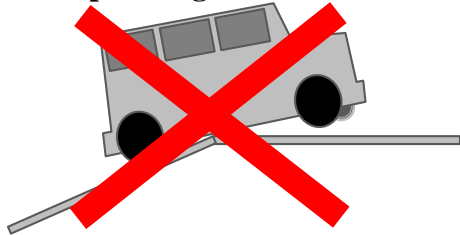
Vehicles climb phenomenally well on straight road sections.



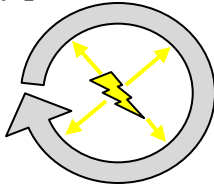
Vehicles climb very poorly on curves.



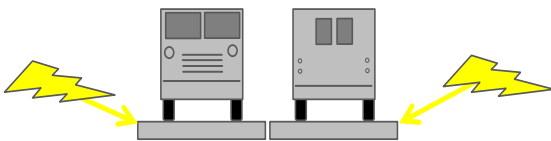
Avoid abrupt changes in incline.



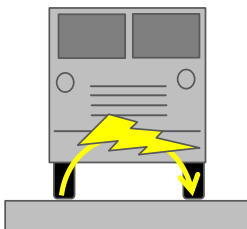
Feed power to the road at many points.



Use one power supply for each lane of each loop.



Be wary of using rail-rail circuit closure.



Vehicles don't climb well on curves. While 'Streets vehicles are prodigious climbers on straight roads, they'll climb less than half as well on D-21 curves and only a fifth as well—very poorly—on D-16. *It is best to try to limit steep climbs to straight roads.*

Blend changes in slope so there are no sharp transitions in angle of incline. The track prefers to bend at junctions when changing slope, but abrupt changes in slope lead to derailling and stalling given the very short wheelbase of the vehicles. It is often necessary to drill additional screw-down holes to mount track so it bends smoothly.

Feed power to the track every eight feet or ten junctions, whichever comes first. This is a conservative recommendation but highly recommended, particularly if the roadway will be permanent. Section-to-section connections that work well enough when new can tarnish over time until they give problems.

Use one power supply for each lane of each loop. A sufficiently large power supply can power all lanes of all loops on a layout. But using several smaller separate sources provides individual control of each lane, increasing fun and satisfaction.

Test to see if isolated rail blocks will work before depending on them. Isolating one outer rail so that a vehicle rolling across it will close a circuit through the other outer rail is a popular way of operating three-rail accessories as well as activating blocking. Fewer wheels and less weight mean that 'Streets vehicles do a far less dependable job of this than toy trains.

Later sections in this chapter will discuss all these basic concepts at length.

Simple Roadway Loops

A single-lane loop of 'Streets road sections is the simplest and most basic 'Streets configuration, yet it can provide a lot of movement and fun. In Figure 1, a D-16 circle (eight pieces) is extended with straight roads to make it a long oval. Each straightaway portion requires two straight-to-curve transition connectors—one at each end—and any number of 5- or 10-inch straight pieces to extend it as far as desired. The single-lane loop thus requires:

- One full circle of curves (eight pieces)
- Two sets of transition and straight pieces
- An equal length of straight on both sides

And two feed wires—applying the author's recommendation for a feed wire every twelve junctions or ten feet, the eight curves and the four transition connector pieces make for

twelve pieces. Any straight pieces beyond that push the count above the recommended number for just one feed wire. However, this rule is very conservative and mostly aimed at 'Streets roadways *permanently* installed on a layout. A single feed wire can be used on roadway loops set up as below, "carpet central" layouts, or where one can easily reach to jiggle roadway junctions if electrical problems develop. Still, owners ought to keep in mind that additional feed wires will make vehicles run smoother and more evenly, and it will avoid problems. The recommendation is based on the author's experience and observations of the experiences of others over time.

Two-lane road loops are built by nesting D-16 curves inside D-21 curves (Figure 2) and extending both loops with equal lengths of straights, as was shown in Figure 1. All four straightaways are made of identical sets of



Figure 1: This basic 'Streets loop consists of eight D-16 curves, four curve-to-straight transition connectors, and eight 5-inch straight road sections. It is similar to the loops provided with many RTR sets. Here and elsewhere, the author has deliberately used several pieces of the older SuperStreets roadway (lighter gray) mixed in with WBB roadway pieces (darker gray, as if newer asphalt) to make the point that there is *no* difference between the old and new roadway pieces except the color. New WBB pieces even have the original K-Line product numbers still molded on their underside.

pieces: transition connectors on each curve end and the same lengths of 5- or 10-inch straight road sections. One needs:

- one full circle of D-16 curves (eight pieces);
- one full circle of D-21 curves (eight pieces);
- eight transition pieces;
- four sets of equal-length straight sections.

The two resulting lanes are separate roadway loops, both physically (a car in one stays on that alone and never runs on the other) and electrically (each loop needs its own electrical feed). The owner can choose to power both loops with one power supply, in which case feed wires must be run from that one supply to each of the loops. But most owners elect to use two power supplies, one for each lane, in order to be able to adjust speeds and operate each lane independently of the other.

Interference between vehicles in opposing lanes—one hitting the other as they pass in nested curves or adjacent straights—occurs with wider stock 'Streets vehicles. The step-van cannot pass another step van without each knocking the side mirrors off the other, etc. Owners planning to use trolleys, Porter and similar small locomotives, or longer bashed/custom-built buses and tractor trailers need to check clearance in corners carefully (Figure 3). If there are problems, there are two solutions:

- Run only one large vehicle in one lane only. But there may be clearance problems anyway if it is a trolley.
- Separate the lanes with a space, as will be covered in Chapter 7.



Figure 2: This two-lane road is made with nested D-16 and D-21 curves. They create a two-lane street as is common in most cities and towns—and on most toy train layouts.



Figure 3: This Williams by Bachmann Peter Witt trolley runs fine on D-21 Streets curves. It will make it around the downtown loop shown here, just clearing the retaining wall behind it and narrowly missing the fireplug at the next corner (seen in Figure 2 above). But it will collide with even the narrow vintage truck, as shown here.



Figure 4: A two-lane dog bone is a loop “squashed” so the straights are adjacent in order to form a two-lane street. That “street” is 25 inches here, but it can be extended as needed.

Dog-Bone Loops

Figure 4 shows a *two-lane dog-bone*, or barbell, road loop, popular because it inexpensively creates a two-lane street on which continuously running traffic can be set up. It is just a single-lane loop “squashed” so that its two straight sections run side by side. Making this configuration requires all those roadway pieces needed for a basic single-lane loop plus four extra curves (for a total of twelve).

The dog-bone loop is popular because it

- creates a two-lane street with one loop—it costs less than using two loops;
- requires less space on the ends—a two-loop, two-lane road would be D-21 wide.

This basic loop can be twisted into any manner of more complicated two-lane

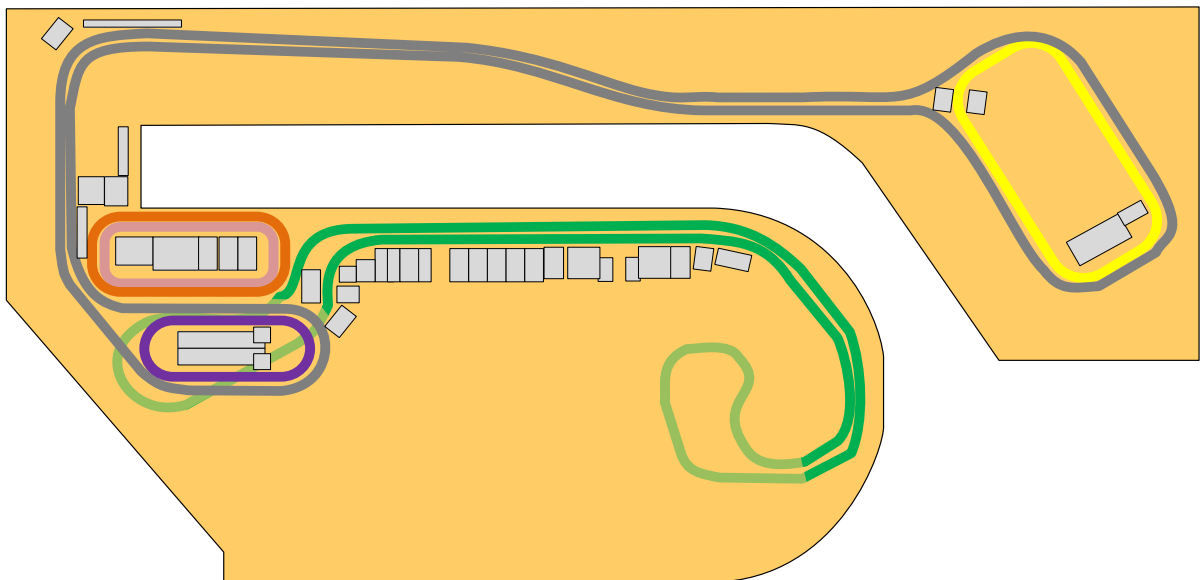


Figure 5: The author has six 'Streets loops on his layout (train tracks not shown), each presented here in a different color. They are all arranged to create two-lane streets and roads. Gray country road and green downtown street are both dog bones twisted to fit the layout. Lightly shaded portions of the green loop pass into tunnels and are under the terrain and out of sight. Layout is 28 x 16 feet edge to edge. Gray boxes are buildings.

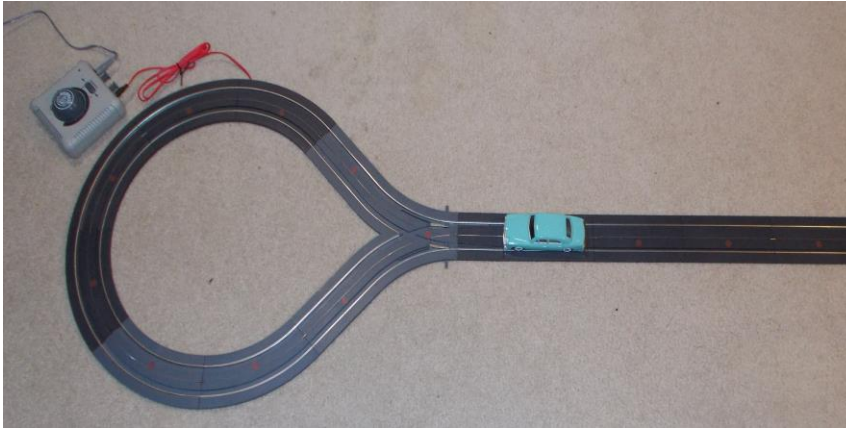


Figure 6: The single-lane dog bone requires two Y-sections plus six D-16 curves, as shown here, at each end. The advantage of the single-lane dog bone is that it most inexpensively produces a long, single-lane, straight road that still permits continuous running as around a loop.

Compared to the two-lane dog bone, the one-lane dog bone uses four fewer curves and only half as many straights, but it requires a Y-section piece for each reversing loop. Since Y-sections each cost about six times what curved pieces cost, this is less costly than a two-lane dog bone of equivalent length only if the central section is at least eight sections long. Few model railroaders pick this configuration for the savings it gives; most pick it because two lanes will not fit where they want a road to go.

The sole advantage a one-line dog-bone has is that it has only the single lane, which can be routed through a very narrow space on an existing layout: it may fit where nothing else will. While a one-lane dog-bone may fit where two lanes will not, a major disadvantage that one cannot easily work around is that only one vehicle can run on it at a time. Put two vehicles down to run on this type of loop, and eventually they will meet on the central section coming in opposite directions on the central section—a head-on collision.

By contrast, one can run two, three, or more cars on a two-lane dog-bone. The author runs up to four at once on his 60-foot downtown two-lane dog-bone (the green route in Figure 5, previous page). While stock ‘Streets vehicles,

don’t run at exactly the same speed at most voltages, they run at very nearly the same speed, particularly in the middle of their voltage range, from 7 to around 12 volts. Closure rate of the fastest to the slowest is usually only a few feet per minute. They can be space around a long loop fifteen to twenty feet apart and they will run at such similar speeds that the owner will only occasionally have to separate vehicles that have caught one another.

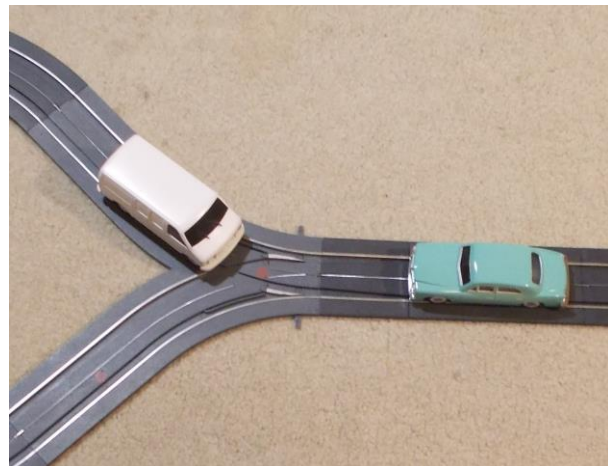


Figure 7: A head-on collision will occur if two cars are run at the same time on a single lane dog-bone. Only one vehicle can be run at a time on a one-lane dog bone.

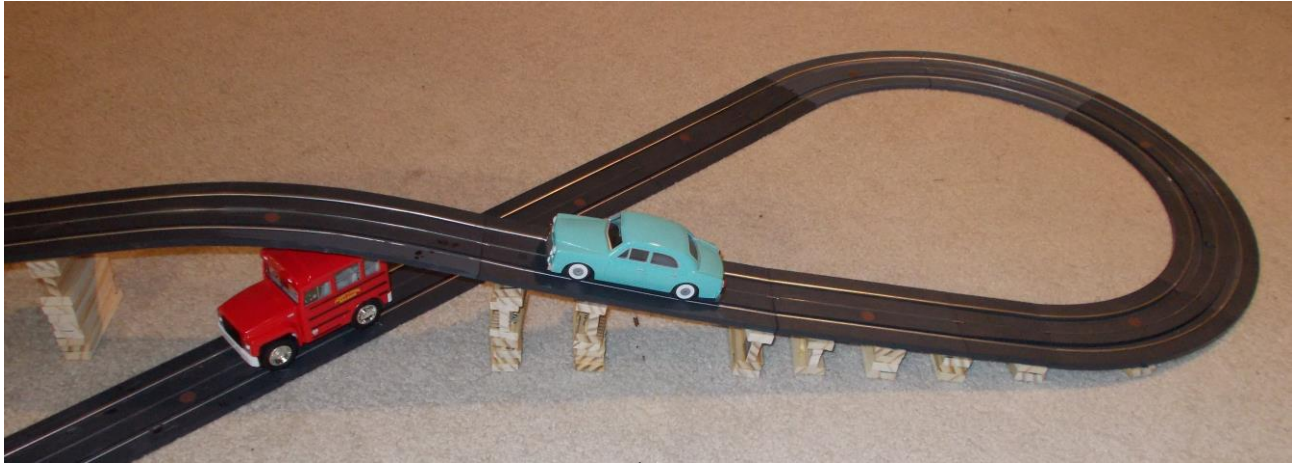


Figure 8: This road crosses over itself with a $3\frac{1}{8}$ -inch clearance. A 10-inch road section at the top has been bent to smooth the transition in incline angle. (See Chapter 5, Figure 13)

Slopes and Elevation

In Figure 8, a 'Streets road crosses over itself. The road leading to the overpass must climb to a sufficient height to pass over vehicles below. Like toy train track that is elevated, 'Streets roadway needs trestles or supports at intervals in order to be properly supported (figure 9).

'Streets road sections are plastic and prone to bending and sagging. It is best to support an overpass entirely along its length if building a roadway permanently. Quarter-inch or 5 inch plywood supported by solid columns or

foundations at each end is recommended for overpass spans under 10 inches long and three-eighths inch plywood for those up to two feet

Net Clearance under the overpass needs to be at least 66 mm (just under $2\frac{5}{8}$ inches)— the height of the tallest standard 'Streets vehicle (Figure 8). Given that future vehicles and trlleys might be taller still, and that some open-air clearance above the top of vehicles passing under an overpass looks best, three inches is a recommended minimum, although three and one half of four looks even better..



Figure 9: Three and one half inch blocks hold the upper roadway here at just under four inches above bench-top level, and prvide a rather natural look to the clearance above the bus.

Planning inclined road sections. To that required 3- or 3½-inch clearance, one must add the thickness of the road (⅓ of an inch) and its support (¼- or ⅜-inch plywood) for about ½ inch in total. So this makes for a total of 3½ to 4½ inches of elevation that a roadway must climb for a road overpass. For clearing train track, the author prefers to use 5½ inches for the train, plus ½ inch for the track and roadbed, for 6 inches clearance needed.

’Streets vehicle types differ a great deal from toy trains in their climbing ability. In all cases, traction, not power, limits climbing. The actual vehicles have nearly enough power to climb vertically, but not nearly enough the traction. Some vintage trucks—those with two traction tires—are by far the best climbers. The school bus does not really have traction tires (see Chapter 3) and is generally not a good climber. A very few K-Line by Lionel vehicles were made with none and climb poorly.

The WBB panel van has one traction tire (usually on the passenger side). It was tested as representative of WBB vehicles on sale now (the sedan also has just one, on that same side).

Table 1 shows that on straight slopes, the van

will begin from a standing start and proceed up an incline as steep as 15%—nearly two inches’ rise per foot. It runs somewhat slower than on level ground, but otherwise, it handles the slope well. If given a running start, it will handle nearly 19%, or about 2½ inches’ rise per foot. On slopes steeper than those, it slows if given a running start, and, regardless, eventually just sits in place with its wheels spinning.

On curves, climbing ability depends somewhat on whether the traction tire is on the inside or outside of a curve. Vehicles climb steeper slopes if the traction tire is on the outside (see table), but one cannot assume this will always be the case (manufacturers occasionally change sides from one production run to the next).

Recommended maximum inclines for ’Streets roadways are shown in the rightmost column of Table 4-1. These recommended steepest slopes result in the climbing distances shown in Figure 11. If climbs can be arranged only on straight roads, the distance needed is less than 2½ feet to clear a roadway and just over 4 feet to clear a train track. However, required distances will be longer if D-21 or particularly D-16 curves are involved—a vehicle spends so much of its

Table 4-1: Climbing Tests for a WBB Panel Van

A WBB van was tested for scale speeds at 12 VDC on a 10 ft. straight and a spiral of curves that were gradually raised in inclination until it would not climb.

Type of Road	Vehicle Will Climb		Recommended	
	From a Stop		Running Start	Maximum
Straight road	15%		17%	12%
D-21, traction tire on outside	13%		16%	7%
D-21, traction tire on inside	10%		12%	
D-16, traction tire on outside	10%		12%	3%
D-16, traction tire on inside	5%		7%	

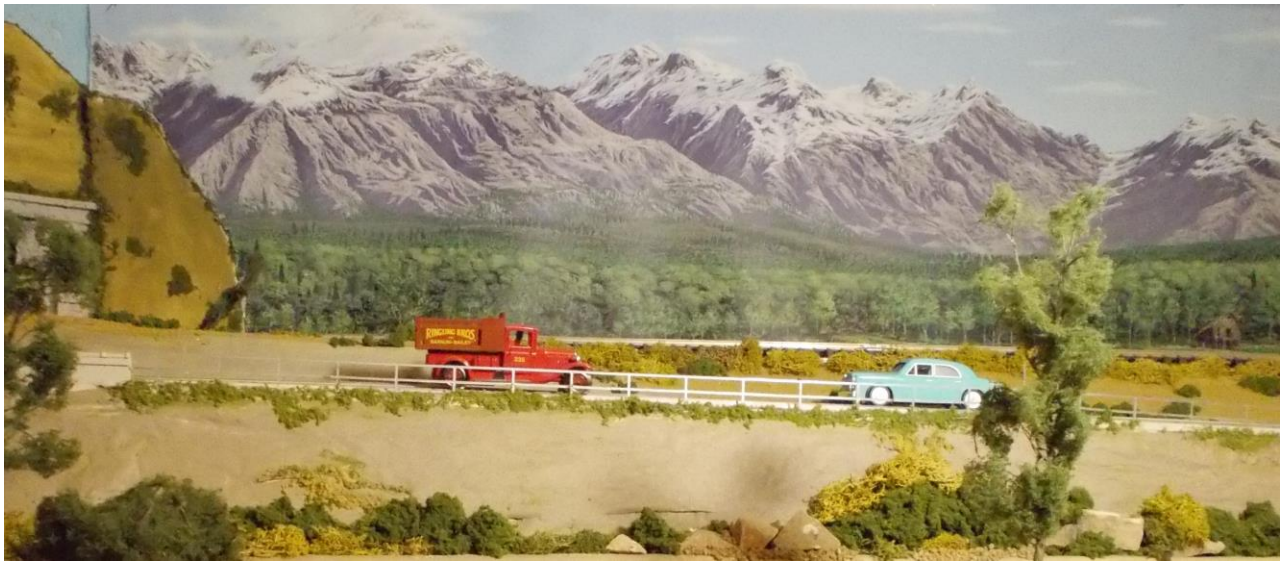


Figure 10: The largest road incline on the author’s layout rises 7 inches in 12 feet of straight road—an incline of just 4.9%. The low incline results in a more natural look and more even vehicle speeds up and down slopes.

energy and traction pushing itself around a D-16 curve that it has little left for any climb. Therefore, wherever possible, owners should arrange climbs so they are mostly on straight road or D-21 curves. When a climb involves straights and curves, the rate of incline can be varied—more on straights, less on curves. Vehicles towing trailers (see Chapter 7) will not climb nearly as well as those without—one has

to try each to see. However, vehicles carrying heavy loads or vehicles that have been converted to heavier die-cast metal bodies may actually climb better due to improved traction. Regardless, the inclines shown below are the *maximum* recommended. Both more natural look and smoother running come from using lower incline angles where possible.

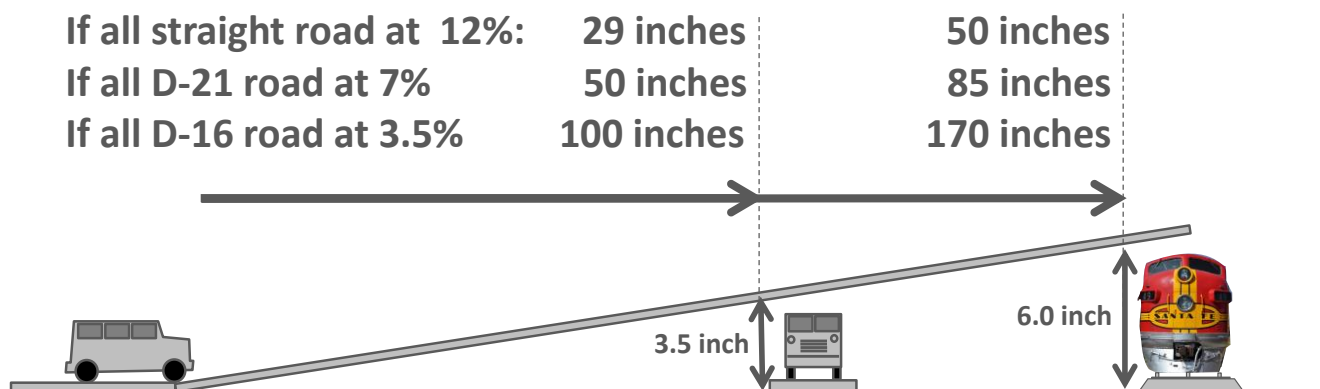


Figure 11: Recommended incline rates result in these needed distances for climbing road sections.

Building Town Roads and City Streets

Many model railroaders love to build a town or city scene on their layout. 'Streets road was designed to fit nicely into such scenes. The first K-Line catalogs show it "coexisting" with a downtown setting including buildings, sidewalks, etc.

Fitted with a single $2\frac{1}{2}$ -inch straight section at the halfway point of its end 180 degree curves, (Figure 12), a half circle of two-lane 'Streets provides $14\frac{1}{2}$ inches of room side-to-side inside its inner loop. That interior space provides room for two sidewalks and back-to-back 6-inch-deep buildings, such as those sold by MTH, Ameritown, or Lionel, on the inside of the loop (Figure 13).

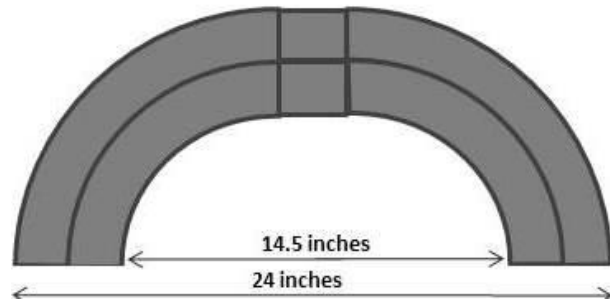


Figure 12: Inserting just one $2\frac{1}{2}$ -inch straight section at the ends of a D-16 loop (the inner loop of a two lane street loop) will create room for a full "city block" inside the loop. Sidewalks and buildings facing both sides of the loop can all fit, as shown in Figure 13.

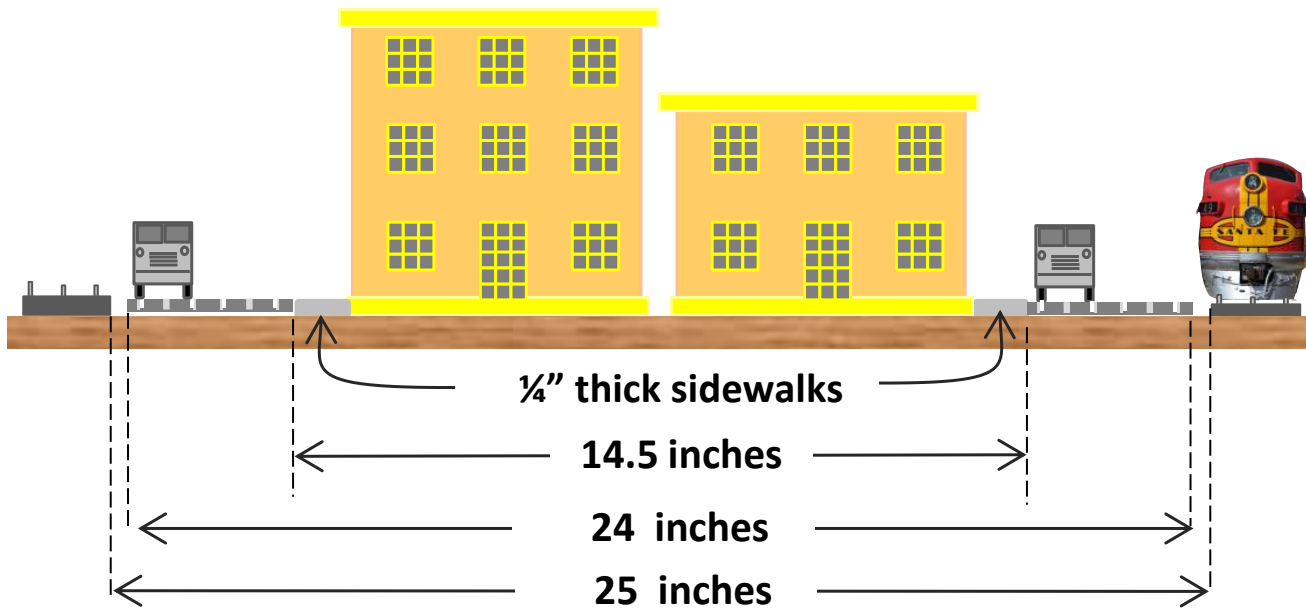


Figure 13: The inner D-16 curve augmented by just one $2\frac{1}{2}$ -inch section permits an entire city block to be built inside it, including sidewalks and buildings facing both sides of the loop. See Chapter 7 for how sidewalks (and a very narrow alley, if wanted) are made of $\frac{1}{4}$ " basswood.

Setting Up Display Roads

Most owners want to put roadways where they will permit close viewing of vehicles as they operate. The author refers to these as *display roads*—roads designed to provide maximum viewing of moving vehicles. Where they can fit, two-lane roads are preferred—they provide twice the volume of traffic to operate and watch.

Generally, straight roads close to the edge of the layout (Figure 14) and running parallel to its edge make the best display roads. They provide a lengthy and continuous view of vehicles as

they operate. Roads elevated by a climb to a hillside or cliff's edge farther back in the layout also work well as display roads. Figures 14 and 15 show layout plans where 'Streets' was added after the original track was in place. Both provide for a good display road in spite of the modest size of the layouts and the preexisting track. The layout in Figure 14 also provides a nice perspective view of traffic moving away up a street with buildings on both sides of it, as seen from the ends of the layout.

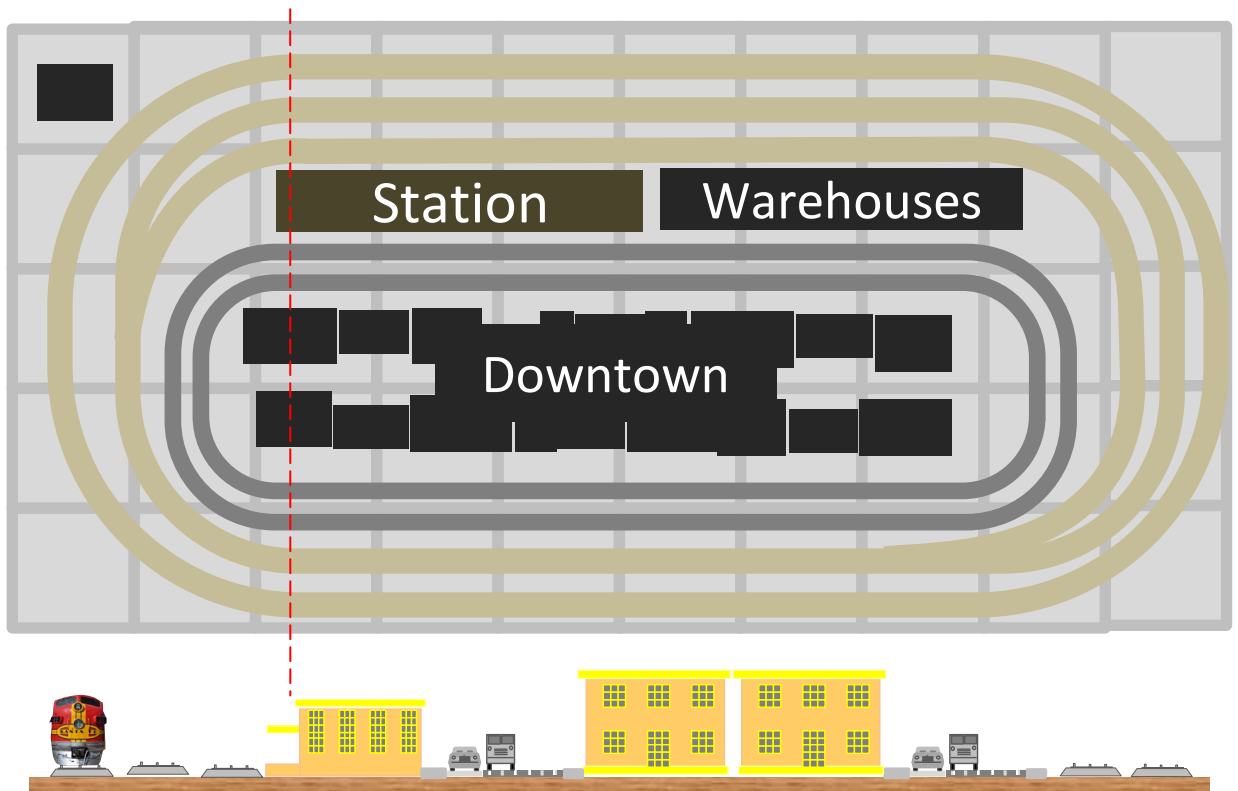


Figure 14: Two loops of roadway (dark gray) forming two-lane streets fit easily inside an O-36 train loop on this 5 x 10-foot layout (beige), leaving room for sidewalks and parking lanes. The rightmost side of the loop is within about a foot of the layout's edge on that side, allowing close-up viewing of vehicles. The leftmost street provides an impressive sight up the street from the lower end of the layout, with traffic moving back and forth toward the viewer and buildings on both sides of the street. Sufficient room has been left to put one-inch sidewalks on both sides of the streets. The red line indicates the location of the cross section shown.

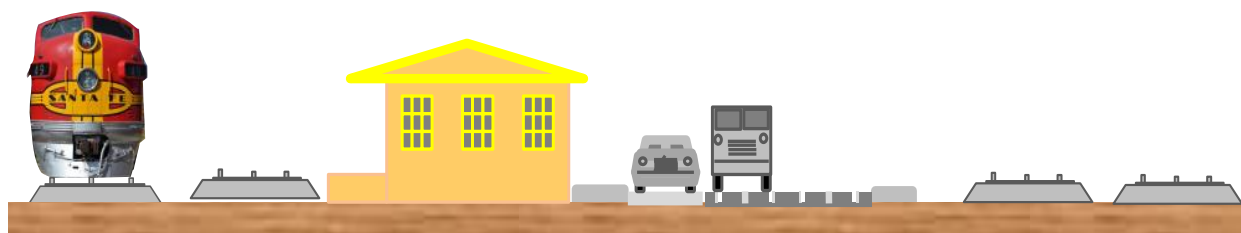
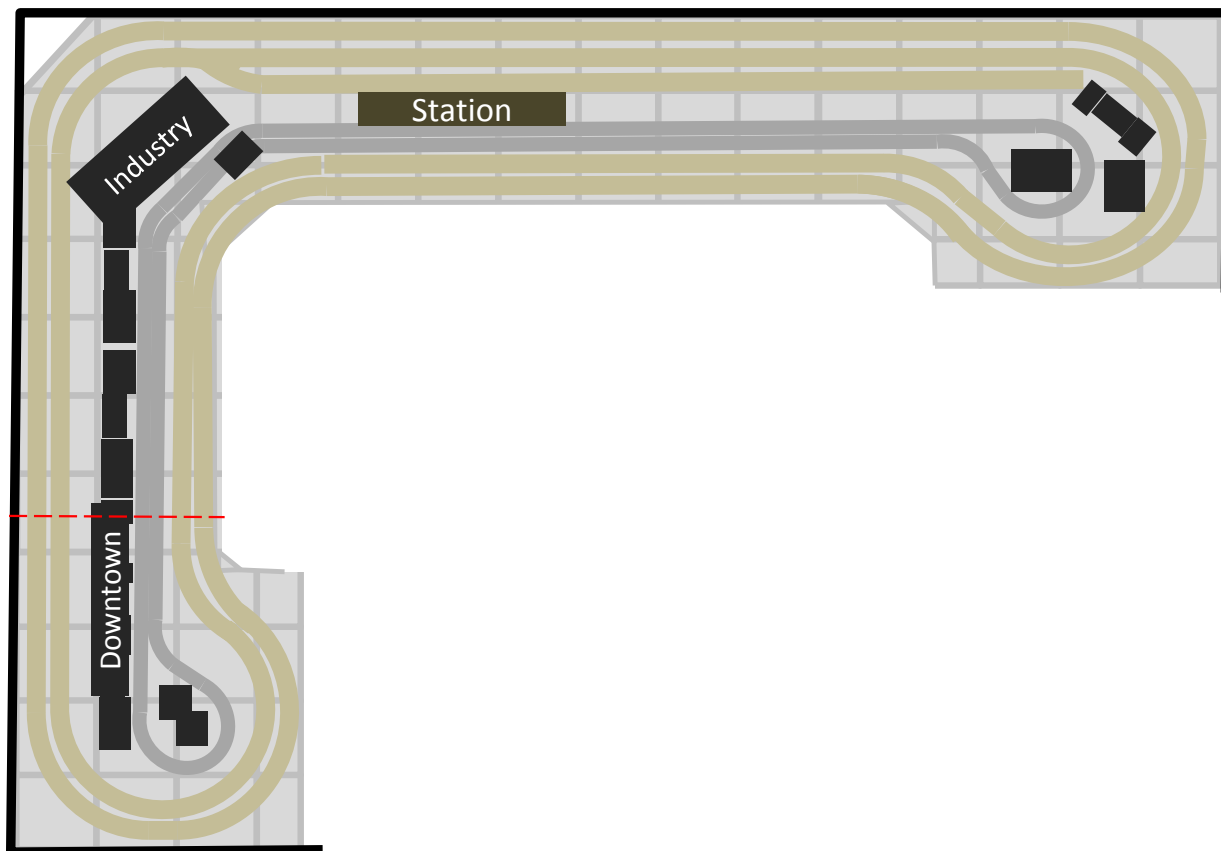


Figure 15: A two-lane dog-bone loop was selected for this shelf layout built along two walls of a utility room. This single loop provides nearly 18 feet of two-lane display road located within fifteen inches of the layout edge and fits with enough room to put 1 $\frac{1}{4}$ -inch sidewalks on both sides of the road and a parking lane on one side. The red line indicates the location of the cross section.

Erratic isolated-rail operation

Isolating one outer rail on a short section of track so that a train rolling across it will close a circuit to the other outer rail, thus activating a crossing signal or blocking relay, has been a popular way of activating O-gauge accessories and staging traffic for decades. Such operation on 'Streets can be made to work, but it is often annoyingly undependable and erratic because

- there are fewer axles than on trains, hence fewer pathways for circuit completion;
- the vehicles are lighter. Perhaps weight beyond what is needed to assure contact should not matter, but it does. The author suspects that with no suspension and very rigid chassis, the vehicles may actually ride on only three wheels at times, or at least roll with not all of them in good contact.

Regardless, if an owner's plan depends on such circuit activation, as for example to block a vehicle coming from one direction if another is about to enter a crossover piece at a figure eight's intersection, the owner should anticipate having some initial problems to work out, if not also occasional continuing headaches.

There are actually two problems that occur. First, as mentioned above, the circuit closure for activation may not be as dependable as it can be with toy trains—it may work sometimes and not others. But second, and worse, the vehicles are likely to stutter and even stall on the isolated-rail section. Providing power to just one outer rail reduces the number of wheels that are directly receiving power from three (the traction tire is not counted) to two or one, depending on which side that traction tire is on.

If problems develop, solutions include:

- Keeping track and wheels well cleaned.
 - Adding weight to a vehicle.
 - Shimming that road section side to side and/or end to end. The author reached the conclusion that vehicles sometimes run with only three wheels in contact with the rails chiefly because shimming road sections to subtly adjust height side-to-side helps in many of these situations.
 - “Adjusting the suspension.” 'Streets front axles actually do have a tiny amount of suspension travel built into them. Chapter 6 shows photos of the copper front-axle finger springs that are used in every type of 'Streets vehicle ever made. It explains how they can fatigue and flatten over time. One consequence of that is that they stop providing good electrical contact between axle and motor, and the vehicle runs poorly or not at all. But in addition, when in good condition and with sufficient “springiness,” these delicate springs push the whole front end up off of the chassis and axle and provide a tiny amount—less than $\frac{1}{32}$ inch—of suspension travel for each wheel. It is enough to make a difference.
- If an owner finds that some vehicles activate the isolated-rail section well but one vehicle consistently underperforms the others in activating that switch, a tired spring or a torn outer-rail connector wire is almost certainly the cause. Chapter 6 has a section that explains how to diagnose and fix this problem.

Unavoidable Gaps. There are legitimate ways of connecting standard 'Streets road sections together that result in “mismatches” where no standard piece of 'Streets road will fit to complete the loop (Figure 16). In such cases, owners must either modify the plan they have made or make a custom-sized piece as described in Chapter 5. While one can usually find an alternate way to connect the pieces that uses only standard pieces and is close to the desired configuration, the reader is encouraged to learn how to make custom-length pieces.

As a general rule, anyone laying out a large loop(s), particularly one tailoring a 'Streets roadway to fit onto an existing layout and route itself in and around train track already in place, should anticipate that customized pieces, each tailored to specific locations, will be needed. Chapter 5 discusses how to make these pieces and shows several examples of their use. The slight amount of effort required is usually a small price to pay for getting exactly the route and location of display roads and high points of the roadway as one wants them.



Figure 16: Some configurations require custom pieces; some do not. The two-lane dog bone at the top requires a custom-cut piece where the gap shows. No standard piece is the right length. By contrast, the dog bone on the bottom, created by mirror-imaging the loops at the ends, works out with only standard pieces—any mismatch in geometry is counterbalanced by that from the other end. Realistically, owners who want a specific route can anticipate having to make several custom pieces. Fortunately, it is easy to do, as will be discussed in Chapter 5.

Setting Up 'Streets Roadways

5

In many ways, model railroaders will feel **right at home** setting up and installing 'Streets roadway because in most regards, it is very much like toy train track. But before taking up some real differences that owners need to understand, it is best to review a few basics that are particularly important with 'Streets.

Connect and seat sections correctly. Electrical tabs should be clean, straight, and fully inserted. When fitting roadway pieces together, the center-rail clip must be inserted with its open side at the top and seated fully on both sides of the junction. Both plastic locking tabs should snap into place.

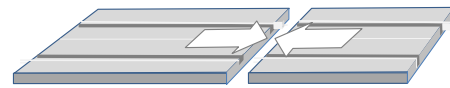
Don't force the fit. With traditional tubular track and "roadbed-less" track like Atlas, a model railroader can slightly compress a loop by $\frac{1}{2}$ inch or more even though it really does not line up correctly, forcing it to fit. With 'Streets road pieces, as with FasTrack and other roadbed-included train track, doing this will definitely lead to track junctions that open up during operation.

Anchor the roadway. 'Streets road pieces tend to slide across bench tops easily because they are light and have a large, low-friction footprint. Owners will find they "migrate" unless they are anchored in place. Number-four tapered-head screws of $\frac{1}{2}$ - $\frac{3}{4}$ -inch length work well.

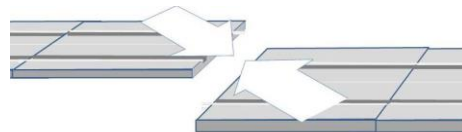
Don't screw it down too far. Track pieces bend easily, and anchor screws mounted too aggressively can create very noticeable dimples in the road that both look unsightly and distort the rails so vehicles do not run as smoothly.

Important Aspects of 'Streets Roadway Setup

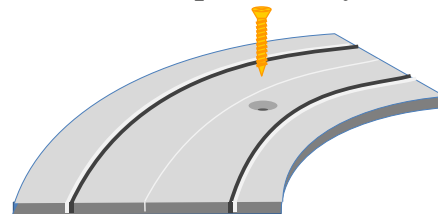
Seat all connectors including the center clip correctly.



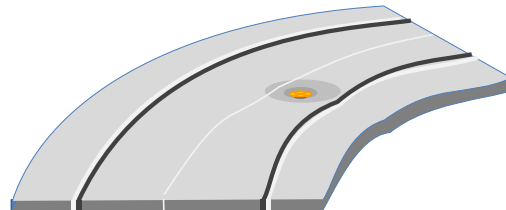
Don't push the fit.



Anchor the road, particularly on curves.



Don't over-tighten anchor screws.



Four Important Differences

Despite 'Streets' similarity to toy train track in many ways, there are four differences that matter when owners are considering where and how to get the most out of their roadways and vehicles:

The two-lane nature of 'Streets was designed to make two-lanes side by side, and most owners will want to create roads and highways with a lane in each direction.

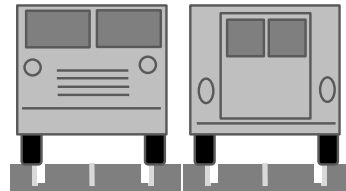
The three types of connector pieces must be used correctly. Short ($2\frac{1}{2}$ -inch) straight sections are available in three slightly different versions. These three sections have different purposes and must be used when and where needed if vehicles are to be used correctly.

Fewer different types of road sections are available as compared to train track. Many owners will find they need to create "custom" pieces from time to time. Fortunately, creating such custom-size pieces is not difficult, but it requires planning and attention to detail in determining just where and how to prepare the piece.

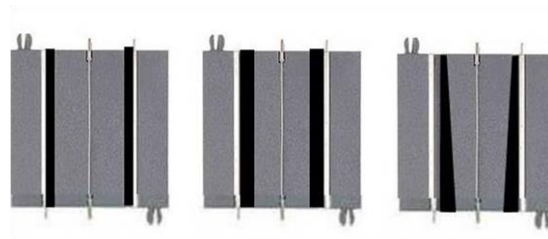
Inclines can have a much steeper slope than in toy train track because under the right conditions, 'Streets vehicles can climb quite impressively. But such inclines have to be not only planned correctly (See Chapter 4), but set up and installed properly to assure vehicles operate well and run smoothly through changes in incline, with tapered entry and exit slopes.

Important Aspects of 'Streets Roadway Setup

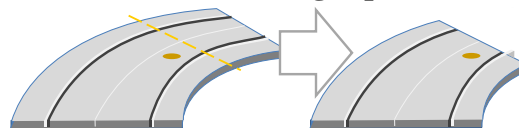
One can set up two lanes side by side.



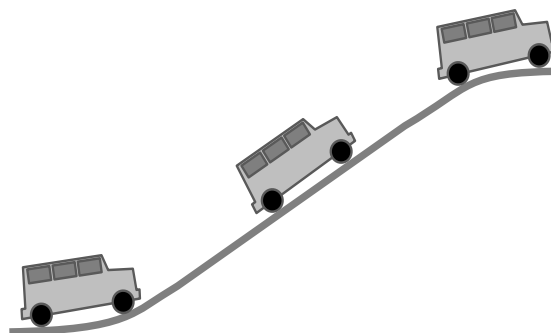
Get the connector pieces right.



It is often necessary to cut custom-length pieces.



Slopes can be made very steep, but their ends must be tapered well.



Two Lanes

'Streets pieces have been designed so they can be put together to form two-lane streets and roads (Figure 1). Two-lane roads and streets are not mandatory; it is possible to build single-lane streets - many good layouts have them and they are a lot of fun. But two lanes provide a more realistic look, more action and more fun because more vehicles can be run at one time and run simultaneously in opposing directions.

A two-lane road will usually be two separate loops. A two-lane street like that in Figure 1 might look like a single road because the available pieces have been designed so that the adjacent lanes fit side by side, but it is can be operated as two separate loops. The adjacent lanes are separate road loops—each will have different vehicles running on it that will never meet. Usually each lane is powered by its own power supply. Thus, while many 'Streets loops are set up as “single two-lane roads,” they are physically (connection of the roadway pieces) and electrically (connection of power) two distinct loops that happen to have been laid out to be adjacent to each other.

Curves have to nest inside each other. 'Streets curves come in two sizes, called D-16 and D-21 (see Chapter 2), with the tighter D-16 curve nesting just inside the D-21 curves, so the two appear to form a single two-lane curve, as shown in Figure 1.

When laying out chicanes or any back-and-forth set of curves, like that shown in Figure 2, the “nesting” may have to change from side to side as shown. This needs to be taken into consideration when planning and ordering track pieces. A useful rule of thumb is: generally, no matter how twisted and convoluted its route, a



Figure 1: A street with nested curves.

two-lane road loop (a configuration that comes back around to meet itself so it closes its two ends) will need the same number of D-16 and D-21 curved pieces somewhere around its loops. – it is simple geometry. The same geometry applies to the reciprocal curve custom pieces covered later in this chapter.

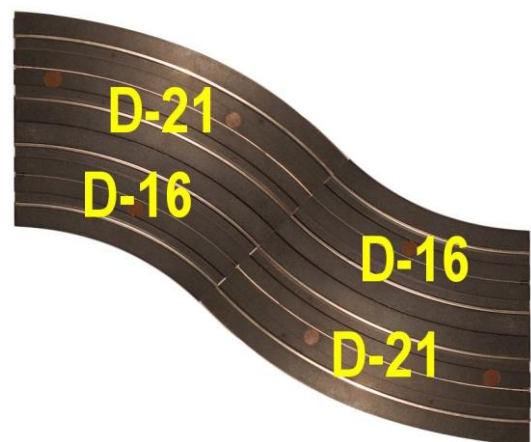


Figure 2: A Chicane requires that diameters of curves alternate.

Get The Use of Connectors Right!

The short, 2 $\frac{1}{2}$ -inch straight sections are referred to as “connectors” by the ’Streets manufacturers. There are three different types (Figure 3). The proper use of each type when it is needed is the sole confusing aspect of ’Streets.

All three connectors are straight sections, and all have the same 2 $\frac{1}{2}$ -inch length (Figure 3). *They differ only in the width of their flange grooves.* Chapter 2 discussed the reason for the different widths of grooves in detail and showed why these three different pieces are needed. Here, it will suffice to note that among longer pieces:

- curves, both D-21 or D-16, have grooves (slots inside the outer rails) $\frac{1}{4}$ inch wide;
- the 5-inch and 10-inch straight sections have flange grooves only $\frac{1}{8}$ inch wide;
- the straight-to-straight connector has a $\frac{1}{8}$ -inch groove, the same the longer straights—it is really just a 2 $\frac{1}{2}$ -inch straight section;
- the curve-to-curve connector has wider flange grooves—the same $\frac{1}{4}$ -inch width as the curved sections.

- The straight-to-curve connector *transition* piece gradually changes from the one width to the other. It is *required* for a smooth transition from straight to curved section groove width and must be used any time a straight and curved section are connected.

Leaving out a transition piece where the road changes from curved to straight, or from straight to curved, and just connecting a narrow-groove straight road section directly to a curved section will make cars and trucks clunk, hesitate, and in some cases derail as they exit or enter that curve. For a detailed discussion of why this will happen, see Chapter 2, particularly the lower part of its Figure 14.

Given that it must have a transition piece on each end, the shortest possible straight would be five inches long—two transition pieces back to back. The wide groove connector exists so that, if needed, an owner can install a shorter 2 $\frac{1}{2}$ -inch straight between curve sections.

Attention to these details will get it right every time and assure smooth operation.

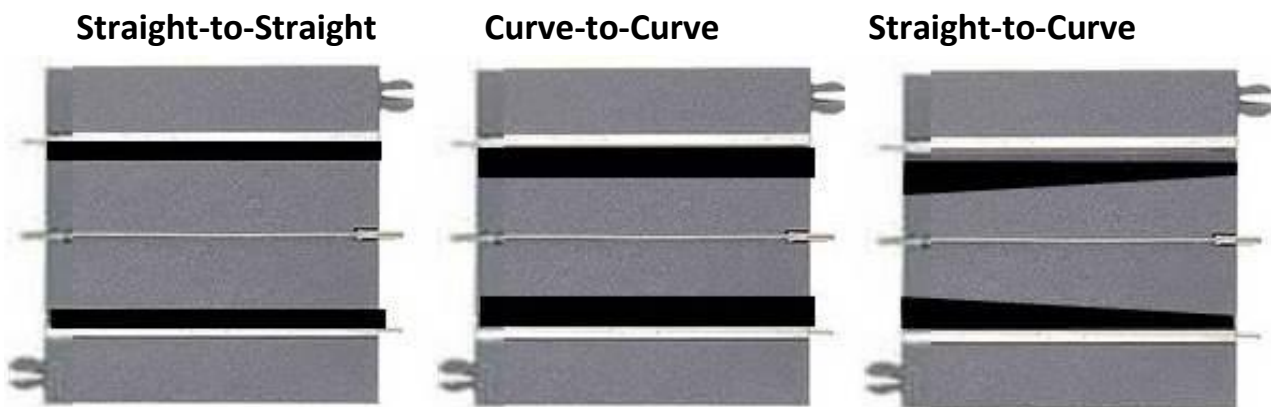


Figure 3: The three types of connectors: short straight sections. Each type must be used in the places it is needed, or vehicles will not run smoothly on the completed ’Streets layout.

Only Few Types of Pieces

Except for specialty pieces, 'Streets roadway sections are available as only six basic shapes:

- two diameters of curve (16 and 21 inch) in just one size (45 degrees— $\frac{1}{8}$ of a circle)
- three lengths of straight road: 10, 5, and $2\frac{1}{2}$ inch (the connectors)
- only one crossover (90 degrees)

Most toy train track systems offer many more lengths/types than this. For example, Lionel's FasTrack is available in six curve diameters: 31, 36, 48, 60, 72, and 84 inch, many in full-, half-, and, in some cases, quarter-length sections. Straights are available in $1\frac{3}{8}$ -, $1\frac{3}{4}$ -, $4\frac{1}{2}$ -, 5-, 10-, and 30-inch lengths. Crossovers are available with angles of 22.5, 45, and 90 degrees. And there are turnouts of different diameters, too. Other manufacturers offer similarly diversity.

The wide variety of train track pieces available allows a lot of tailoring to meet a model railroader's specific needs. By contrast, the more limited 'Streets offerings puts a mild constraint on what can be laid out. The problem is not just that the diameter and angle of curved pieces are limited. Straight sections can create a mismatch at times, too: there can be a need for short straights of *almost but not quite* the same length, as shown in Figure 4. There, a completely legitimate connection of standard 'Streets pieces results in a gap of 1 inch. Two 2-inch, rather than two $2\frac{1}{2}$ -inch pieces installed in the straightaway would solve the gap problem. Situations like this develop in train track, too, and are why Lionel sells $4\frac{1}{2}$ - and 5-inch-long straight track, and MTH offers $3\frac{1}{2}$ -, $4\frac{1}{2}$ -, and 5-inch straights. But there is no equivalent of this in 'Streets.

“Cheating” in the use of connectors – the 2.5 inch straights. Always try to use connector pieces properly, as was described on the previous page. Nothing else is recommended. Still, at times there are just not enough of the right pieces available. In those situations, some substitutions will work better than others and will often work until more of the correct connectors can be purchased.

- The curve-to-straight transition connector can often be left out going *into* a curve if the traffic will be one-way. If this does not work well (long-wheelbase vehicles may still clunk), a curve-to-curve piece can be placed where the transition piece should go.
- If a curve-to-curve connector is not available, a curve-to-straight transition piece can be substituted on a one-way road, with its flange groove narrowing in the direction of vehicle travel. Long wheelbase vehicles could have a problem with this, but it generally works with all stock vehicles.
- A curve-to-curve connector can be placed between two straight sections with narrow grooves, and in almost all cases, vehicles will go through it smoothly in either direction. Best results (least likelihood of any problems) are assured by putting the piece in the middle of the straightaway, not near the ends.

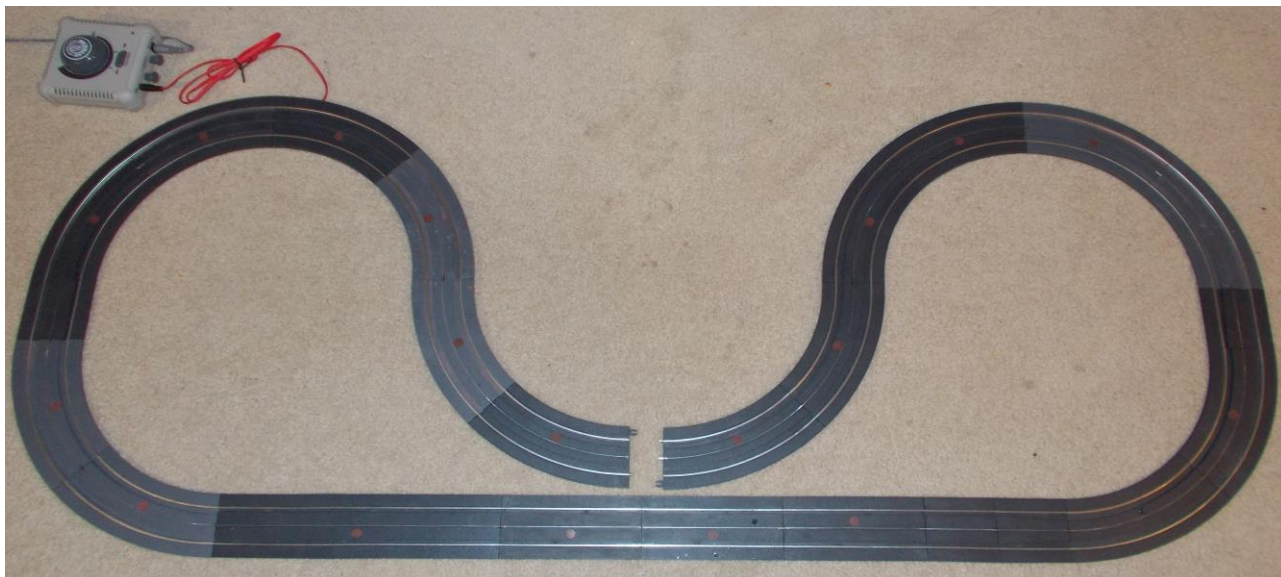


Figure 4: Standard roadway pieces have been assembled here, leaving a gap of about 1 inch where no standard piece will fit. One can force fit a 2¹/₂-inch straight section in the gap, but the road will gradually open up at junctions as cars and trucks are run over it.

The limited number of 'Streets road section pieces still permits a great number of interesting configurations to be built, but situations like that shown in Figure 4 come up from time to time, and an owner will want straight sections of customized length and/or curves of some angle other than 45 degrees.

Not recommended: the adjustable-length straight. K-Line by Lionel offered an adjustable-length straight (product 6-22598, two sections to the pack). Although not offered by WBB, the K-Line by Lionel product is still widely available at local hobby stores, online retailers, and Internet auction sites. It is a complicated piece and not adjustable in the sense the author would use that word. Instead, it can be customized to a specific nonstandard length one time, and one time only, after which it cannot be changed again.

In the author's experience, the piece requires as much work as the method for making custom-length pieces, covered next in this section. In

addition, the adjustable-length piece does not provide the flexibility many owners will need. It makes only straight sections with narrow flange grooves; sometimes owners will need custom-length curves or wide-groove straights. For these reasons, the use of the adjustable piece is not recommended or covered here.

Readers interested in that piece can look at and download the product instructions from Lionel's website:

<http://kline.lionel.com/pdf/AdjRoadwayInstructions.pdf>

The instructions can be confusing because they seem to refer to a product slightly different from what one will find in stores. The "base section" pictured in the instructions is just a normal 2¹/₂-inch straight with the metal rails removed. The product comes with a straight 2¹/₂-inch piece with the rails still attached, and the owner is expected to remove them.

Recommended Way of Making Custom-Tailored Sections

As the preceding discussion showed, some road configurations will require straights that are not $2\frac{1}{2}$, 5, or 10 inches long, or curves that are something other than 45 degrees. The method described here makes a custom piece by *shortening* it, removing a portion from its *middle* and *reassembling the two end pieces* so that the now-shorter piece has tabs and connectors on both ends, as normal.

If a $3\frac{3}{4}$ -inch-long straight section is needed, it is made by taking a 5-inch section and shortening it by $1\frac{1}{4}$ inches. If a 78-degree curve is needed, it is made by fitting one 45-degree section to the road being assembled, leaving a gap of just 33 degrees, and then cutting a second piece to remove 12 degrees from that piece, leaving a 33-degree piece that will fit. And so forth.

The steps in making a custom-length piece, curved or straight, are:

Step 1: Measuring and marking. Fit all the standard pieces together to leave a gap where the custom piece is needed (Figure 5). Fit the shortest longer piece that will otherwise fit to one end of the gap and position it under the other end of the gap as shown in Figure 6, and mark it with a fine line.

Step 2: Determine where to make the cuts. The marked line is *not* where the piece will actually be cut. It just indicates the exact length of the section to be cut. The actual cut is done as two cuts in the interior of the piece.

Using the mark from Step 1, determine how much needs to be removed. For example, if a $3\frac{3}{4}$ -inch straight section is needed, $1\frac{1}{4}$ inch must be removed from a five inch section.



Figure 5: Fit standard pieces to leave a gap where the custom piece will go.



Figure 6: Fit a standard piece under the gap and mark just where it would need to be cut.

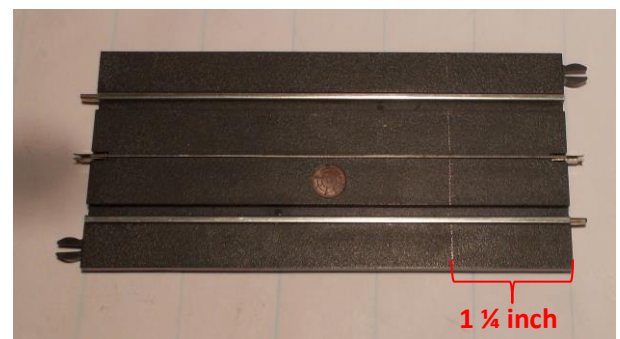


Figure 7: Use the mark to determine how much to shorten the piece. In this case, it is $1\frac{1}{4}$ inches.

Step 3: Turn the piece over (Figure 8) to determine where to actually make two cuts that are at least $\frac{1}{2}$ inch from an end, keeping the ends securely assembled; avoid cutting through the electrical connectors or tabs; and as much as possible, center the section to be removed between tabs (Figure 8).

Step 4: Make the cuts. The author uses a band saw with 24 teeth per inch and makes cuts straight across the road. A hacksaw can be used instead. The rails are best cut if the piece is positioned so the blade cuts at a slight angle, not flush against the side of the rails.

Step 5: Join two pieces. File the plastic body and metal rail ends smooth and glue them together. The author uses Plastruk General Purpose Plastic Solvent. It is best to reinforce underneath the point with small pieces of styrene (Figure 9).

Step 6: Solder electrical jumpers for all three rails across the junction on the underside, soldering to the tabs (Figure 9). Care should be taken, as excessive soldering can melt the road section's plastic. The piece is done (Figure 10).

If a piece shorter than one inch is needed, one of the two pieces on either side of the gap should be lengthened. Suppose a 1-inch straight is needed next to a 5-inch straight section. Remove that 5-inch section and make a 6-inch section out of a 10-inch straight.

In rare cases, a single curved section greater than 45 degrees will be needed. In those cases, the method above can be used, but with end sections cut from two curved pieces, glued, and soldered together to make, say, a 53-degree curve section, or whatever is needed.



Figure 8: Turn the piece over and determine where to cut out a section the length needed— $1\frac{1}{4}$ inches in this example—so as to leave as many of the bent tabs in place as possible.



Figure 9. Make the cuts. Glue the two end pieces together on a flat surface. Glue on reinforcing plastic (white). Solder jumpers across tabs to connect the three rails.

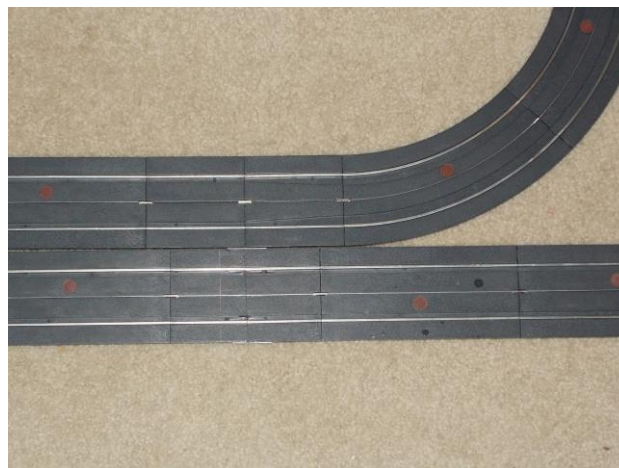


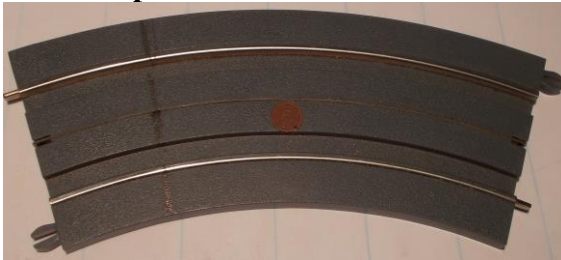
Figure 10: The custom piece in place.

Making Reciprocal Custom Curves

Often, when a custom curved section is needed, there will be a need for what might be called its reciprocal somewhere else in the loop. For example, if a 33-degree curved piece has to be made (removing 12 degrees from a 45-degree curved piece), often a curved section of 57 degrees (45 degrees *plus* 12 degrees) will be needed later on. The reason is that every loop must eventually work out to 360 degrees. Remove 12 degrees from one place, and that 12 degrees will be needed somewhere else.

There are situations where this is not the case, but the author's experience is that other piece is needed about two-thirds of the time. If this is the case, both custom curves can be made at the same time from two standard 45-degree pieces with just two cuts. This method does not remove a section from either piece but makes a single cut in each *and switches their end pieces* before gluing them together, so as to get a longer and a shorter piece. Figure 11 shows how to make both pieces in one operation.

Mark a piece for the size needed.



Determine where to actually make cuts.



Mark one cut on one piece and the other cut on another piece.



Make the one cut on each piece. Switch their ends, glue them together, glue on reinforcement plastic, and solder jumpers across the junctions of all three rails.

Needed piece: 33 degrees

Reciprocal: 57 degrees



Figure 11: Steps in making a custom curved roadway piece and its reciprocal.

Building Inclines and Tapering Inclines at Their Ends

'Streets vehicles are prodigious climbers under the right circumstances. Chapter 4 discussed how well they climb and how to use that to advantage, and how to plan inclines. But smooth, trouble-free operation of vehicles as they climb and descend depends on tapering inclines at the top and bottom so vehicles ease into and out of climbs.

'Streets roadway pieces are thin, but molded-in reinforcing ribs make them stiff. As a result, roads want to bend at joints (Figure 12). The slope shown is 18%, but the vintage truck can handle it well. What it cannot handle is the quick transition from steep to level at the top of the incline. With its weight shifted slightly to the rear, the way the road falls away in front of the vehicle causes the center front pickup spring to push the front wheels off the rails momentarily (middle photo). A moment later, the chassis bottoms hard on the center rail (lower photo). The vehicle may derail if going fast, or stall due to momentary lack of power if going slow.

Permanently tapered incline pieces can be bent with as much as a 3% change in incline per inch (Figure 13). The author bends a piece by placing it over an empty spray can laid on its side and pressing down on both sides until it bends slightly, then moving down the piece about $\frac{1}{2}$ inch at a time and repeating that step over the length of the piece.

On a temporary layout, owners who do not want to permanently bend or modify pieces can make a change in incline of three or four degrees at each of several junctions.. This will permit normal vehicle operation, if perhaps look a bit unnatural.

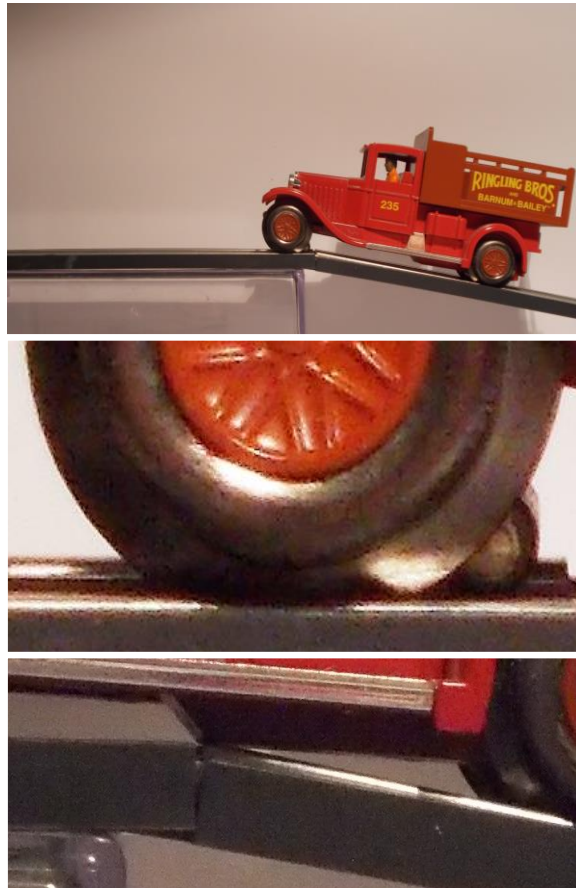


Figure 12: This truck climbs nicely, but as it transitions to level road, it encounters problems that may cause derauling or stalling. See text for details.



Figure 13: The section of road was modified permanently to have a taper and permits smooth operation of the truck.

Wiring and Power

Electrical feed to 'Streets roadway is similar to that for toy train track. Two wires are run from the variable-voltage terminals of the power supply to the roadway and connected to the road's rails. With AC power supplies, the black terminal/black wire is connected to the outer rails, the red to the center rail. With DC supplies, the negative (usually black) is connected to the outer rails, the positive to the inner rail.

If 'Streets track has an electrical weakness, it is in the center-rail connector clips. Their light weight and limited surface area mean they do not always provide the best possible connection, even when inserted correctly (bottom of the U cross section down) and seated firmly.

Electrical conductivity problems are likely to develop a bit more frequently in 'Streets roads than on model train track because on average roadway pieces are about half the length of train track. Thus, there are twice as many junctions where a bad connection can develop.

Therefore, it is recommended that feed points be used about twice as often as with train track. In cases where the road will be installed permanently and rewiring might be difficult, it feed wires locations should be determined not on the basis of distance but on the number of track pieces between them, with no more than twelve and ideally no more than ten or even eight junctions between each feed location to the road (Figure 14).

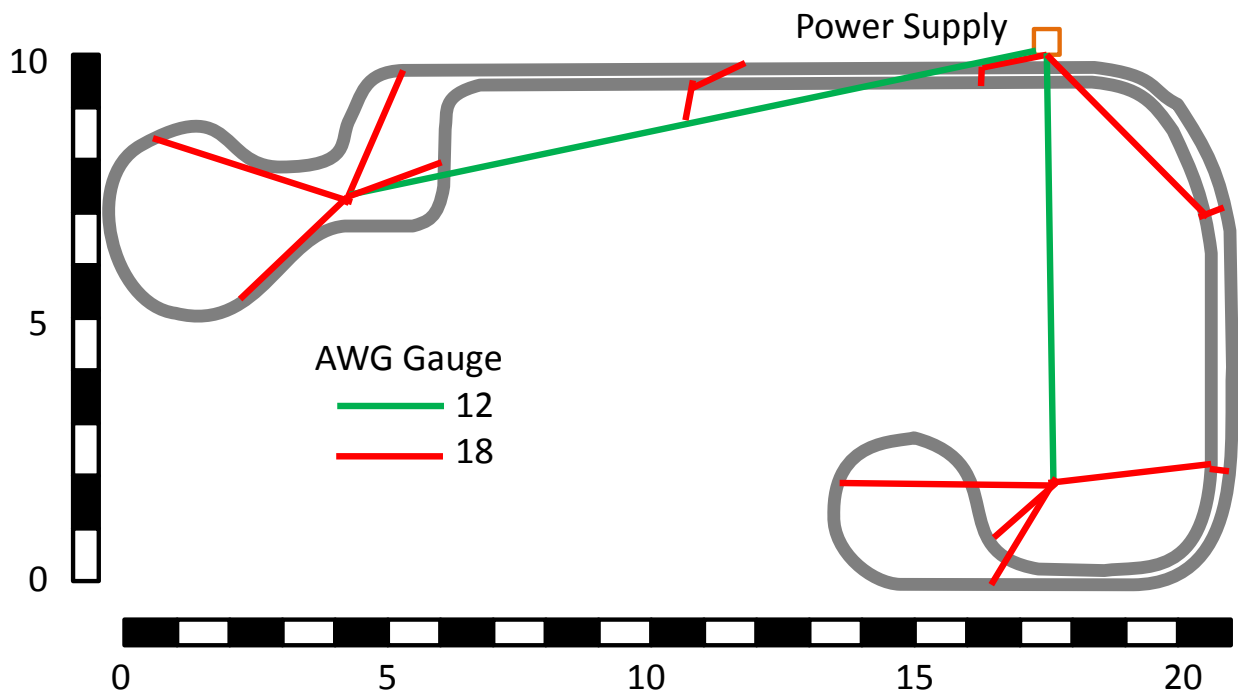


Figure 14: One of the author's loops: about 60 feet of road fed at 15 points—one every 4 or 5 feet—with a combination of AWG 24 (red) and 16 (green) wire.

Intersections

Intersections and road crossings can be built using the crossover piece (Figure 15; also see Chapter 2). The crossover pieces are the only 'Streets pieces without side-to-side symmetry; one side is slightly wider than the other so that they are $2\frac{1}{2}$ inches wide (all other pieces are $2\frac{3}{8}$ inches wide). This extra width is necessary to make them equal to a $2\frac{1}{2}$ -inch section of road in both directions, so the "geometry" of laying out pieces is more likely to work out.

An intersection of two single-lane roads is made using one crossover piece. Which side the wide shoulder in on is unimportant.

A single-lane road intersecting a two-lane road is made by using pieces side by side, with their "narrow shoulder" sides face to face in the center of the two-lane road.

An intersection of two two-lane roads requires four crossover pieces. The narrow shoulder sides of all four go along the centerlines of the roads.

Crossover pieces electrically connect the outer rails of all crossing lanes but keep the center rails of the crossing lanes isolated from each other. Owners need to recognize and think this through when setting up track wiring.

Complicated piece. The crossover piece has "a lot going on" on its face, as Figure 16 shows. Near the center (point A), the center rails are recessed so the center roller in the other direction does not contact or trip over it. The outer rails do not extend all the way across the piece but end about $\frac{1}{2}$ inch in. A flat metal plate (B) fills part of the flange groove, making it shallower, and the vehicles ride up on these plates slightly, rolling on and making contact only with the outer edges of

their flanges. It is normal for vehicles to "thunk" a bit as they pass over this piece and roll onto and off of these metal plates. However, vehicles with less-than-well-adjusted center rollers—too little or too much spring pressure—may stall or even derail here.

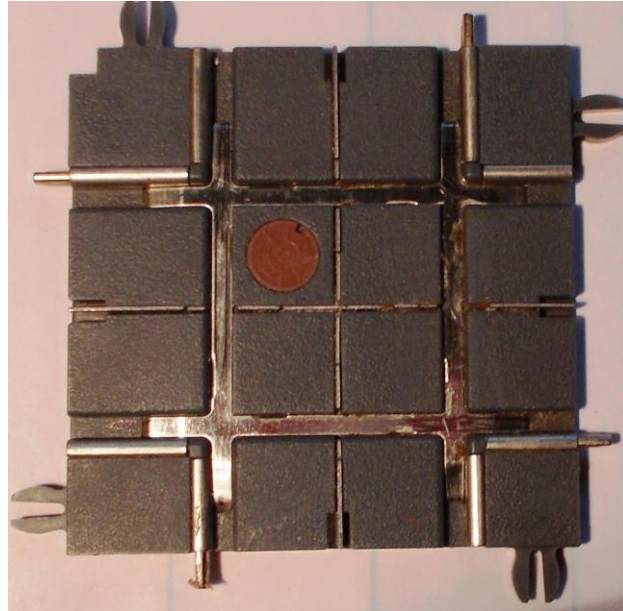


Figure 15: The only 'Streets crossover is this 90-degree one. It is square - $2\frac{1}{2}$ inches on a side: the length of a connector in each direction.

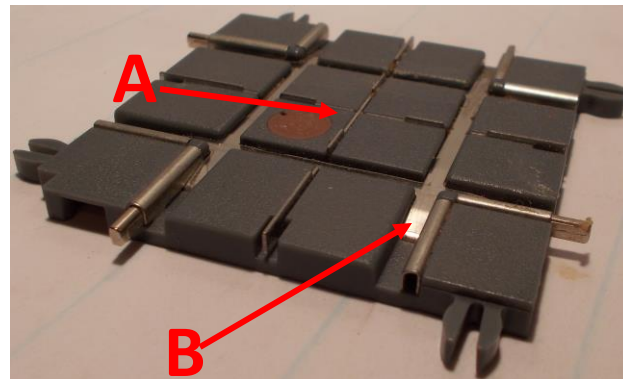


Figure 16: Center rail is recessed at the center (A). Wheel edges ride up slightly on thin plates in the flange grooves (B) during gaps in the rails. The piece presents a challenge to vehicles with poorly adjusted center-roller springs.

Running and Caring for Vehicles

6

'Streets cars, buses, and trucks are for the most part well designed and robustly made. Beyond keeping wheels and rollers clean, owners will find maintenance requirements light and infrequent. However, like all machinery, proper use and care can assure an owner of the longest period of satisfactory ownership possible.

'Streets vehicles run on AC or DC power, 0 to 18 volts RMS, and go only forward regardless of type of power or polarity. The author never runs them at over 16 volts, just to be certain of long motor life (and because that is quite fast enough). Table 6-1 shows typical satisfactory performance characteristics of 'Streets vehicles.. One that run otherwise needs attention.

Table 6-1: Normal Good Performance

All four wheels are firmly on road (if not, front finger springs are not adjusted well or chassis is bent).			
Slowest smooth speed	voltage	5.5	
	amps	~.025	
	Scale mph	33	
	Real feet/sec	1.0	
Vehicle will go at least	voltage	16	
	amps	~.3	
	Scale mph	82	
	Real feet/sec	2.50	
Vehicle will climb	on straight	>12%	
	on D-21	>5%	
	on D-16	>3%	
Vehicle will go through curves at full speed without derailing.			
No gear whine			

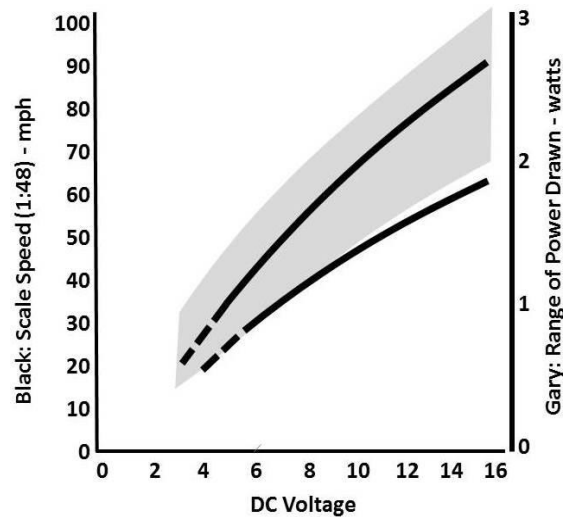


Figure 1: Typical voltage-versus-speed and power curves for 'Streets cars. See text for details.

Figure 1 shows typical speed-versus-voltage and power-consumed-versus-voltage curves for 'Streets vehicles. Black lines indicate top speed on long straights (top curve) and speed around a D-21 loop (lower curve -speed would be even slower on D-16). The gray area indicates the range of power needs at any voltage, which will depend on slope and curve of the road. For example, the figure indicates that at 10 volts, this vehicle runs at a scale speed of 65 mph on straights but only 45 mph in curves, and that power used will vary somewhere between 1.5 and 2.5 watts depending on slope and curve.

The results shown were obtained by testing one of each of the five 'Streets vehicles on a closed loop of D-21 and a 15-foot straight, and averaging the results for the five vehicles.

Recommended Routine Care

Clean wheels and pickups frequently. 'Streets vehicles are somewhat more sensitive to dirty wheels and track than toy trains. The three main reasons are:

Small electrical contact patch. 'Streets vehicles have only four wheels (and typically one has a traction tire) and two small center rollers. Most toy locomotives—even cabooses—have more.

Low weight. 'Streets vehicles weigh less than any O-gauge toy locomotive, even a Plymouth switcher. Weight alone won't make up for dirty wheels, but it helps, and 'Streets vehicles don't have "road hugging weight" on their side.

Smaller wheels. 'Streets wheels are only about half the diameter of the smallest wheels normally seen on locomotives. The rollers are smaller, too (many are only $\frac{1}{8}$ inch in diameter). The point is: they roll many more revolutions for any distance covered, and this seems to make them collect dirt and grime faster than larger locomotive wheels.

Finally, most owners want to run their vehicles at scale speeds of 30 to 55 mph—speeds that require only 5 to 7 volts, a voltage level not nearly as good at "punching through" contact resistance due to a bit of dirt and tarnish as the voltages typically used to run toy trains (10–12).

If not proactively serviced, vehicles will let the owner know when they need cleaning. They begin to stutter and stall. Typically, once stopped, a vehicle with dirty wheels will not restart even if voltage is increased to maximum. The author uses 91% isopropyl alcohol on a Q-tip, cleaning in much the same way a person would clean the wheels and rollers on a toy locomotive. Care must be taken with



Figure 2: Care must be taken when cleaning the tiny center rollers on K-Line and K-LbL vehicles. The small spring arms are easy to accidentally bend and not easy to “unbend” back to their original position and tension.

the small center rollers, particularly the tiny spring arms on K-Line and K-LbL vehicles. On the WBB sedan, the very delicate springs that telescope the rollers downward can be damaged by too much pressure. If cleaning the wheels doesn't help, the most likely cause of poor running is a weakened front spring arm, which will be covered later in this chapter.

Lubrication. Vehicles come from the factory with a light coating of grease on the worm-drive gear combination, but they have axle bearings that seem to do fine without lubrication. On the sedan, the body has to be removed to check whether the gears are dry. On all others, they can be inspected and relubed if need be through the openings on the underside of the chassis.

Check underbody for lint, dirt, etc., that has made it into the gearbox and front and rear axle areas. Toy locomotives have an additional advantage over 'Streets vehicles when it comes to trouble-free running: toy train track has a $\frac{1}{4}$ - to $\frac{3}{8}$ -inch-deep “pit” between the rails into which dirt and debris can fall, keeping them away from the bottom of a toy locomotive. By contrast, dirt and debris that collect on a 'Streets road will be as close as $\frac{1}{8}$ inch from the bottom of the vehicle (Figure 3). Figure 3 shows the large open area on the vintage truck—the lower teeth of the drive gear are only $\frac{1}{4}$ inch from the road surface. All K-Line and K-LbL vehicles have an identical opening, while the WBB van has a larger one (Figure 4). Particularly when running on “carpet layouts,” these vehicles routinely pick up lint/fiber/dog-hair/whatnot through this opening and wrap it around their axle and gears.

Owners can use that hole in the chassis to inspect for anything that has been picked up. Debris caught in the gears or on the axle can sometimes be removed from underneath, through that hole, with tweezers and a bit of work. However, an owner may wish to remove the body and work from inside. This is recommended on vehicles with the spring-arm type rollers—the rear roller is easy to bend with the tweezers when trying to remove debris from underneath the vehicle. (Removing the body is covered later in this chapter.)

The WBB sedan's metal chassis is noticeably more “sealed from below” than the other vehicles, and it is less likely to pick up fibers and wrap them around its axle. It cannot be inspected from underneath, but only by removing the body. Fortunately, that is particularly quick and easy on the sedan.



Figure 3: Top—The vintage truck has but a $\frac{1}{8}$ -inch clearance between the road and the chassis and the rear. The rear center roller projects out and down through a hole directly under the drive gear, through which lint and debris sometimes find their way into its gearbox. The trailer hitch was added by the author (Chapter 7 discusses doing so).



Figure 4: WBB replaced the spring-arm rollers on the van with a better lever-arm type, as can be seen at the left here. However, they left the original hole in the chassis.

It is best not to store vehicles on their wheels.

All 'Streets vehicles except the sedan use a copper finger-spring for electrical contact to the front axle (Figure 5). When running, the weight of the vehicle forces the front axle up against this spring (the axle can move up and down about a millimeter), putting tension on it and thereby increasing its contact pressure on the axle, assuring good electrical connectivity. Copper is not the most elastic of materials and the arm length is very short, so given enough time operating like this, even with a movement of only a millimeter, the copper *will* fatigue and weaken. The vehicle may begin to run erratically due to weak electrical contact, and the spring will need to be readjusted as described later in this chapter.

Unless a vehicle is mishandled, spring fatigue sufficient to cause operating problems will not set in until after hundreds of hours. But storing a vehicle *standing* on its wheels on a shelf keeps that spring extended all the time. Two to three months (672 to 1440 hours) will do the trick.



Figure 6: Vehicles can just be stored upside down, or on small pedestals, as shown in Chapter 1, Figure 12.



Figure 5: View of the vintage truck's front axle from above with its body removed. The shorty bus, step van, and panel van also use this tiny copper spring (yellow arrow) to maintain electrical contact to the front axle and hence the outer rails.

The author stores vehicles for long periods upside down. If the owner is concerned about marring paint or just wishes to display them well, he or she may place them on small pedestals (see Figure 12 in Chapter 1).

The two small black plastic brackets shown by white arrows in Figure 5 keep the axle in place and limit up-and-down movement. If a vehicle is handled roughly, as by a child pushing down on it as he or she “drives” it across the floor, these brackets will snap, the copper fingers will bend, and the vehicle will not run. The plastic bracket pieces can be replaced with new ones the owner makes or simply removed and the copper finger spring straightened (requiring removal and reassembly). It alone will keep the axle in place if the vehicle is treated gently from that point on.

The sedan does not have a plastic chassis and does not use the copper finger spring; these recommendations do not apply to it.

Removing the Bodies

Depending on the vehicle type, the body and chassis are held together by between one and three screws that unfasten from the underside of the chassis. These screws are located near the front and rear of the vehicle (red arrows in Figures 7-10). ***Do not loosen the two screws near the center of vehicles with a plastic chassis (yellow arrows in figures).*** They hold the motor frame to the chassis, and it is difficult

to realign it once loosened. Interiors remove from the inside with from one (bus) to six screws (sedan). On the school bus, step van, and sedan, those screws and the interiors must be removed in order to gain access to the rectifier, motor and its subframe, wiring, and chassis underneath. The panel van has no interior, and that in the vintage truck is press fit into the upper body and comes off with it.

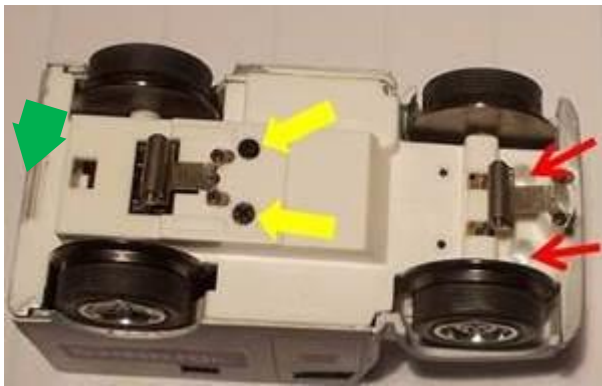


Figure 7: The school bus body is held to the chassis by two screws located in mounting holes just ahead of the front axle. Once they are removed, the front of the chassis can be pulled up and forward a bit, pulling a tab loose at the rear (green arrow) and freeing the chassis. The interior removes from the chassis with one screw, located in the interior floor near the back.

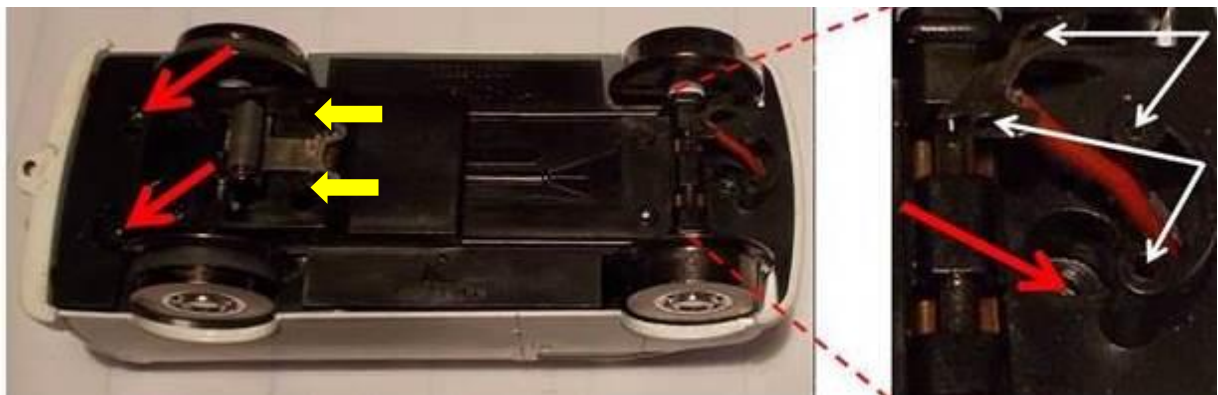


Figure 8: The panel van is by far the most difficult to disassemble. The two rear screws on the panel van remove easily. However, the front screw is located *under* the front center-rail roller pickup. Since the pickup is both delicate and has a wire attached, and the screws are very small and easy to lose, particular care must be taken. On the WBB versions, a small screw in the base of the lever-arm pickup assembly unfastens, and the base pulls off a small locator peg that fits in a hole in that base. The whole assembly can then be pushed aside enough to get at the front mounting screw. On earlier versions (photos above), two tiny screws (white arrows) must be removed from the end of the spring arm and mounting tower and pushed aside—the screw is in a well behind the mounted tower. Once that screw is removed, the body simply “falls off.”

Figure 9: The step van and sedan are both straightforward to take apart. In each, three screws are removed, and the body can be pulled straight up and away from the chassis.

The interior in each must be removed once the body has been taken off in order to get at the machinery and wiring. The interior of the sedan is two pieces held on by six screws (Figure 19, in a few pages, gives details). That in the step van is one piece and has a single screw.



Figure 10: The vintage truck has only one screw (red arrow above) that must be removed in order to separate the truck's body from its chassis. Once that is done, the lower portion of the body (fenders and running boards) and the chassis are removed from the upper body as a unit by pulling them up at the front and then forward, freeing a tab from the lower body that fits into a slot in the back of the upper body piece (white arrow). The chassis body is then removed from the lower body in a similar manner, by freeing its tab-in-slot at the rear of the lower body.

The interior is press fit into the upper body and can just be left in it until reassembly. The chrome-plated radiator and headlight assembly often drops loose from the front of the upper body. It is easy to lose. Put it in a safe place until reassembly.

The Plastic Chassis: Details

Two types of chassis have been used for Streets vehicles. These two types of chassis are referred to here as the *plastic chassis* and the *metal chassis* because they are most easily distinguished that way.

The **plastic chassis** is the original SuperStreets chassis and was the only type used for the first decade of production. Manufactured in slightly different lengths and widths, with different sizes of wheels and different mounting pegs and screw holes molded to it, it was used for four vehicle types: the panel van, 1934 Ford stake-bed truck, postal/delivery step van, and the short school bus. It is still in use by WBB, in its version of the panel van.

Although of different lengths and appearances, etc., all of these vehicle chassis are nearly identical inside. Figure 11 shows a typical plastic chassis – that from the delivery step-van truck. The chassis itself is one piece, made out of a flexible hard plastic or rubberlike material that does not meld well with most plastic cements and adhesives but bonds well but not exceptionally to epoxies and cyanoacrylate. In all plastic chassis, the rear axle is powered by a small motor mounted longitudinally, as shown. Electrical pickup is made from all four wheels and two center-rail roller pickups mounted underneath the body. Power from the track is fed to a bridge (full wave) rectifier, and from there to the motor. The positive terminal is on

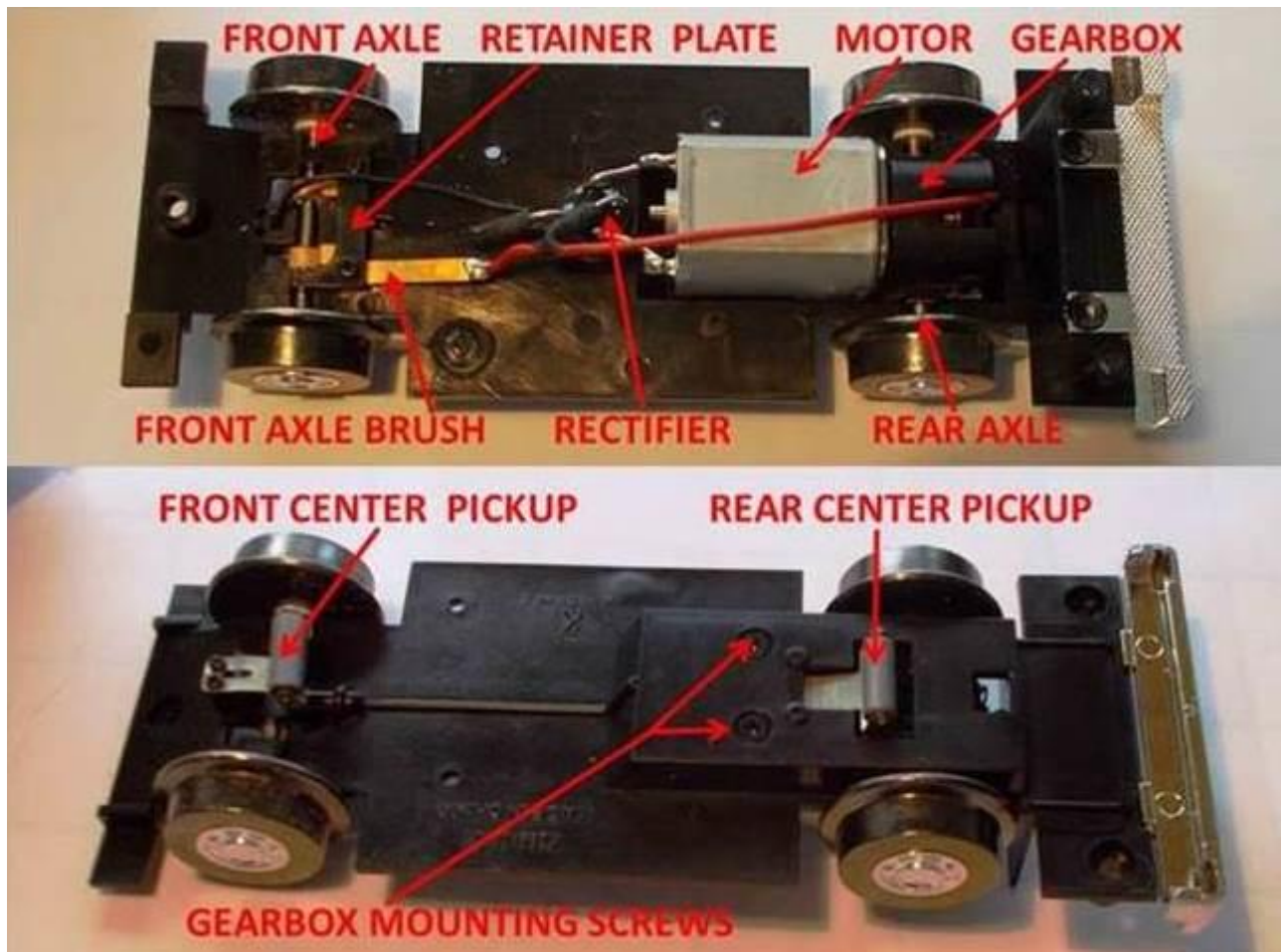


Figure 11. The plastic chassis and the various components mounted on and in it.

the vehicle's left (passenger) side and the negative on the right (driver's side.)

Electrical contact to the front axle on plastic chassis vehicles is made with a front-axle brush (Figure 3), which fits under a small plastic retainer plate that holds the front axle and that brush in place (see Figure 12). That retainer is held to the chassis by two screws.



Figure 12: Front-axle contact brush and the plate that holds it and the front axle in place.

The motor-gearbox-rear axle is held together in a plastic subframe that is mounted to the chassis with two bolts that screw in from underneath the chassis (yellow arrows in figures 8 and 9) and a small tab in the back end of the gearbox that fits into a slot in the chassis. Removing the screws releases the entire assembly.

There are six screws on the underside of the subframe that cannot be reached until it is removed from the chassis. Two hold the motor to the subframe and four hold the gearbox to the frame. The motor's screws can be removed and the motor worked back out of the gearbox. If the four screws for the gearbox are removed, the gearbox cover will release and free the rear axle from the frame.

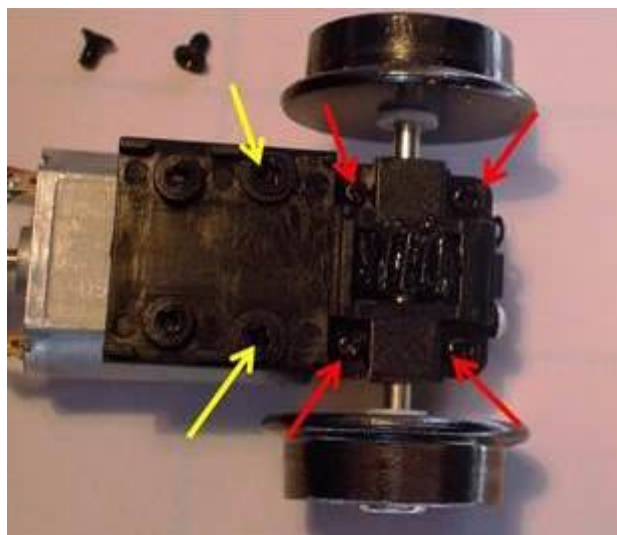


Figure 13: The motor-gearbox-axle assembly releases with the removal of two screws (shown) as described in text. On its underside are screws that hold the motor (yellow arrows) and gearbox (red arrows) to the assembly frame.



Figure 14: The vintage truck uses the motor on the left; all others use the motor on the right. Both types have a press-fit brass worm gear on the front shaft, no flywheel, and a mounting plate held to the front face by two machine screws. The larger one has a motor body exactly 1 inch long.

Figure 15 shows the two axles. Each has two thin nylon washers that fit between the wheels and the chassis to reduce friction. The rear axle has sintered metal bearings that fit into recesses in subframe, held in place by the gearbox. This particular chassis had no traction tires. Some 'Streets vehicles have one, and a few vintage trucks had two. There seems to be no intentional pattern to which vehicles have them and which don't. The author has vintage trucks with one, two, and no traction tires. Generally, 'Streets vehicles don't need traction tires in order to run well unless pulling a trailer (see Chapter 7). Those with none have noticeably better electrical connectivity which contributes to smoother running.

The two center-rail electrical pickups are mounted under the axles. Most plastic-chassis vehicles use the spring-arm-type rollers shown in Figure 16. The front and rear are similar but not the same—they have different mounting-hole locations as shown. The rear pickup mounts from the top of the chassis, the front to a small tower that projects down from the chassis just in front of the front axle. WBB Ford panel vans use lever-arm pickups (Figure 17) instead.



Figure 16: Although similar in construction, the front and rear rollers on many plastic chassis are different, as shown.

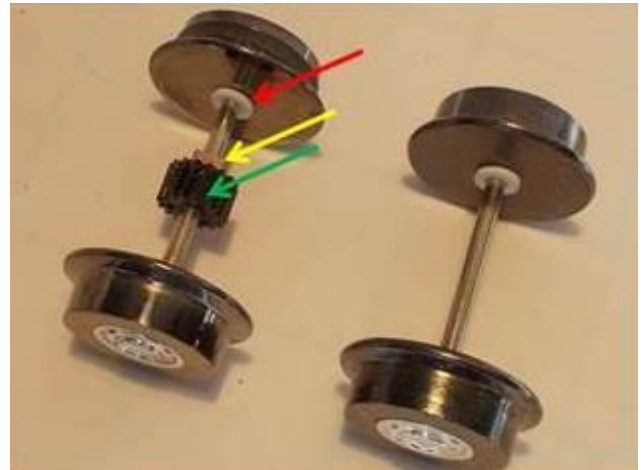


Figure 15: The axles all have metal wheels press fit onto them. Sometimes, as here, plastic hubcaps are fit into recesses in the wheels. Both axles have nylon washer/spacers that fit between chassis edge and wheels (red arrow). The rear axle has a gear to engage the motor's worm (green arrow), and two sintered metal bearings that fit into slots in the sub-frame to carry the axle (yellow arrow points to one).



Figure 17: When it began producing the new E-Z Street product line, Williams by Bachmann replaced the spring-arm rollers (Figure 7) on the plastic chassis with the small lever-action rollers shown here. They work much better, in the author's opinion almost justifying the higher price Bachmann charged for their versions.

The Metal Chassis: Details

The metal chassis (Figure 18) was first used by Williams by Bachmann (WBB) for its sedan in late 2013. The layout of major parts is identical to that in the plastic chassis. The rear axle is powered by the same longitudinal motor as in the Ford panel van and located in the same place. There are center pickups front and rear. There is the same rectifier, mounted in a circular recess in the same location and wired in exactly the same way. But there are differences. By far the most important is that the chassis is metal, weighing just over 6 ounces.

Unlike on the plastic chassis, the rear axle is held in the chassis, not in the gearbox subframe. That subframe is metal, too (see Figure 18). The chassis is disassembled in the same way the plastic chassis is, the only differences being:

- The interior (Figure 19) consists of two plastic pieces—that are held to the chassis by six small screws.
- The gearbox mounting screws are accessed from the top, not underneath.
- The wires to the motor fit into recesses in the metal chassis.

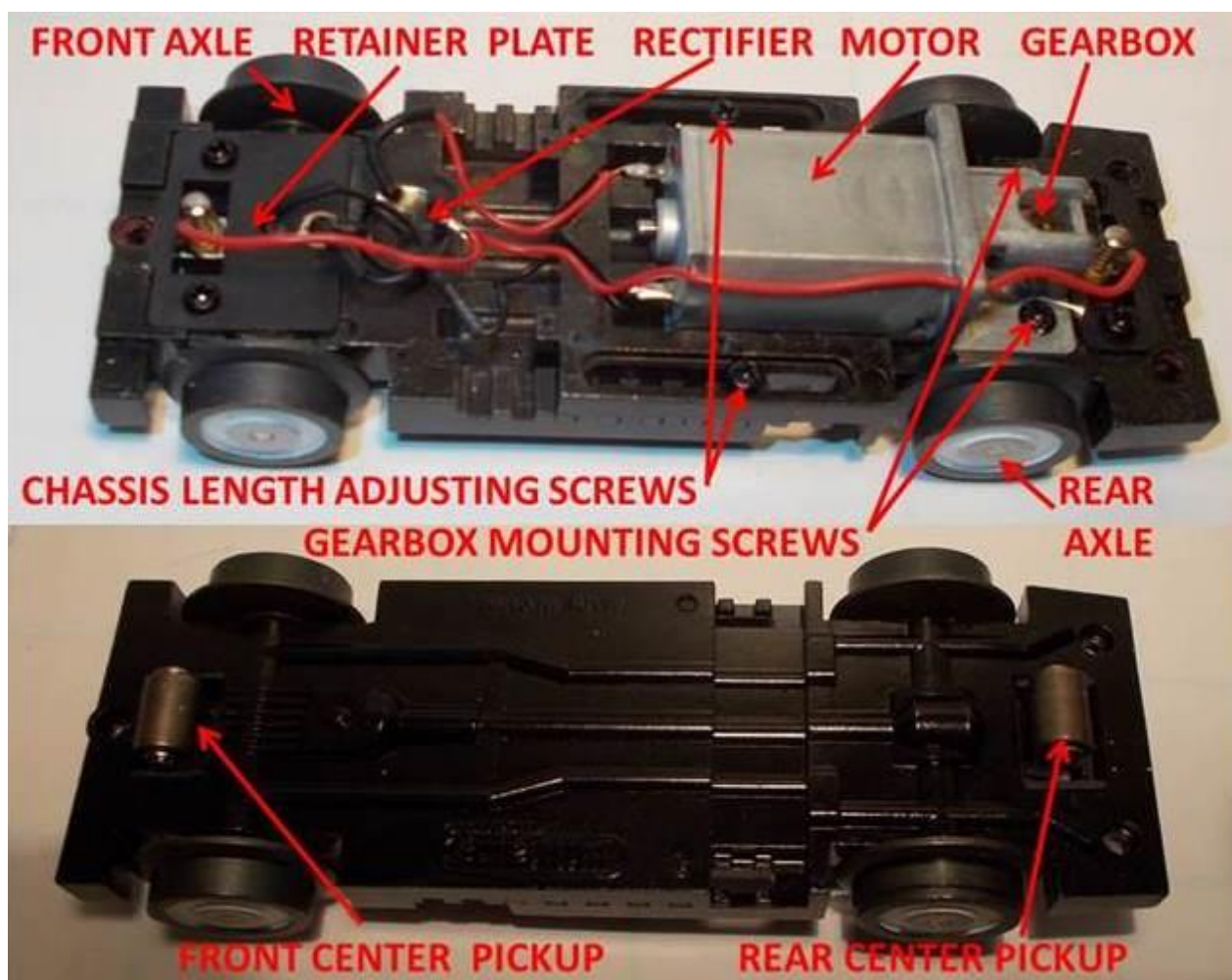


Figure 18: The metal chassis and the various components mounted on and in it.

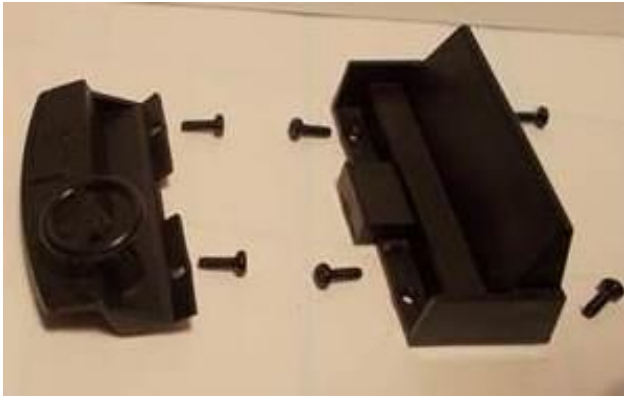


Figure 19: The dashboard and bench seat are mounted to the rear part of the chassis with two and four screws, respectively.

A unique feature of the metal chassis is its adjustability. It is cast in two parts that can move back and forth to adjust the wheelbase to between $2\frac{1}{32}$ inch and $3\frac{5}{32}$ inch. As delivered with the sedan, it is set to $2\frac{11}{32}$ inches. A series of teeth molded into the two parts lock them place with two machine screws (See Figure 20).

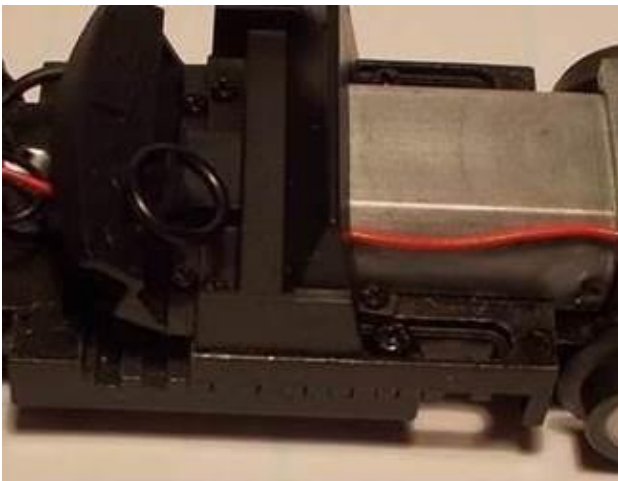


Figure 20: The two parts of the chassis lock into place with a set of teeth on each side, as seen in the photo above, and are held in place by a machine screw on each side. Note the interior mounted in this photo.

Chassis electrically connected to outer rails.

The metal chassis holds both axles, which are also made of metal. This means that all—chassis, axles, and wheels—are electrically connected to the outer rails when the vehicle is running. So there is no need for the front axle brush as in the plastic chassis. But both center pickups have to be electrically insulated from the chassis. The pickups are telescoping types that move straight up and down with a small spring to provide pressure to keep them in contact with the rail. They are mounted inside small plastic boxes that fit through the chassis (Figure 21). The roller projects out the bottom to make contact with the center rail, and the frame sticks out on the top side, where a red wire is attached to route power to the rectifier (see top view in Figure 18).

One Traction Tire. All metal-chassis vehicles the author has seen have a single traction tire on the right (passenger) side of the rear axle, as can be seen in Figure 12.

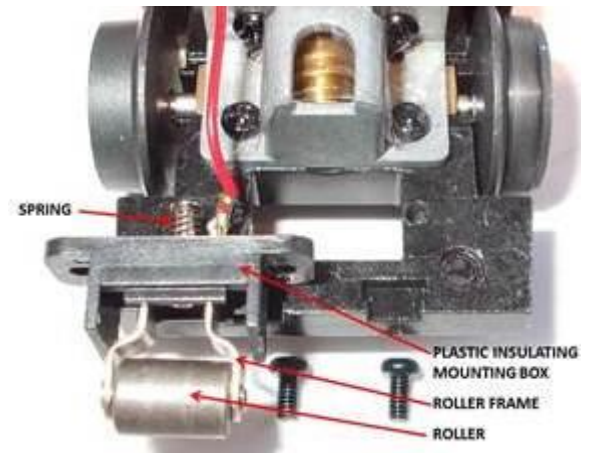


Figure 21: The center pickups telescope up within plastic boxes mounted through square holes in the chassis—at the rear, just behind the gearbox, as shown above; and in front, just ahead of the front axle.

Five types of wheels and three types of center pickups have been used on various 'Streets cars and trucks (Figures 22 and 23, Table 6-1). Each type of wheel is unique to one type of vehicle, except the van wheels. Some step vans also came with panel van wheels rather than larger wheels.

The five types of wheels vary in diameter, from 15.5 mm (29 scale inches at 1:48, 26 at 1:43) to 23 mm (scale 43 and 40 inches respectively). While all are mounted so they have a 1¼-inch gauge, the width across the different axles varies substantially, so the extreme width from side to side varies from 38.5 (scale 72 or 65 inches) to 47.5 mm (scale 90 or 80 inches). Flanges vary slightly in both depth and angle, but not significantly. All wheels are metal and press fit onto metal axles. All but the sedan wheels have plastic hubcaps of some sort. The “big wheels” type has a realistic removable tire that fits onto a plastic hub mounted to the actual metal wheel.

Three types of center pickups have been used, including the spring-arm type (most K-Line), a small lever-action one similar to those on locos (WBB Van and all TMCC vehicles), and a telescoping model on the WBB sedans.

Table 6-1: Dimensions of Wheels On 'Streets Vehicles



Wheel Type	Dimensions - mm			Used in
	Diameter	Flange	Width	
Sedan	15.1	1.9	38.5	Sedan
Vintage	15.8	2.0	39.3	Vintage truck
Panel van	19.0	2.0	41.2	Both vans
Truck	21.5	1.5	41.5	Early step van
Bus	23.0	2.0	46.5	School bus

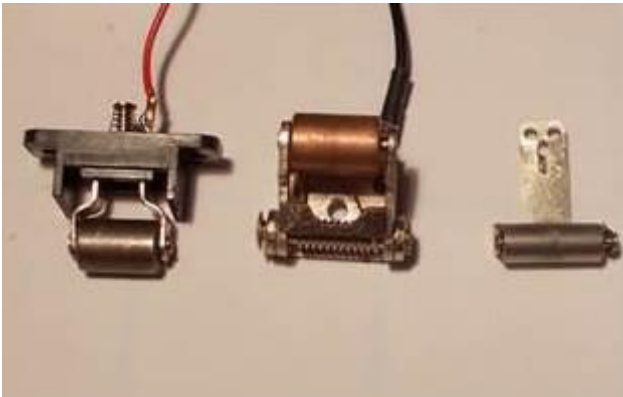


Figure 22: Left to right: telescoping center pickup from the sedan, lever-action pickup from the WBB van and Lionel TMCC vehicles, and spring-arm roller pickup as in some K-Line/K-Line by Lionel vehicles.

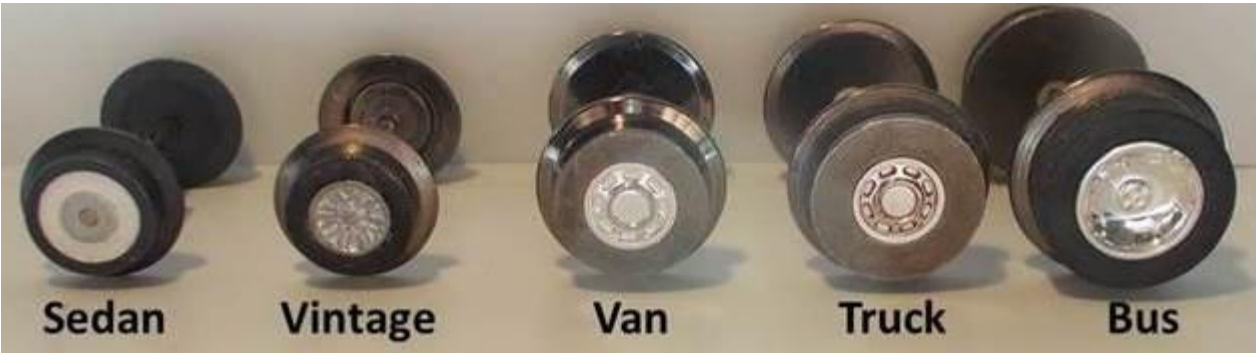


Figure 23: The five types of wheels used in 'Streets vehicles.

Removing the Rectifier

'Streets vehicles come with a rectifier installed:

- They run on AC or DC power (0-18 volts).
- They run only forward regardless the type and polarity of power fed to them.

Many owners remove the rectifier and wire the motor directly to the power leads from the rails. Modified, the vehicles will run only on DC, but they will run backward if polarity is reversed. The ability to put the cars into reverse, so to speak, adds a new operating dimension.

The rectifier is in the same location and wired identically in all 'Streets vehicles, regardless of what type, when they were built, or who built them. It's recessed in a cup molded into the middle of the chassis (Figure 25). Power from the track, whether AC or DC, flows into the rectifier from a red wire (front and rear center pickups) and a black wire connected to the axles/wheels/outer rails. DC power leaves the rectifier on a red wire (positive, on the right—passenger side). See Figure 24.



Figure 24: The rectifier has four leads. Front and rear wires are respectively the red outer- and black inner-rail inputs feeding from the road. Upper (red—positive DC) and lower (black—negative) are DC output to the motor.

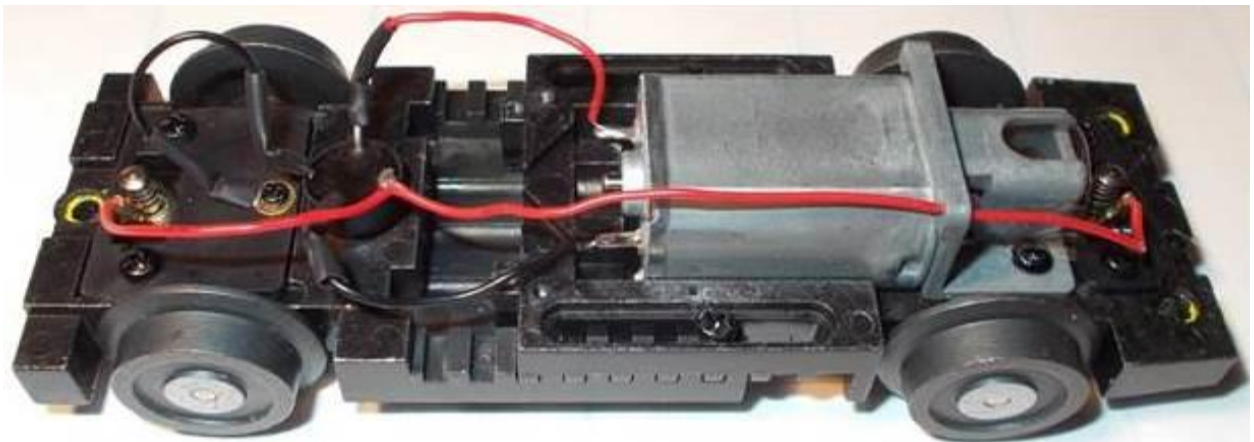


Figure 25: The WBB sedan chassis is laid out like all 'Streets vehicles. Regardless of type, the rectifier always sits in a small cup-like depression molded into the chassis in the center near the front. The only difference among chassis is that on the sedan chassis, which is metal, the chassis, gearbox, and motor case are “grounded”—electrically connected—to its wheels and axles and thus to the outer rails. All other vehicle types have a plastic insulating chassis.

Step 1: Remove the body, and if necessary the interior, from the vehicle to get at the rectifier.

Step 2: Cut all four wires attached to rectifier as close as possible to the rectifier (Figure 26).

Step 3: Strip away the shrink-fit insulating sheath from each of the three leads that had it (the double red does not on many models).

Step 4: Remove the rectifier. Usually it pops right out, but on some old K-Line models, it has to be pried out.

Step 5: Connect and solder the red leads that went to the rectifier together. Connect and solder the black wires that ran to it together. Apply some electrical tape to the junctions. (Figure 27).

Step 6: Test the new connections by holding the vehicle down on a powered (DC) track, pushing lightly to establish contact. Make sure everything works well.

Step 7: Reassemble the vehicle.

The vehicle will now run only on DC power, but it will back up if DC polarity is reversed.

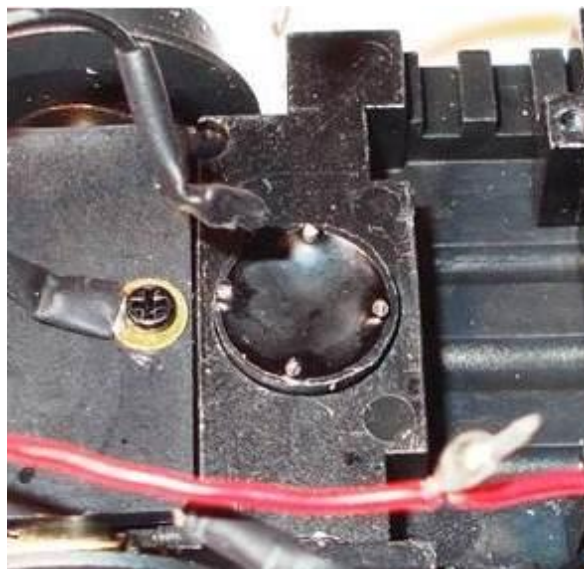


Figure 26: All four leads have been cut flush at the rectifier, leaving as much of the wires as possible. No harm comes from leaving the rectifier in its place, but the author removes it anyway.

A rectifier causes a small voltage drop as it functions. With the rectifier removed, the motor will receive slightly more power at any track voltage, and as a result will run three to five scale miles per hour faster than before.

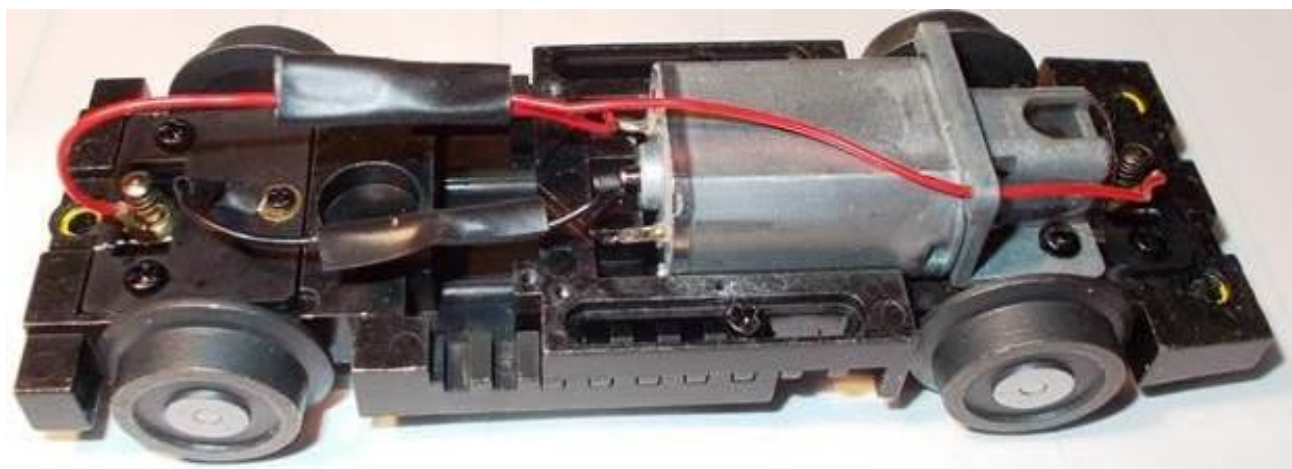


Figure 27: WBB sedan with the rewiring completed. The rectifier has been removed, the wires soldered as indicated in the text, and the junctions taped. The vehicle will now go forward when positive DC polarity (positive on the middle rail) is fed to it and backward when that polarity is reversed.

Road and Vehicle Customizing Projects

7

This chapter covers easy-to-do customization of roads and vehicles so as to make 'Streets roads fit into a layout's scenery more realistically, and to create a wider range of vehicle types to run on them. Projects presented here can be done with hand tools alone and require only modest modeling skills although care, attention to detail, and an eye for detail are needed. Very often, repainting is not necessary. In a couple of cases, the project can be done with only paper, scissors, glue, and thirty minutes' of time. A follow-on volume, *Modifying and Building 'Streets Vehicles*, covers more extensive types of projects.

Customizing roads and streets by adding parking lanes, shoulders, sidewalks, curbs, and square rather than round corners, makes for a much closer resemblance to real-world roads. Usually there is not enough room to model roadways at scale size—some compression has to be accepted, but a sense of realism can be achieved in less space using the ideas presented here.

A $\frac{3}{16}$ -inch-thick piece of basswood matches the thickness of 'Streets road pieces exactly. It is inexpensive, easy to work and install, and easy to seal and paint so it looks like road.



Figure 1: Roadway and vehicles shown were made with the “no disassembly required” methods covered in this chapter. The street looks much more realistic. Vehicles are for the most part recognizable as originally having been 'Streets vehicles, but they have a lot more diversity, realism, and personality now.

The best $\frac{1}{2}$ inch one can “spend” on additions to 'Streets is to insert a $\frac{1}{2}$ -inch-wide spacer between lanes. Space is always at a premium on a layout, particularly around roads, and often $\frac{1}{2}$ inch is a good portion of all that is available. But that $\frac{1}{2}$ inch widens the gap between lanes, providing something approaching prototype clearance between opposing directions of traffic, which now looks much more natural (Figure 2). Owners who do this—and it is recommended when 'Streets is to be put down permanently on a layout—should note that this means a few custom-length cuts of 'Streets road pieces are more likely to be needed.

A straight piece of basswood $\frac{1}{2}$ inch wide by $\frac{3}{16}$ inch thick works very well as a spacer between opposing lanes of traffic on straight road sections. On curves, the way to create the lane spacer is to put the road into its final position with $\frac{1}{2}$ -inch strips in place on all straights, slide a piece of paper under each curved section, trace the void between the two curved road pieces, and cut the wood to shape.

Paint it! Basswood parking lanes and road extensions are filled, sanded, primed, and painted. One can paint the 'Streets road pieces, too, both to eliminate that “it’s plastic” sheen and to change paving color—asphalt to concrete, etc.^{1,2,3} See Figures 1, 6, 7, and 8.

Check out municipal, county, and state standards. City, town, state, and county governments post required street, road, and sidewalk dimensions, standoffs, sign location guidelines, etc., online. Maybe one can’t fit



Figure 2: Adding $\frac{1}{2}$ inch between lanes on a two-way street improves the look tremendously, separating opposing directions of traffic to a distance that does not seem so alarmingly close to the eye.



Figure 3: The addition of a lane spacer is necessary if one intends to run larger 'Streets vehicles in opposing lanes. Here, the Snack-On step van will lose its rear inspection mirror as it passes the school bus. Were the bus another step van, both of them would lose both their front side-view mirrors and their rear mirrors.

¹ 'Streets vehicles never touch the road surface. Their wheels and rollers touch only the rails, so they will not mar painted road surfaces.

² Owners should remember to paint only the plastic, not the metal rails.

³ The author finds it easiest to paint pieces before installing them and then touch them up once installed.



Figure 4: 'Streets lanes are separated here by $\frac{1}{2}$ inch basswood, and two-inch wide, $\frac{3}{16}$ inch thick basswood is used for parking and sidewalks. Parking is overlapped $\frac{1}{4}$ inch by the curb-sidewalk for a scale seven-foot parking width (near scale). Sidewalk has rounded curb, and the two-inch width means a full eight scale feet. But normally, the author sets the building front (white outline) atop on the outermost quarter inch for a scale seven feet, resulting in 49 scale feet storefront to storefront. Note road is crowned – see text for details.

real-world roads onto a layout, but it helps to know what size they are and how they are built, and the relative size of one feature to another is often a key to achieving good compression. The author likes the City of Chicago's—comprehensive but easy to follow, with good diagrams, tables, and definitions.

<http://www.cityofchicago.org/dam/city/depts/cdot/StreetandSitePlanDesignStandards407.pdf>

Selective compression is nearly always needed. Table 7-1 and Figure 4 show the author's preferred compressed spacing—not always achievable but a good balance between space and look. The table also shows spacing for a typical commercial-area city street and what the author thinks is the narrowest that each component can possibly be modeled (sidewalks need to be at least an inch wide, parking wide enough to hold a scale die-cast car free of traffic, and the traffic lanes can be no narrower than 'Streets roadway pieces are wide, etc.).

Pinstripe tape makes for good street markings, $\frac{1}{8}$ inch for lane markings, etc., and $\frac{1}{4}$ inch—a scale foot—for walkways (Figure 6). Glossy surfaces can be rubbed with #400 or #320 sandpaper to dull them, but the author prefers to use black pinstripe tape painted flat white, a bit

thin. White over black done like this dries to a more realistic and dull, weathered look.

Parking lanes can be used to “square off” corners so that the ends of city blocks look square, not rounded, as shown in Figures 5 and 6. The 'Streets curve is swept through the “parking lane” at the corner as shown. If parking lanes are exactly 1.76 inches wide, the sharp corner of the sidewalk/curbs will come just to the edge of 'Streets D-16 piece but not overlap it at all. If parking lanes are narrower, the sidewalk corner will have to be slightly rounded, as they often are in the real world.

Table 7-1 Spacing of the Lanes and Streets - ft

Portion of Street	Width in feet		
	Real	Preferred	Minimum
Sidewalk+curb	10	7	4
Parking+gutter	10	7	6.5
Traffic lanes	<u>11</u>	<u>10.5</u>	<u>9.5</u>
Two of each, total	62	49	40
Inches at 1:48	15.5	12.3	10
Reduction in space	0%	21%	35%
Realism retained*	100%	90%	70%

*Author's personal opinion

Road crowning makes for a more realistic look—it is another feature of roads often not noticed unless it's not there. However, it creates a lot of work. Pretty much every piece needs to be screwed down when the road is crowned and crowning tends to open seams between pieces a tiny bit, which some owners wish to fill with filler putty, sand, and paint. Cumulatively this can be a lot of work, but it provides a much more realistic look. The roads shown in Figures 6, 7, and 8 are all crowned very slightly.

Shoulders on country roads or roads without sidewalks can be made with ballast poured to a $\frac{3}{16}$ -inch depth alongside the road pieces and feathered from the edge of the paving to a distance of five to ten scale feet from the edge, to simulate gravel (Figure 8). This and a few road signs, etc., good a good look of realism.

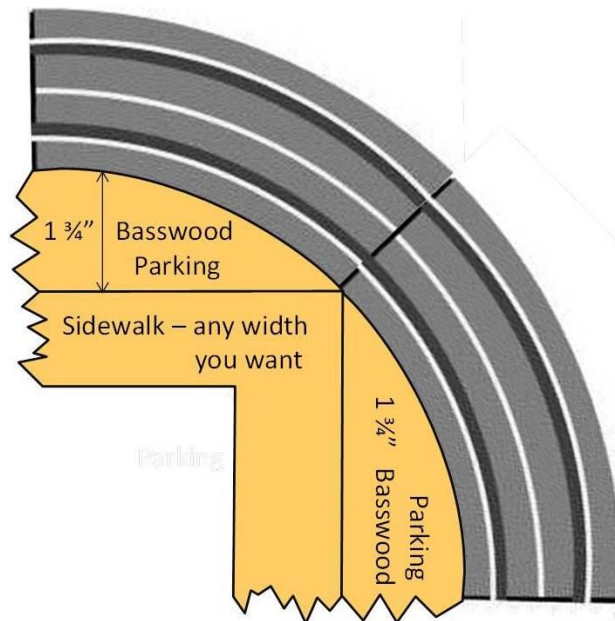


Figure 5: Parking lanes $1\frac{3}{4}$ inches wide work out perfectly at providing enough space to sweep D-16 curves through them at a corner, leaving the sidewalk area square.



Figure 6: This street corner has been squared off. Parking lanes provide the needed space to sweep the curves around a square corner of sidewalk.

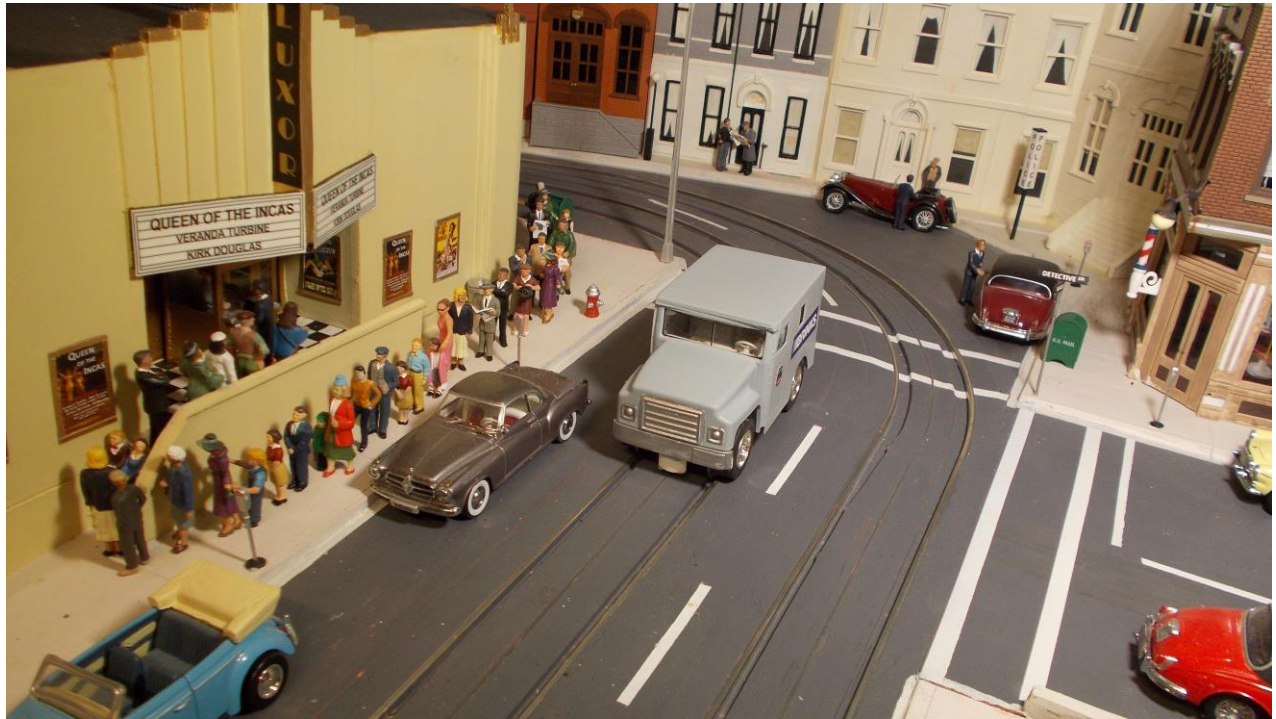


Figure 7: Pinstripe tape has been used for road striping here. Imagine for a moment this scene without the white markings on the street. They not only make the road more realistic, but give it “presence” too. Without them, it would just be a gray area between sidewalks. With them, it competes for the eye’s attention as an element of the whole scene.



Figure 8: This country road has ballast glued down alongside the full $\frac{3}{16}$ -inch near the road pieces, feathered outward for about $1\frac{1}{4}$ inches. The road has a $\frac{1}{2}$ -inch spacer between traffic lanes, and it is lightly crowned.

Customized Vehicles

A much wider variety of different types and looks of cars, trucks, and buses running on a layout can be produced using only easy-to-make and quick modifications to what are still basically unmodified 'Streets vehicles. This chapter covers only what are called *body-on customizations*—projects that are done without disassembly of the vehicle yet produce a significantly different look. Without disassembly, or the use of power tools, a great deal can be done to change the appearance of standard 'Streets vehicles so that a much greater diversity of vehicles is running on the layout (Figure 10). Furthermore, these projects can be a lot of fun in and of themselves.



Figure 9: Only five types of vehicles are made for 'Streets, each in a wide variety of colors, company logos, etc., but the limited range can still be monotonous. In its own way, each makes a good starting point for customization.



Figure 10: Who wouldn't want these on his or her layout? Every vehicle here was produced using only modest modeling skills and without removing the body from the chassis.

Towing Boats and Trailers

Having a vehicle tow a boat, trailer, or car behind it provides a lot of “different” on the layout. And nothing else provides as much “bang for the buck”—a lot of fun and eye-candy on the roadway for so little effort expended. For example, the truck-towing-travel-trailer shown in Figure 11 was completed in just three minutes of work.

’Streets vehicles can pull a light load such as the plastic trailer in Figure 11 (2.25 ounces) without any noticeable degradation in speed. Heavier loads cause some slowing around curves and a reduction in incline angles that can be climbed.

Versions of the vintage truck with two traction tires—not common but available—are heroic pullers. The “tractor trailer” shown in Figures 10 and 12 will climb a 7% slope while pulling its trailer and bulldozer (7 ounces, just a bit more than what the truck weighs).



Figure 11: This plastic trailer was packaged with the car seen behind the wrecker in Figure 12, both for \$12.95. It came with a trailer hook that was simply glued to the back of this vintage truck.



Figure 12: ’Streets vehicles will tow about $\frac{1}{3}$ to $\frac{2}{3}$ of their weight (at least 2 to 4 ounces) without significant problems or a severe reduction in speed.

Trailer hitches. The 'Streets panel van as made by all three manufacturers has a trailer-hitch-tab molded into its rear bumper. In the earliest K-Line versions, those with "K2625-" in their product number, it was drilled (Figure 13). In vans made since 2005 it is not, but it can be drilled with a $\frac{1}{16}$ -inch high-speed metal drill bit. While a person could install a tiny trailer hitch ball on it and build a trailer tongue with a model hitch, the most expedient way is to attach the trailer is with a small wire hook (Figure 14).

On the vintage truck, a trailer hitch is most easily mounted to the projecting rear overhang of the plastic stake bed (Figure 15). With the stake bed removed (to be covered later), heavier loads can be pulled with a hole for a peg over the rear axle. A hitch can be attached to the step-van (Figure 16) and the WBB sedan in either of two ways (Figure 17).



Figure 13: Ford panel vans made by all three manufacturers have this projecting tab on the rear bumper, but only early K-Line vehicles have it already drilled for a trailer.



Figure 14: The author drilled a $\frac{1}{16}$ -inch hole in the tab on this K-Line by Lionel van from 2008, then used a bent U of wire to fasten the boat trailer to the van.



Figure 15: Vintage truck from Figure 11. The trailer hitch provided with the travel trailer was glued onto the underside of the stakebed.



Figure 16: On both the step van and the school bus (not shown), the only feasible attachment is to glue a hitch to the plastic rear bumper.



Figure 17: On the WBB sedan, a plastic hitch can be glued to the rear bumper (left), or the bumper can be drilled and a small wire hook (this was made from a paperclip) bent and used.

What to tow? Just about anything that fits on the road and has wheels: cars, boats, travel trailers, construction trailers, caged animals, flatbed trailers with construction and military loads—whatever one’s imagination wants. Trailers longer than about eight inches (half the width of a D-16 curve) don’t work too well.

Flanged Wheels or Unflanged Wheels? The towed car, the boat trailer, and the travel trailer in the earlier figures have flangeless plastic wheels, yet all three track well and behave themselves on ’Streets roadway when towed. Flangeless wheels can be used when:

- The trailer is less than half the weight of the vehicle.
- The axle is wide enough that both wheels will not drop into the flange groove at the same time.
- The “trailer base”—the distance from the rear axle of the vehicle to the axle of the trailer—is not more than $4\frac{1}{2}$ inches.

Long or heavy trailers work best with flanged wheels. Longer trailers without flanged wheels tend to cut across lanes in curves (Figure 18). Flanged wheels keep it in its lane (Figure 19). A pivoted two-axle truck on the trailer *greatly* reduces the force required to pull a trailer around a curve. Particularly with heavier trailers, vehicles may balk at doing so without one. The “tractor trailer” in the foreground of Figure 1 and in Figure 12 has a trailer base of six inches and a weight of three ounces—nearly half that of the truck towing it. The trailer was made from sheet styrene and uses the front truck from a broken Atlas Atlantic bought at a TCA swap meet. Without flanged rear wheels and the swiveling two-axle truck, this trailer would not tow well.



Figure 18: A long trailer with no flanges encroaches a lot of the other lane.



Figure 19: A long trailer with flanges stays in its lane and also pulls easier.

Body-on Conversions

The simplest customization involves attaching “stuff” to vehicles. The author shops TCA and train-club swap meets for damaged die-cast cars and trucks to use as parts donors.

The vintage trucks shown in Figure 20 have had their plastic stake beds removed (a chisel inserted between it and the metal body will work it loose). The wrecker bed was made from sheet styrene and some odd parts from old die-cast cars and trucks and glued on. The tow vehicle for the flatbed trailer has had horns, filters, exhausts, fuel tank, and a new heavy-duty bumper added in front.

The WBB convertible in Figure 21 is a good example of how easily plastic bodies can be modified. It would perhaps best be done with the body off unless one is very confident of one’s cutting skills, but it is straightforward and easy overall, producing a very different “look.”



Figure 20: Two vintage trucks have had equipment added to them.



Figure 21: This convertible sedan was actually converted without removing the body. The roof was cut off (very delicate work around the top of the windshield). The original interior (the sedans have only a front seat) is left in place; dark cardboard was cut and inserted atop the engine in the rear seat area. The folded top is just cardboard cut to shape, folded, glued, and painted. The vehicle was not repainted. Several figures and busts complete it.



Figure 22. This fire truck is the author's favorite version of the K-Line vintage Ford truck. Slightly longer than stock, and with a good deal of added features, it is both a very different type of vehicle to run and quite good looking.

The author's favorite "glue stuff on" conversion is the fire truck shown in Figure 24. It has good proportions and lots of eye candy. No doubt the red color and the Dalmatian have something to do with its appeal, as well as the handsome lines of the '34 Ford truck itself.

Styrene was cut to shape and glued to the sides, top, and back of the vintage truck's stake bed to raise and fill it in to the form shown, making a cocoon in place. The truck, originally a dull red, was carefully masked with painter's tape over wheels, underneath, etc., and primed and spray-painted a very bright red. Various bits and pieces from cast-off die-cast toys, particularly shiny ones, were used for the new bumper, siren (atop bumper), warning light, hoses, ladder, and various equipment along the sides (Figure 22).

Gaps and crevices between body, cocoon, and added parts, if objectionable, can be easily filled before painting using white or yellow glue and a bit of patience (Figure 23).

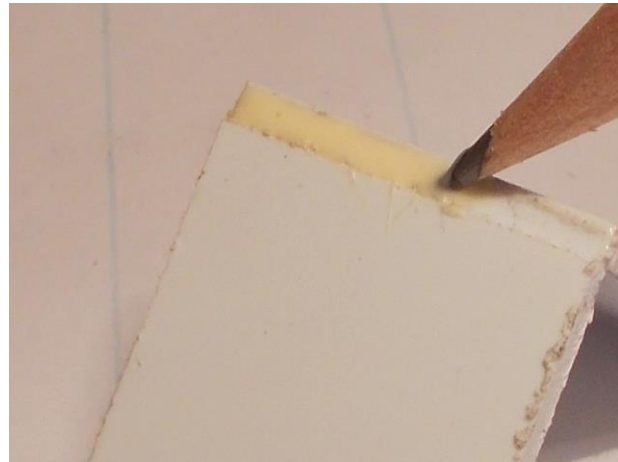


Figure 23: Small gaps and rough edges can be filled using yellow wood glue applied with a pencil tip to ease the glue in. It is drawn into gaps by capillary action. Then one can smooth it with the tip. It holds well enough to metal and plastic to fill gaps smoothly.

The author uses a pencil because as glue slowly hardens and dulls the tip, it can be wiped off and just be put into a sharpener to clean it up.

Conversion Cocoons

The vehicles on this and the next pages were made by installing “shells” over or on the stock bodies. In many cases, such as the box van vintage truck shown in Figure 24, the conversion additions are made of cardstock, carefully printed, bent and glued to shape, sized to fit exactly over the stake bed of the vintage truck, and are removable if desired.

The TV truck in Figure 25 is a box made of a styrene sheet so as to slip over a WBB van, with some odd bits and pieces glued to it. The only piece requiring intricate work is the front face of the “box.” The author made a paper template (several trials were required) that just fit the van’s cross section, and when it was perfect, used it as a template to cut the plastic. It was slipped on from the rear and is permanently bonded to the van body just because the author made it that way.

The black vintage bus shown earlier (in Figure 10) was made with a body of sheet and clear plastic (windows) glued to the sides of the stake bed and body of the vintage truck (the bus body is not removable). Unlike all the other vehicles in this section, its construction was involved, taking about ten hours of work. However, the body never came off the vintage truck. The bus body was made and installed a piece at a time. The two sides were made and glued directly to the sides of the stake-bed (which had been trimmed lower about ¼ inch at the top) then the rear panel was fit, filed and filled, the windows inserted and roof installed, etc. the bus body is permanently glued on, but the entire original body, with it attached can still be removed as one piece in case repairs need to be made.



Figure 24: While not the most detailed or different-looking version of the vintage Ford truck possible, this model was very easy, cheap, and quick to make. The rear “box” is a folded and glued manila folder with printed signs glued on the sides.



Figure 25: This remote TV reporting van has a plastic box made to fit over a standard Ford panel van body. Various scrap pieces and vinyl letters decorate the box.

Serendipitous dimensions. The RV and food truck shown in Figures 26 and 27 are among the easiest conversions possible. The author found the KINS FUN toy trucks shown in Figure 26 at a local drugstore. The chassis of each came off with the removal of three screws, and the interiors required only a small amount of cutting and tugging to remove, leaving the RV and food-truck shells. These fit over the stock WBB van with only a tiny bit of trimming required. Each is just wide enough to slip over the van body, grasping it tightly enough to hold itself in place. It is as if they were made specifically for this application.

Since the interiors could not be retained (the van fills the interior), clear plastic painted black on the inside was used for the windows of the RV, and the food truck had its hatches and doors closed with heavy white card stock. These turned out to be nice, colorful additions to the road system for very little money or effort.



Figure 26: The KINS FUN brand food truck and RV cost less than eight dollars each at a CVS near the author's home. They are all plastic and simple to disassemble. Parts are easy to cut, trim, and modify, although almost no modification was needed in these very easiest of all customization projects.



Figure 27: Food truck and RV mounted on unmodified WBB Ford panel vans. Each project took ten minutes. Except for the fact that its doors and windows are now closed for the road, the food truck looks little different than before.

Vintage Fire Water Truck

A Barnum and Bailey vintage truck (Figure 28) was “cocooned” into a very nice tank truck. In this case the tank was made from an empty plastic travel-size mouthwash bottle (Figure 29): any plastic bottle about 1 5/8 inches across could be used.

Step 1: A chisel placed under the stake-bed at the back will pry/pop it loose.

Step 2: The bottle was cut to 2 3/8 inches in length, with a one-inch slice cut out so that it could fit over the truck’s rear body (Figure 29).

Step 3: The bottle is fit onto the truck in a trial-and-error process beginning with trimming the profile along the underside of bottle to fit the profile of the truck’s rear chassis and body (Figure 30). The tank is fit on the truck, checked, and the profile then trimmed lower a millimeter at a time, fitting and observing, then trimming another millimeter, etc. When it slipped down so it sat firmly atop the rear fenders, it resulted in a good fit. Finally, it was trimmed evenly in back to 2 3/16 inches length.

Step 4: A round disc of styrene sheet about .125” thick was cut to fit inside the bottle and cemented and epoxy-puttied in place flush with the back end of the tank to make a strong rear wall (Red arrow points to the piece in Figure 31.) The gray putty that can be seen is Loctite Repair Putty.

A hole was cut in the front face of the tank and a peg glued projecting forward. It fits into the cut out area of the cab’s rear wall (yellow arrow shows where peg and wall meet) holding the tank in place. Putty was put at the front purely to add weight and balance the weight of the putty at the rear. Finally, a thin styrene sheet (green arrow) was glued and trimmed so that there is a neat, smooth rear face to the tank.



Figure 28: Stakebed was pried off this Barnum & Bailey truck with a chisel. Graphics were removed with Goo-Gone.



Figure 29: Original bottle (right) and after completion of Step 2.



Figure 30: The bottle, as on the right in Figure 29, is held in place and areas to cut for the initial trial and fit are marked.

Step 5: A ridge plate was glued along the tank top. Gaps were filled as described in Figure 25. The tank was primed (Rustoleum spray can) and painted a color as close a match to the truck body as could be found (again, Rustoleum).

Step 6: The author had originally intended to complete the truck as a gasoline delivery truck, applying sans-serif lettering to the side of the tank with the company name Texaco, etc. But it was obvious it would make a dandy fire department water tanker, too, making a pair with the fire-truck shown earlier. A simulated light atop of the cab, a siren, and a few other shiny details and some hoses and valves completed the look. Chrome bumpers were added front and rear. The result is a nice duo of 'Streets fire trucks with a lot of eye candy on them.

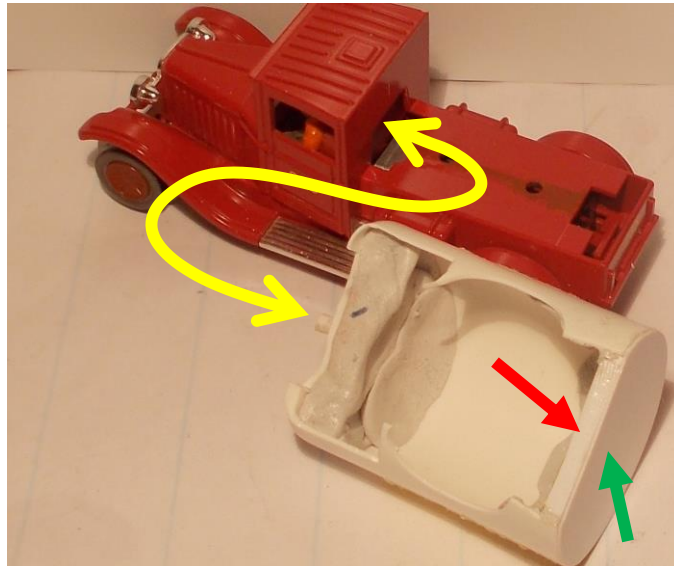


Figure 31: After Step 4. The tank is complete but not detailed or painted. Text on previous page gives details and explains the various colored arrows.



Figure 31: The completed truck has a scale 500 gallon water tank and, in company with the truck discussed earlier, provides the fire department with a very handsome pair of fire trucks.

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This easy-to-use guidebook shows how to get the most out of the Williams By Bachmann E-Z Street™ and the K-Line and K-Line by Lionel Superstreets™ lines of operable roadway, cars, trucks, and buses for O-Gauge model railroads. Whether called Superstreets, E-Z Streets, or just abbreviated ‘Streets, this system can provide a lot of additional motion and fun on a toy train layout. This book covers:

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