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Modeling a HO Scale PRR P70fbr Coach

By Thomas W. Casey

Editors Note: Tom has prepared a detail description of how he upgraded the basic Alco Models/Eastern Car Works kit. There are also references included so one may do their own research. This article is a first for the Whistle Post in that due to the length we will print a portion of it here, with the entire article available on the GSD website.

The P70fbr was a PRR commuter car and some lasted into the early '80s. Many stayed in PRR paint but they also wore PC Green or were marked with PC or MBTA heralds.

Introduction

While only a few may be interested in modeling a Pennsy P70fbr coach, many of the techniques and problems discussed in this article will be of use in other modeling projects.

Project Motivation and a Brief History of the P70:

I was looking to model a northern New Jersey 1960s/1970s commuter train for operation on my club's layout. I had previously kit-bashed a Pennsy Passenger Shark. They ended their days hauling New York and Long Branch (now North Jersey Coast Line) commuter trains. Pictures of these trains from this era show a large number of P70fbr in their consists.

The first Pennsylvania P70 was built in late 1907 (Ref 1), after only a few previous experimental all steel coaches had been

built. By 1929 the railroad had built over 1000 of them. As a result of the Depression the railroad, rather than continuing to build new cars, started a rebuilding program to upgrade and modernize their existing fleet of P70 coaches. The various rebuilt cars were classified with suffix letters indicating the model. This program was suspended by the needs of World War II with the last P70far built in 1942. After the war the railroad resumed this rebuilding program in 1948 with the P70fbr. It was to be the last rebuilt P70 that was a recognizable descendent of the P70. (Subsequent rebuilds of P70 were smooth sided streamline coaches, which while sharing the same basic dimensions, did not show their P70 heritage.) By the end of this rebuilding program in 1952, 156 cars had been rebuilt as P70fbr for the Pennsylvania Railroad (1600-1749, 1760-1765). Another 40 were rebuilt for the Pennsylvania-Reading Seashore Lines. I believe all were originally built with clerestory roofs but as leakage problems developed they were rebuilt with arched roofs or retired. As of February 1968, 87 of them remained in service with 80 of them conveyed to Penn Central. By 1971 the fleet was down to 66. (Ref 2). I don't have any information as to when the last of them were retired. In addition to the Pennsylvania-Reading Seashore Lines and New York & Long Branch line, I have seen images of P70fbrs on Northeast Corridor trains and (Continued on next page)

**Below: Tom's completed P70fbr model.
(Photo by Christos D. Kavvadas)**



(P70 continued from previous page)

in suburban service out of both Boston and Chicago. Several of these cars survive in tourist railroad operations. Drawings of Pennsy P70s can be found in several publications (Ref 3,4, & 5) as well as the following web site: <http://pr.railfan.net/diagrams/PRRdiagrams.html>. These are all based on the railroads equipment diagrams, which give basic dimensions, but should not be viewed as scale drawings and do not show a lot of details.

I downloaded the equipment diagrams (side and floor plans) for the original P70fbr with clerestory roofs (Ref 8). Using Microsoft Paint I cleaned up the drawings, modified it to show an arch roof and added additional information (underbody detail locations) from various images to develop the drawings I used as my guide for the assembly of this car. While the dimensions are accurate, I tried to maintain proper proportions; but, it should not be viewed as a scale drawing.

Nomenclature

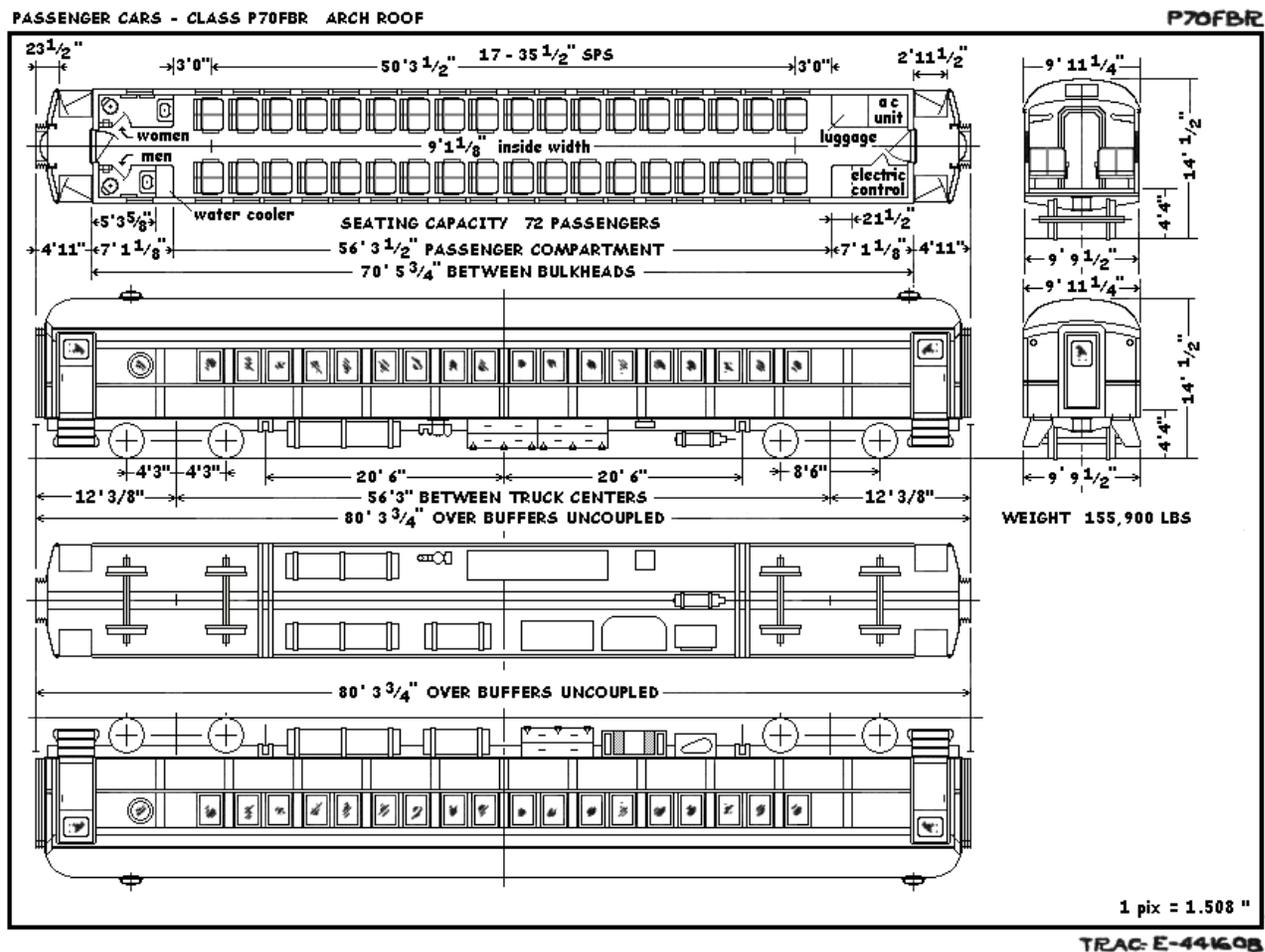
The designation of P70 is a generic designation for a railroad coach with a passenger or revenue compartment (that is between the internal vestibule walls or bulkhead walls) nominally 70-feet long. The Pennsy P70s were more than 80-feet long over the buffers uncoupled. Each vestibule used roughly five feet of car length. Washrooms, luggage storage, electrical cabinets, etc. were considered to be within the passenger compartment. On the Pennsy the first letter suffix (starting with "b") designated the class (or model type) of P70 coach. The letter "r" denoted refrigeration (a.k.a. air conditioning).

Introduction - Alco Models/Eastern Car Works

Alco Models (AM) produced a series of plastic model kits of Pennsy P70 coaches and related cars (PB70 Combine, Z74 Business Observation, etc) composed of mostly flat pieces. In addition to an early P70 and a P70far, they also produced a P70fbr. At sometime Eastern Car Works (ECW) acquired the line although I believe only

unpainted kits. At some point during their production improvements were made to the floor piece and possible other pieces as well. The P70fbr kit was offered with either the earlier clerestory roof or the later high arch roof. I keep an eye open at swap meets and have successfully found P70fbr with arch roofs. More recently Bachmann has produced its Spectrum series Pennsylvania Railroad ready-to-run passenger car models. I have some of these cars and have used similar techniques to enhance them; but I find the first run of the Spectrum models have overly pronounced rivets and rivet strips. As such, I prefer the AM/ECW kits for their more subtle details. However, the most recent release of the Bachmann/Spectrum cars have been improved with finer detail in some areas including the rivets.

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This effort started several years ago when I acquired a built up, painted, but somewhat beat up Pennsy P70fbr at a swap meet. After studying the model and prototype photos I decided to rebuild the model. Luckily for me the model was assembled with a light touch of what I believe to have been plastic glue. (The Alco Models instructions recommended Testers type tube glue.) With gentle / careful prying (and/or twisting) I was able to successfully disassemble the entire model without damaging any parts. I was not as successful disassembling a subsequent acquisition built using an ACC type glue and needed to replace some small parts I damaged. Over the years I have also acquired several kits for the original P70. Those kits used the same detail parts sprue as in the P70fbr kits so I have plenty of extra parts. (This detail part sprue is also available as a separate offering from Eastern Car Works.) I feel that some of the detail parts are crude and could be improved. I then reassembled the kit partially following the kits instructions and partially my own method. My objective is to create a "layout" quality model for operation and not just a "display" or "contest quality" model. Thus any compromises I make favor operation and layout handling.

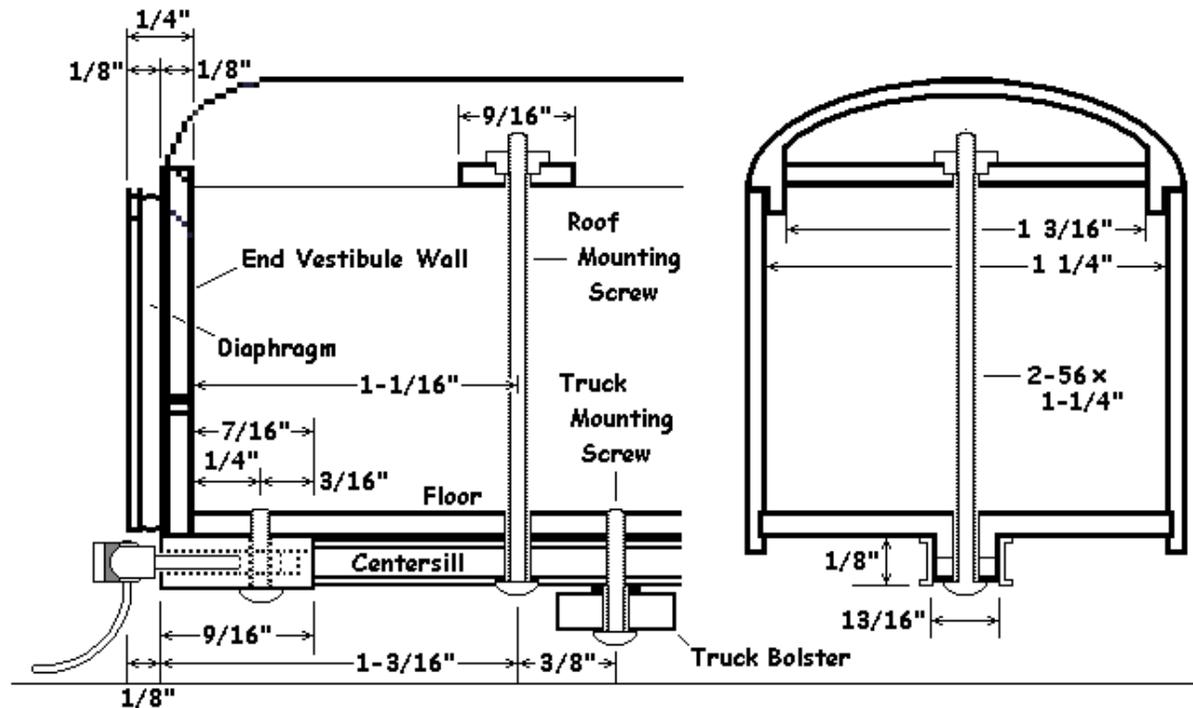
General Kit Construction Guidelines

Although the kit's assembly may seem self evident, in general, it is better to read the instructions to understand how the manufacturer intended the kit to be assembled. There maybe some seemingly odd directions or sequences that may be important. You won't find this out until you've boxed yourself in. Once I understand the intended assembly instructions, I decide how I'm going to assemble the kit. This also is a good time to familiarize oneself with the part names. I leave them on the sprue until I need them. If small parts need to be painted it maybe easier to do so before removing them from the sprue and touch them up after installation as necessary. I remove the parts with a sprue cutter, which cuts finer than a wire cutter and with less likelihood of distorting the part. However there may still be a remaining portion of the sprue or flash to be removed.

Overview of Assembly Sequence

I'll first assemble the floor including the trucks and couplers to assure that the assembly operates well. Both the trucks and couplers are mounted with 2-56 screws as they will be removed and reinstalled from time to time during the assembly. I'll then paint and decal the sides; and then assemble the car body by gluing it to the floor. Rather than gluing the roof on, I will attach it using two long 2-56 screws inserted thru the floor to a mounting bracket glued under the Roof. This will allow me to install and maintain lighting and interior details as desired. I install (glue on) the under-body details after the car body has been assembled. Less chance of knocking them off during handling

Dimensions and details of the coupler and roof mounting are shown below.



Coupler and Roof Mounting

Gluing

I glue plastic parts together using Lacquer Thinner as a solvent. (Weld may be a more accurate term but I'll stick with glue.) I wet both surfaces and then gently press them together. I kept the Lacquer Thinner I am working with in a small old Liquid Paper glass jar. Its cap has an applicator brush attached to it which I use to apply the solvent. Using this small bottle helps cut down on excess fumes as both the opening in the jar is small (roughly 1/8" diameter) and the cap plugs the opening when not in use.

Modifying the Underframe (i.e. the Floor)

Due to the length of the car and the radii it will be expected to negotiate, I use a long shank coupler body mounted in a modified coupler pocket. The Kadee #156 long center shank scale whisker couplers accomplish this. In order to achieve closer car spacing, I recess the couplers further under the car than the coupler pocket molded on to the floor would allow. This places the knuckle's swivel pin roughly in line with the outer edge of the diaphragm. The cast in place coupler pocket has to be filed down so that it is at the same height as the floor's original cast in centersill. (Some AM/ECR floors have coupler pockets cast into the floor and some don't; and some floors have the cross braces (unique to the PRR cars) molded into the floors as well.)

Truing up the Floor Piece

I found I have to vertically true up (square up) the end of the floor piece. The floor's ends have a slight vertical slope cast into them apparently to ease in separating the part from its mold. This would leave a crack between it and the car body's end pieces when they are attached later. Using a square as a guide, I file the end in a plane perpendicular to the car's centerline axis. I then add a 0.010" by 0.060" styrene strip cut to length to each end to restore the floor piece to the proper length. This also results in additional contact surface area when the car body end is attached later.

Creating a new Coupler Pocket

Due to the length of the car and the radii it will have to negotiate, I use a long shank coupler, as mentioned above. I also recess the coupler to maintain close-coupled car spacing. The length of the coupler lessens the amount the cars are drawn together on curves. I don't want the rigid diaphragms touching as that would likely lead to derailments. I want a coupler pocket that will support the coupler's long shank as close to its head as possible in order to reduce coupler droop. The lengthened coupler pocket also limits the coupler's side-to-side swing to that necessary for normal operation but prevents

the excessive side-to-side play which would occur using a shorter coupler pocket. Excessive side-to-side play would also interfere with proper coupling and be problematic during pushing moves. Kadee does not supply a longer coupler pocket with any of its long shank couplers so I kit-bashed my own.

I created a longer coupler pocket by simply lengthening the coupler pocket supplied with Kadee's #156 scale coupler. Unfortunately two of these coupler pockets, supplied with the couplers, are necessary to make one longer coupler pocket. The bottom part of Kadee's coupler pocket has cast into it the boss used to hold the coupler in place. I remove this boss from one of the two bottoms I'll be joining and cut off the front of this pocket at the front of the coupler pocket mounting hole. This gives me a piece roughly 1/8" long. Before attaching this extension to the other bottom, I file the flanges off the front of the second coupler box flush with its sides. After a dry fit with the coupler in place to be sure the resultant coupler pocket is not too long and does not interfere with the coupler's side-to-side movement, I glue the extension to the front of the other coupler pocket bottom to make the longer coupler pocket I desire. After the joint is dry I smooth the joint's interior surfaces to provide for the coupler's side-to-side movement. As I don't trust this joint to hold up over time by itself, I laminate a styrene strip to both sides of the coupler pocket. It is not necessary to extend the top piece of the coupler pocket as it will be flush up against the car's floor. I file off the coupler pocket's top flange as it would otherwise interfere with flush mounting the extended coupler pocket to the car floor. I install the coupler into the extended bottom and snap the top into place. Clean up any remaining rough external surfaces and the extended coupler pocket is ready for installation. This results in a coupler pocket that supports the #156 coupler shank just behind its head and limits its side to side play to that necessary for good coupler operation.

Installing the Coupler Pocket

I recess the coupler so that the knuckle's swivel pin is roughly in line with the outer edge of the diaphragm. This is enough separation to allow for vertical motion of adjacent couplers without snagging on the adjacent car's diaphragm, lifting it and possible derailing the car. It is also enough separation between the cars to allow for their uncoupling by lifting one of them. Any closer coupling would not allow for the easy uncouple the cars manually as the coupler's knuckle would snag on the adjacent car's diaphragm.

I mount the coupler pocket to the car's floor using a 2-56 Phillips head

screw. I use Phillips head screws as they are easier to install and remove as the screw driver is less likely to slip out of the screw head. The diaphragm assembly and the end wall piece are both nominally 1/8-inch thick. I drill a #50 hole 1/4-inch back from the end on the floor piece's centerline and the tap it for a 2-56 screw. The coupler pocket assembly is then installed. Any portion of the screw extending above the vestibule floor is removed. I measure the amount to be removed, remove the screw, then rough-cut and file it down to the desired length. Using a die, I clean the threads before re-installing, as burrs will damage the threads taped into the softer plastic floor. The whole purpose of screw mounting the coupler assembly is to be able to remove and reinstall it, as necessary both during construction and for future maintenance.

Enhancing the Box Girder Centersill

One of the unique features of the Pennsy's P70 design was the use of a box girder for the car's centersill. Most heavyweight era passenger cars had a fishbelly centersill. Some of the equipment diagrams suggest that this box girder extended a foot or so below the cars side-sill. All the AM/ECW kits underplay this element. To start rebuilding the underframe, I choose to enhance the kit's centersill by adding a strip of 1/16" thick plastic the same width of the centersill on top of it. (I work on the floor piece downside up.) This additional centersill strip fills in between the backs of the coupler pockets, which are temporarily installed for this purpose. I then remove the rivet strip molded into the floor piece along side the centersill. After the location of the cross braces have been determined and the coupler pocket mounted, I cut pieces of 1/8" Evergreen plastic channels to fit to both sides of this deeper centersill for its entire length. (Some floor pieces have the cantilever cross supports molded into the floor, some don't. If it is present it has to be removed as it will interfere with the longer 8'-6" wheel base trucks used under the P70fbr. The cantilever cross supports are offered on the detail parts sprue to replace those removed from the floor.) I spray paint the channels a grimy black before installing them as it will be more difficult to get good paint coverage after installation.

Trucks and Truck Centers

The truck centers on all Pennsy P70 cars are 28'-1.5" from the center of the car or 56'-3" between truck centers. Depending on the kit floor being used, the truck mounting holes are either 56'6", 54'4", or 52'3" apart. Some kits have three holes drilled at each end to allow for different trucks including a 6-wheeled truck to be installed. The closer truck spacing is for models of cars with larger truck wheelbases than the 8-foot wheel based trucks (Pennsy

designation 2D-P5) used under most Pennsy P70s. According the equipment diagrams, the P70fbr used a truck (Pennsy designation 2E-P5) with an 8'-6" wheelbase. The truck supplied with the P70fbr kit is for an 8-foot wheelbase truck. Based on photos I chose to use Model Die Casting's (MDC) Commonwealth passenger car truck, which has the desired 8'-6" wheelbase and is similar to the trucks used under the P70fbr. MDC's truck frame is a single part cast in a Delrin like hard plastic. Compared to the truck kit supplied with the kit, it is less likely to be damaged by rough handling, rolls freer, and it's needle point axle bearings are likely to last longer.

Installing the Step Wells

Clean the flash off of the step wells. The step wells provided with the kit have a curved outer edge on the bottom step. This may or may not be correct but I remove this curved portion. This allows the step wells to be moved out from the centerline of the car the same distance that was removed from the bottom step. This is roughly a 1/32". I glue 0.030" x 0.060" strip plastic to the floor at the back of the step well to accomplish this. In addition the notch provided in the floor seems to be large than that necessary for the step well. I also add strip plastic to the side of the step well notch to move the steps further away from the center of the car and bring the step flush with the end of the kit's floor piece. These modifications also provide some additional space for the truck to swivel and are done before the new truck center holes are drilled. To ensure the proper alignment of the step wells, the step wells are installed with the floor upside-down on a flat surface. At this point I also install the step well traps provided with the kit as well.

Locating the Truck Mounting Holes

After I have installed the step wells, I determine the final placement of the truck mounting holes. As the truck mounting hole in the floor I was using was too close to the steps to allow for the free swivel of the MDC trucks, I had to find a new truck center position as close to the steps to allow there free movement, but not so far away as to create an obviously too large gap between steps and the truck. This new location turned out to be too close to the existing hole to assure that while drilling the new hole, I would not drift into the existing hole. In order to avoid this difficulty, I plugged the existing truck center holes.

Plugging Holes

To plug holes, I use a procedure I not seen written up before. I use this technique when I have to drill a new hole in or near a pre-existing hole. I

partially tap the hole. (I may have to drill the hole up to the size necessary for the tap I'm going to use.) I then shave, scrape, and/or file down a sprue of a similar plastic to the diameter of the clearance hole for the corresponding thread to be tapped into the hole. (Try to work with plastic sprues from the car's kit so that you can be sure the plastic is of the same type. If the plastic is harder or softer, new hole drilled may tend to drift towards the softer plastic.) I use a numbered metal drill gauge to finally scrape down the sprue to the clearance drill size to get a rounded shaft. I use a die on the shaft to start a thread on the shaft only to the depth of the hole I'm plugging. The threads on both tap and its corresponding die are tapered. By only taping the hole until the tip of the tap emerges at the other end of the hole and similarly only threading the shaft the depth of the hole, the shaft will bind at some point when threading into the hole. After a dry fit to assure that the shaft won't bind before filling the hole, I then lubricate both the hole and the threaded shaft with a solvent and screw it in until it binds. As the solvent has softened the plastic I don't force once it starts to bind. I then let it dry and cut off the any protruding portion of the shaft and file / sand the surface smooth. If need be I can now drill a new hole nearby (or within) the pre-existing hole without having to worry about the bit drifting into the old hole. Previously, when I just glued a shaft into the hole, it would sometimes break free and twist when drilling a new hole even if only a portion of the plug is touched by the bit. This process avoids this problem.

Positioning Truck Mounting Holes

With the step wells installed, I determine the location of the truck-mounting hole to be as close to the step wells without interfering with the swivel of the trucks. This was 1-1/32" from the step well, which placed it on the edge of one of the holes provided by the manufacturer. After having plugged the existing hole, I mark the center of the desired hole with an indentation and then progressively drill up to a # 50 bit, which I then tap for a 2-56 screw. I create a thin spacer washer from a sheet of plastic to raise (lower) the mounting surface to below the channels used on the side on the box centersill beam. I install the trucks and then position the cantilevered cross support brace to clear of the truck's swivel. At this point I check the resultant coupler height with a Kadee coupler height gauge. Expect the couplers to be high at this point. The coupler height will be adjusted later by either shimming the coupler pocket down or filing down the top of the trucks bolster. The under body details can be added at this point.

Cantilever Cross Supports

Another unique feature of the Pennsy P70 coaches are the cantilever cross braces 20'-6" from the car center or 7'-7.5" from the truck centers. These cross braces support the car sides and are a visible under-body detail. On conventional cars with fishbelly cars, triangular braces between the centersill and the car sides preformed the same function. Depending on the kit, some have this cross brace cast into the floor; some kits do not have this cross brace it cast into the floor. Two cross braces are provided as a separate parts on the detail parts sprue. These cross braces may have to be placed closer to the car center (further from the step wells) in order to assure unencumbered swivel of the cars trucks. I found I had to place the truck side face of these cross braces 2.1" from the truck side face of the step wells or 2.5" from the end of the floor piece.

Mounting Under Body Details

I was initially suspicious of the underbody detail location sketch provided with the AM/ECW kit. As such I went to find as many pictures of these cars as I could and then developed a composite sketch of the position these details. Much to my surprise the locations of the various under body details shown in the kit's instructions appeared to close enough to the photos of P70fbr's that I decided to follow the kits instructions for under body detail placement. The water tanks are near the end of the car with the porthole windows for the rest rooms. On some P70fbr's there was only one water tank rather than the two shown in the instructions. I chose to install both tanks.

Enhancing The Under Body Details

I find that some of the under body detail parts provided with the kit to have crude features. Almost all of them have to be assembled from component parts. The straps on the water tanks strike me as grossly over sized. To assemble under body details, I clean flash off the pieces; file flat any mating surfaces; wet the mating surfaces with a solvent; press them together and then check that they are properly aligned while the joint is still soft. Once dry I clean them up with files and fine sand paper. On the tanks I both filed and sanded the tanks to eliminate any indication of the seam line between the part's upper and lower halves. I also sand-down the apparent thickness of the cast on support straps to my sense of what looks good. Evidence of seam (or joint) lines also need to be eliminated on battery boxes as well as other under-body pieces.

One telephoto broadside image of a P70fbr in commuter service on the North Jersey Coast Line shows a large truck powered generator hung under the centersill at one end of the car. None of the parts supplied with the kit match this generator. I kitbashed a part to simulate this generator using the large half of the pair of air tanks and half of what the instructions call the air brake. On the P70fbr's the brake cylinders are mounted on the outsides of the truck frames so the part is not needed under this car. The air cylinder I borrowed from another P70 kit. Assemble the pair of them and then cut the large tank separate from the smaller tank. I cut the air brake cylinder in half, drill out the center of the air tank and insert each half of the air brake cylinder in the ends of what was the air tank.

Rather than relying on the small surface areas provided on some parts to attach them to the under side of the car, I add some plastic pads to their tops to increase the surface area I'll have to glue them to the car. Some of these parts are otherwise more easily broken free in rough handling or derailments. In addition some of these mounting surfaces are not perpendicular to the outward facing surface of these details. With the new mounting pads installed I square up the mounting surfaces so the part's surfaces will be in a plane parallel the car sides. These pads also lower some of these parts a bit, which increases their visibility under the car.

Once these under body details are ready to be painted, I make up a painting paddle, which consists of a piece of masking tape taped to the paddle with the sticky side out. The parts to be painted are stuck to the paddle as if it were the underside of the car with the surfaces to be glued to the car stuck to the tape. Spacing between the parts is increased compared to their final placement under the car to insure more even paint application when sprayed. I choose to paint these parts a grimy black.

Car Side Preparations

Before assembling the car body components, if the model kit is not painted, now is the time to do it. In addition the decals (road name and car number) have to be applied and set to the car side. I use Testors Dullcoat to set decals. Once painted, lettered, and dull coated, the window strip can be inserted and glued into its wall component.

Grab Irons

If grab irons are going to be added to the car sides, now is the time to do it before the car body components are assembled. They should be painted black. After installation, I use a black paint stick to paint them. I slip a piece of paper behind them in order not to get any black paint on the car side.

Assembling Car Body

I follow the manufactures instructions for the remaining steps. Install (glue) the side windows into the sidewalls. Clean the flash and any paint from the gluing surfaces and attach (glue) the inner vestibule walls perpendicular to the floor. Some floors have a small alignment bar molded into the floor to help with this step. Install the walls on to the floor. Use a small square to make sure both sides are positioned perpendicular to the floor. The already installed inner vestibule walls help with this; however some intermediate temporary bracing may be necessary if the side-walls are warped. Also make sure that the side-walls ends are in the same plane as the end of the car floor. If not the outer ends when installed will be noticeably skewed. (To accomplish this I bought two 18" long combination squares, and placed both of the squares on one of the rulers to visually look like a clamp.) I install the roof using screws (see section below) rather than gluing it on as I will have to remove it to work on the interior. With the roof in position, test fit the car ends. I found I had to re-contour the tops of the car ends to better fit into the underside of the arched roof. When pleased with the fit and with the roof in place, glue the ends to the floor and the sides but not to the roof. This completes the basic body assembly.

Fabricating Internal Walls for Restrooms, Electrical Cabinets, Air Conditioning Units

I don't like the look of hollow cars. The interior vestibule (bulkhead) walls helps in this regard but I like to add the other interior walls. Following the car's floor plan, I cut from sheet styrene pieces to represent these interior walls. I don't detail these walls with sinks, toilets, doors, etc. They are merely meant to be visual blocks. They also hide the screw being used to hold the roof on. I glue these walls to a thin sheet of styrene I use as the floor. This floor extends under the center seating section.

Installing Additional Car Weight

The prototype light weight was reported to be 155,900 lbs. This scales out to be 0.24 lbs or 4.77 ounces. The NMRA weight standard calls for a model of this car's length to weight 6.5 ounces for good operation. Weighing all the

parts together, add the necessary weight.

Installing Interior Seating

I've used the interior seating section from a Spectrum P70 Coach to providing the car's seating. The seat spacing is correct for this car, however it has to be shortened as the P70fbr had fewer seats than the earlier P70's that Spectrum models. Not knowing the correct color of the seating, I spray paint them a cream yellow to represent rattan seating. This is probably incorrect as they probably used a dark plush seat covering but that would not show off the seating as well from the outside. I'd like to be able to populate these seats but have not found an affordable set of scale seated people.

Installing Interior Lighting

While I'm not sure what kind of lighting was used in these cars, I'm playing with the idea of installing illumination using many small amber LEDs representing incandescent lighting. These would be spaced using the light vent locations in the earlier P70 clearstory roofs. As I run these cars on a club layout with DCC power system, there is always A.C. power in the track. I would have to rectify the track voltage and group the LEDs to match the resultant available voltage. I'd like to add a capacitor to reduce the flickering of the lights but I don't think I have enough space for an adequate sized capacitor.

Modifying the Roof

The width of the under section of the roof which receives the sides is the same width as the floor piece. But, this fails to take into account the roughly 1/32" deep notch in the car sidewalls designed to receive the floor piece. Not correcting for this would result in a noticeable "keystone" effect of the sidewalls in the completed model. I proceeded to add some width to the floor (0.040" thick) by adding some 0.040" by 0.020" strip styrene to both sides of the floor piece and increasing the recess in the roof which received the side walls by filling down the indent notch under the roof which receives the sidewalls. This recesses the car sides into the roof a bit further than intended and widens the car at the floor level eliminating the "keystone" effect.

Mounting the Roof

Rather than gluing the roof to the car body, as per the instructions, I want to be able to remove the roof. I drill two #43 (to clear a 2-56 screw) holes thru the centersill roughly 3/8" ahead of the truck mounting hole or 1-1/16" in from each end of the floor piece. This dimension is not critical but you need to be

able to get to the screw's head with a screwdriver without having to remove the trucks. Thru this hole I will insert a 1-1/4" long 2-56 screw to hold down the roof. Under the roof above this hole I glue a cross brace (1-3/16" by 5/8") to receive this screw. A 2-56 nut is force fitted and glued into the center of this cross brace. It is then glued to the underside for the roof piece with sufficient clearance above it to allow the screw to travel through the nut without it hitting the roof. In addition to physically attaching the roof, this screw mounting also gives me the opportunity to transmit power to lights under the roof if I choose to install them in this model at a later time (refer to page 14).

Post Script

In the process of preparing this article, I acquired an assembled Eastern Car Works, Pennsy P70fbr at a swap meet. Upon initial inspection at the swap meet it appeared to be in good enough shape that I would just have to change the couplers and their mounting, change trucks, and reattach some parts that had come off at their glue joints. Upon further inspection at home, I realized that the underbody details were mostly installed upside down. Due to the use of plastic glue, most of them came off without much difficulty and without any damage. Two did not; but luckily, I have plenty of replacement parts from other similar P70 kits I've picked up for reasonable prices over the years at swap meets. I then noticed that car sides were "keystoned". For some reason the roof piece is either too wide or the floor is too narrow. Since most of the glued joints snapped apart along the glue line without damage to the parts, I proceeded to completely disassemble the car to virtually return it to kit form and start all over again. The width of the under section of the roof which receives the sides is the same width as the floor. But, this fails to account for the roughly 1/32" deep notch in the car sides designed to receive the floor piece. I proceeded to add some width to the floor (0.040" thick) by adding some 0.040" by 0.020" strip styrene and reduced the width of the roof by filling down the indent notch under the roof which receives the sides to reduce this "keystone" effect. This recesses the car sides into the roof a bit and widens the car at the floor level eliminating the "keystone" effect. This additional car body width at the floor level is not noticeable when the car end pieces are installed. **WP**

Tools

1. I use a 6" metal ruler with dimensions tenths of an inch and hundreds of a foot in addition to the conventional fractions of an inch
2. I use a 6" combination square and a 3" modelers square to both cut pieces square and help file pieces square.
3. I use a small piece of plate steel (3/8" by 12" by 7") as a working surface with the squares to get square cuts
4. Numbered and fractional drill bits of various sizes
5. Assorted single ended pin vises with frequently used bits already installed.
6. A hair pin to make an indentation at hole centers to prevent the bit from drifting during drilling
7. Sprue cutters
8. Small screw drivers (I prefer to use Phillips head screws when possible)
9. Files: assorted small fine files to larger medium course files
10. Assorted hobby knives with various different blades
11. A steel numbered bit guide to help scrape down sprues to a desired diameter.
12. Tweezers to hold and position small parts
13. Calipers (both digital and analog) to measure parts, openings, etc.
14. A toothbrush to clean up pieces after filing or sanding as necessary
15. An 18" combination square with two squares on it.

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