From Junk to Jewel

The Modeling Journey of Mule Car No. 2

Presented November 5, 2023
South Central Wisconsin Division
By Ken Mosny

Here's What We'll Do

- Use Simple Jigs and Fixtures to Make Easier and More Accurate Models.

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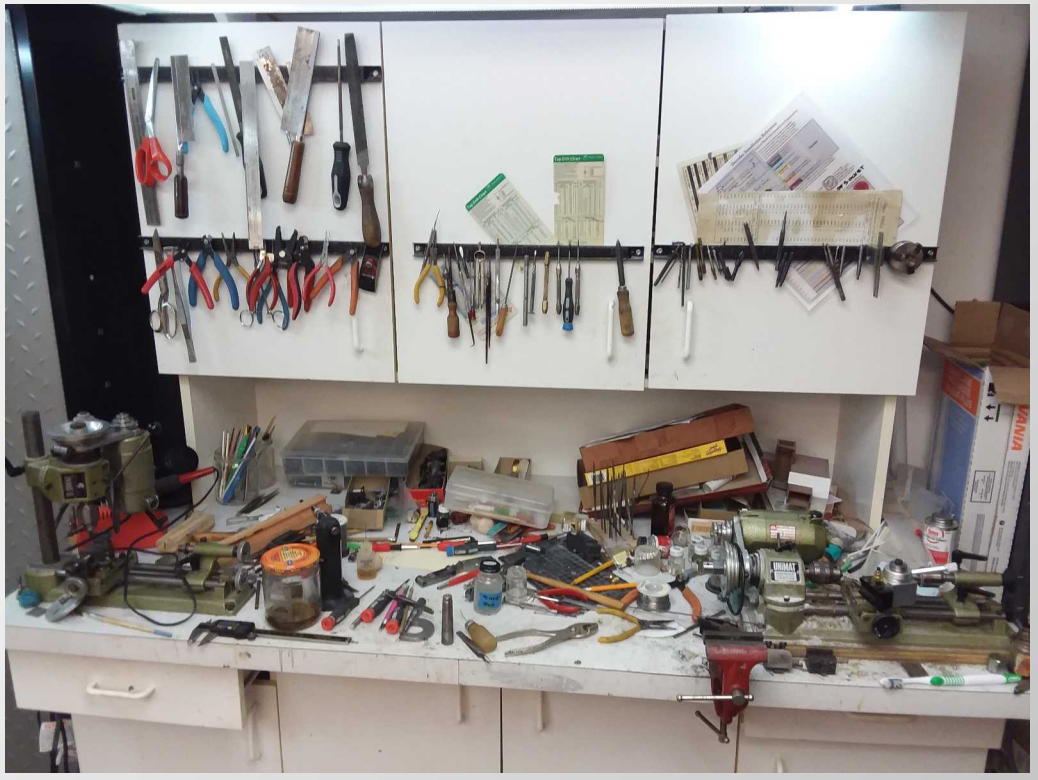
- Show Simple Modeling Techniques
- Show Some (Possibly to you) New Tools or New Uses for Tools You Have
- Use NMRA Standards and Recommended Practices Where Applicable to Build the Project.

First Things First



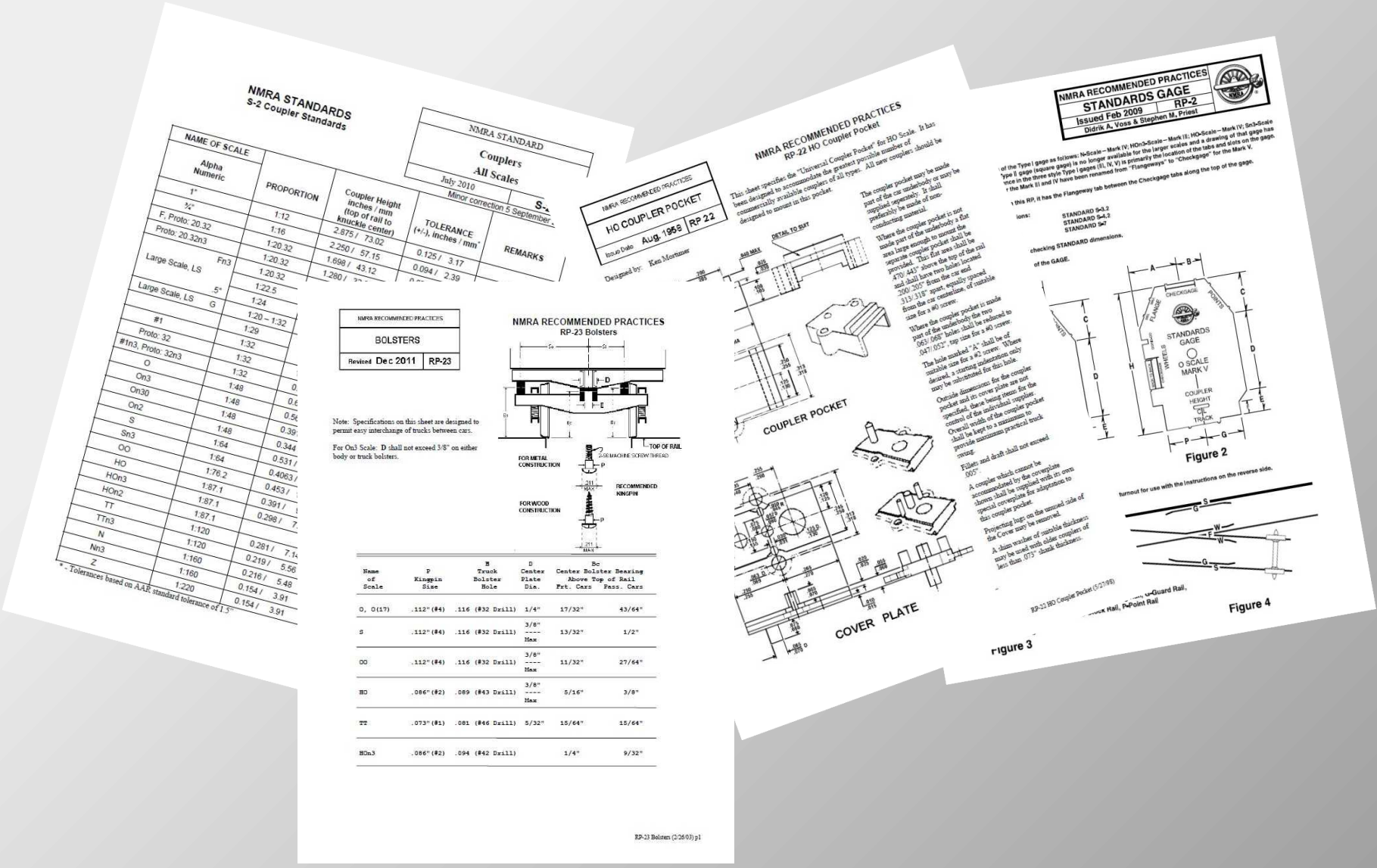
- At least a six inches square space is needed for any successful project
- As my granddaughter ounce said, “This is where the magic happens”.

The Project

- Mantua Horse Car Junk Box Find
- Lumpy Brushed Red Paint
- Incorrect Trucks
- Missing Couplers and Details
- Broken Parts

Prepare the Frame

The Truck and Coupler Standards and RP's



NMRA STANDARDS
S-2 Coupler Standards

NAME OF SCALE Alpha Numeric	PROPORTION	Coupler Height inches / mm (top of rail to knuckle center)	TOLERANCE (+/-), inches / mm*	REMARKS
1"	1:12	2.875 / 73.02	0.125 / 3.17	
¾"	1:16	2.250 / 57.15	0.094 / 2.39	
F, Proto: 20.32	1:20.32	1.698 / 43.12		
Proto: 20.32n3	1:20.32	1.280 /		
Fn3	1:20.32			
Large Scale, LS 5"	1:22.5			
Large Scale, LS G	1:24			
#1	1:20 – 1:32			
Proto: 32	1:29			
#1n3, Proto: 32n3	1:32			
O	1:32			
On3	1:32			
On30	1:48			
On2	1:48			
S	1:48			
Sn3	1:48			
OO	1:64			
HO	1:64			
HOn3	1:76.2			
HOn2	1:87.1			
TT	1:87.1			
TTn3	1:87.1			
N	1:120			
Nn3	1:120	0.281 / 7.14		
Z	1:160	0.219 / 5.56		
	1:160	0.216 / 5.48		
	1:220	0.154 / 3.91		
		0.154 / 3.91		

* - Tolerances based on AAR standard tolerance of 1.5"

NMRA STANDARD
Couplers
All Scales
July 2010
Minor correction 5 September

NMRA RECOMMENDED PRACTICES
HO COUPLER POCKET
Issue Date: Aug. 1965 | RP 22
Designed by: Ken Mortimer

NMRA RECOMMENDED PRACTICES
RP-22 HO Coupler Pocket

This sheet specifies the "Universal Coupler Pocket" for HO Scale. It has been designed to accommodate the greatest possible number of commercially available couplers of all types. All new couplers should be designed to mount in this pocket.

The coupler pocket may be made part of the car underbody or may be supplied seperately. It shall preferably be made of non-conducting material.

Where the coupler pocket is not made part of the underbody a flat area large enough to mount the seperate coupler pocket shall be provided. This flat area shall be and shall have two holes located .470/.445" above the car seat .260/.305" apart, equally spaced .313/.318" apart, equally spaced from the car centerline, of suitable size for a #0 screw.

Where the coupler pocket is made part of the underbody the two .063/.068" holes shall be reduced to .047/.052", tap size for a #0 screw.

The hole marked "A" shall be of suitable size for a #2 screw. Where desired, a starting indentation only may be substituted for this hole.

Outside dimensions for the coupler pocket and its cover plate are not specified, these being items for the control of the individual supplier. Overall width of the coupler pocket shall be kept to a minimum to provide maximum practical truck swing.

Fillets and draft shall not exceed .005".

A coupler which cannot be accommodated by the coupler shown shall be supplied with its own special coverplate for adaptation to this coupler pocket.

Projecting lugs on the unused side of the Cover may be removed.

A shim washer of suitable thickness may be used with older couplers of less than .075" shank thickness.

DETAIL TO SUIT

COUPLER POCKET

COVER PLATE

Figure 3

NMRA RECOMMENDED PRACTICES
STANDARDS GAGE
RP-2
Issued Feb 2009
Didrik A. Voss & Stephen M. Priest

of the Type I gage as follows: N-Scale – Mark IV; HOn3-Scale – Mark II; HO-Scale – Mark IV; Sn3-Scale
Type II gage (square gage) is no longer available for the larger scales and a drawing of that gage has
nce in the three style Type I gages (II, IV, V) is primarily the location of the tabs and slots on the gage.
r the Mark II and IV have been renamed from "Flangeways" to "Checkgage" for the Mark V.

this RP, it has the Flangeway tab between the Checkgage tabs along the top of the gage.

ions:

STANDARD S-1.2
STANDARD S-4.2
STANDARD S-7

checking STANDARD dimensions.

of the GAGE.

STANDARDS GAGE
O SCALE
MARK V
COUPLER HEIGHT
TRUCK

Figure 2

turnout for use with the instructions on the reverse side.

Figure 4

NMRA RECOMMENDED PRACTICES
BOLSTERS
Revised Dec 2011 | RP-23

Note: Specifications on this sheet are designed to permit easy interchange of trucks between cars.

For On3 Scale: D shall not exceed 3/8" on either body or truck bolsters.

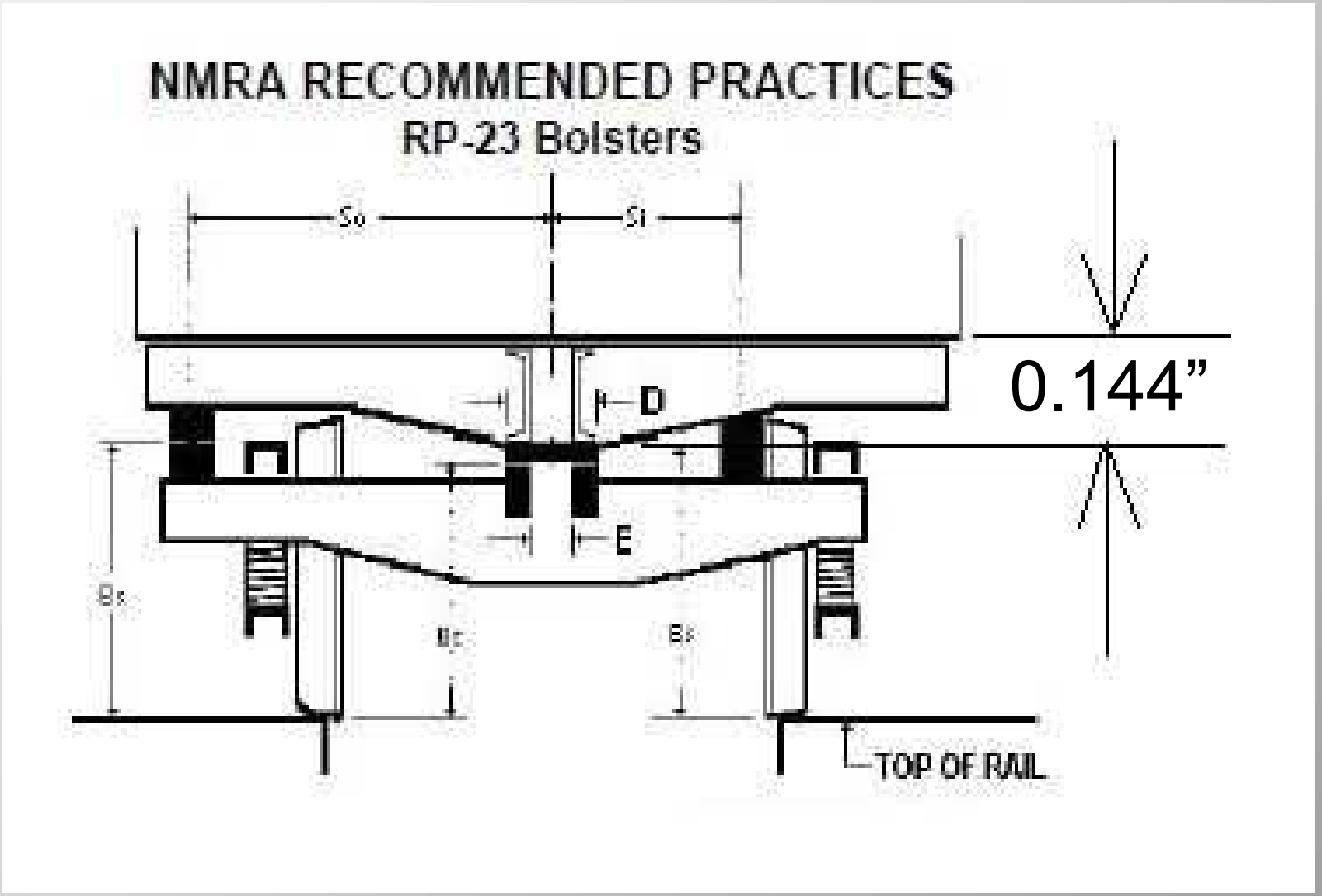
NMRA RECOMMENDED PRACTICES
RP-23 Bolsters

FOR METAL CONSTRUCTION
FOR WOOD CONSTRUCTION
TOP OF RAIL
2-56 MACHINE SCREW THREAD
RECOMMENDED KINGPIN

Name of Scale	P Kingpin Size	B Truck Bolster Hole	D Center Plate Dia.	Bc Center Bolster Bearing Above Top of Rail Frt. Cars	Pass. Cars
O, O(17)	.112" (#4)	.116 (#32 Drill)	1/4"	17/32"	43/64"
S	.112" (#4)	.116 (#32 Drill)	3/8" ---- Max	13/32"	1/2"
OO	.112" (#4)	.116 (#32 Drill)	3/8" ---- Max	11/32"	27/64"
HO	.086" (#2)	.089 (#43 Drill)	3/8" ---- Max	5/16"	3/8"
TT	.073" (#1)	.081 (#46 Drill)	5/32"	15/64"	15/64"
HOn3	.086" (#2)	.094 (#42 Drill)		1/4"	9/32"

RP-23 Bolsters (2/26/03) p1

The Height of the Bolster for Freight Cars Figures to 0.144”



Adjusting the Bolsters to Standard

- This Brass Plate is 0.144” Thick, the <u>Correct Height for Freight Cars</u>
- Using It Makes It Easy to File the Bolsters Square and to the Correct Height.

Filing the Bolster to Height

Fixing the Bolster Hole

- NMRA RP-23 Specifies a #2 Screw for Truck Kingpin in HO
- Here Styrene Tube is Glued in to Correct the Oversize Hole
- It will be tapped 2-56

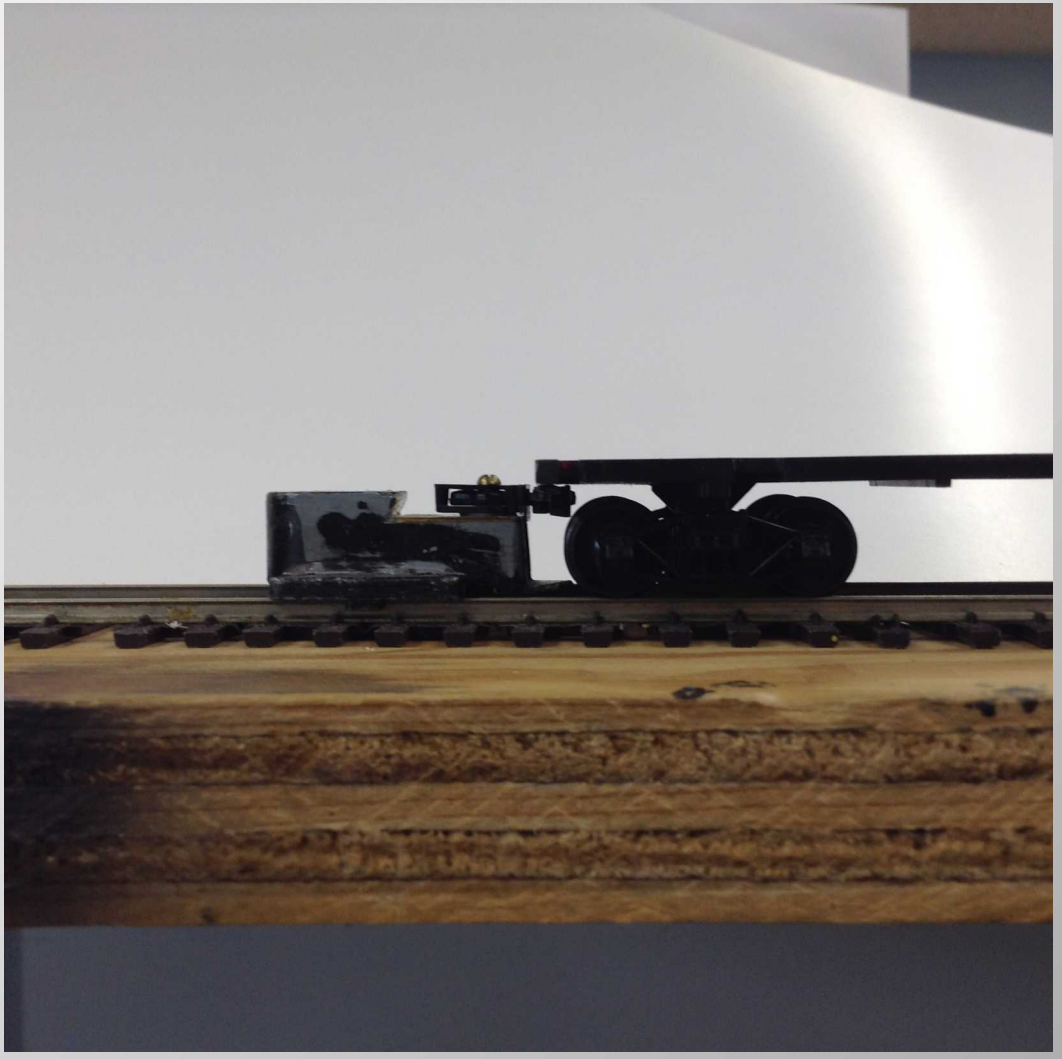
Checking the Bolster Height

- Using a 0.144” Drill and Straight Edge to Verify the Bolster Height
- You Can Also Measure the Height by Gauging What Drill Bit Fits

Checking Truck Height to RP-23

- RP-23 Specifies 5/16” Height From Rail Head to Truck Bolster Mounting for <u>HO Freight Trucks</u>
- Span a Pair of Trucks with a Straight Edge
- Use 5/16 Drill to Gauge the Height

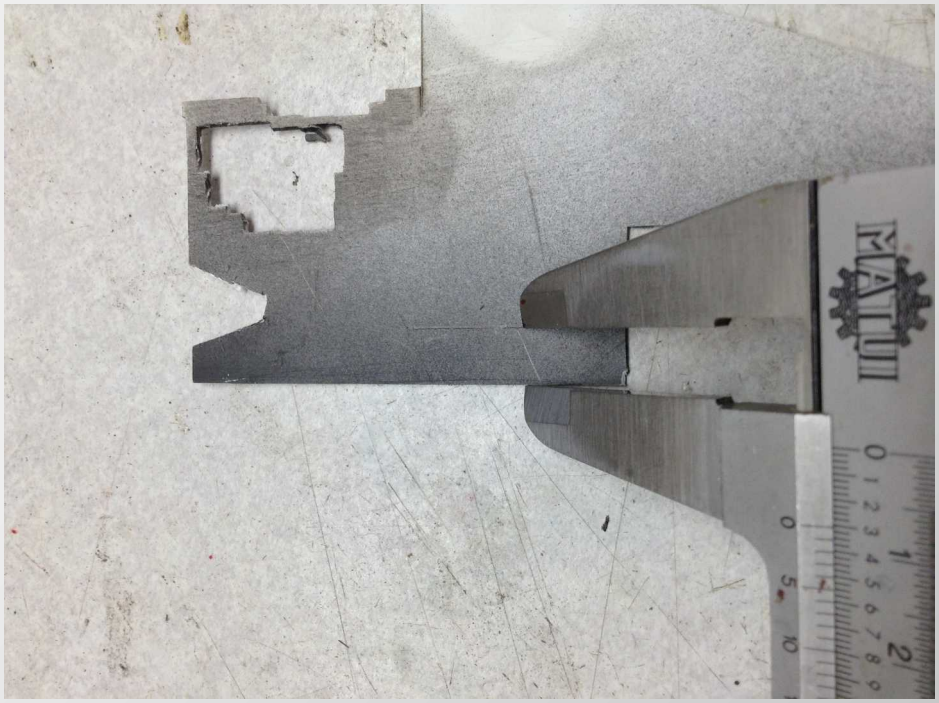
Perfect



Measuring for the Coupler Pad

- Use A Caliper to Gage the Width for the New Styrene Coupler Pad.

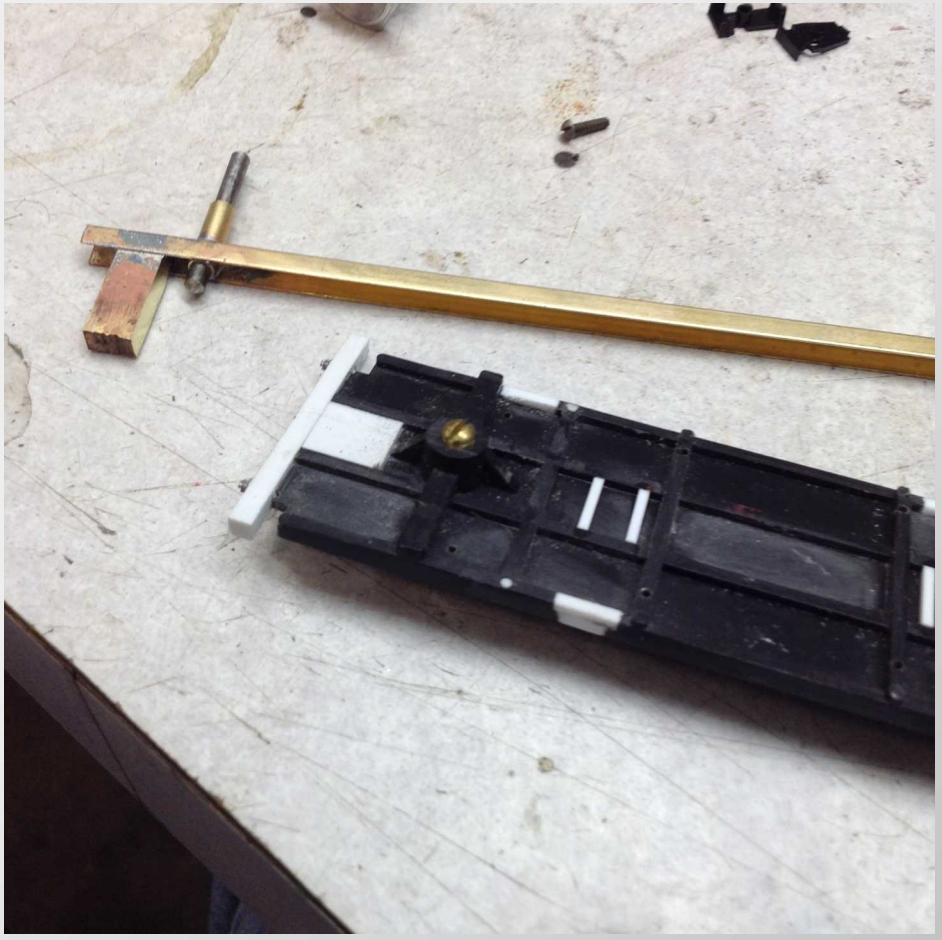
Transferring the Width

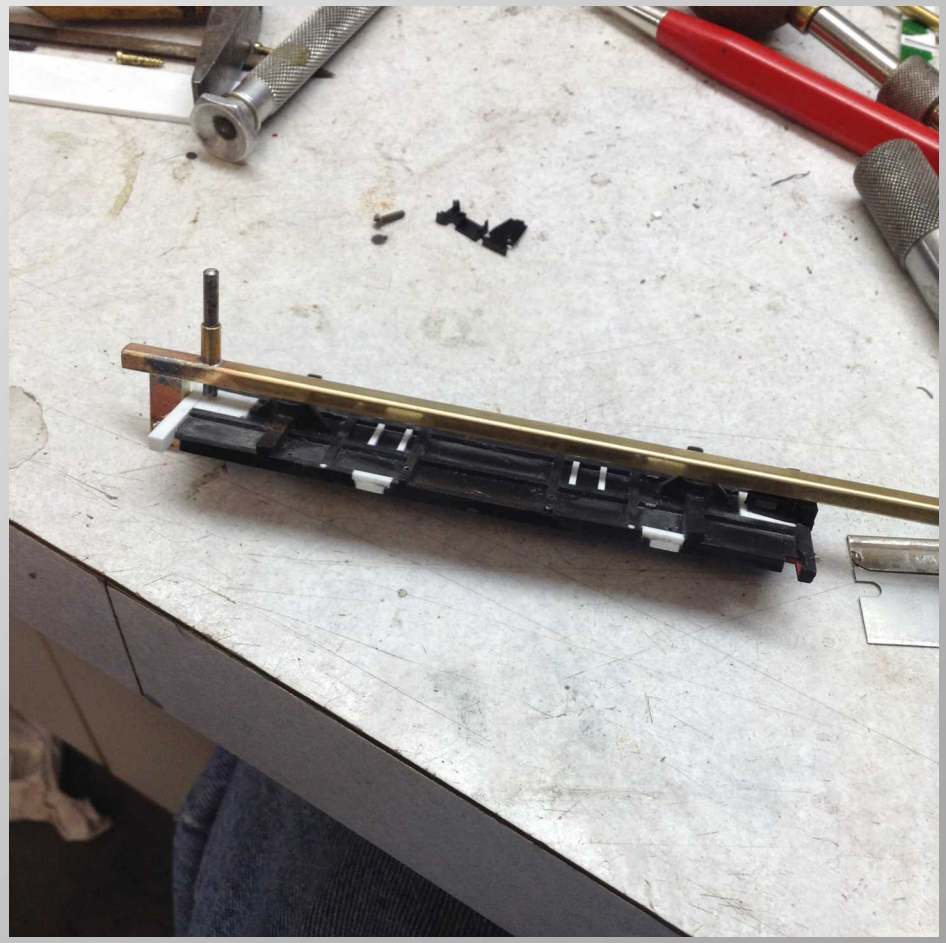


- Without Changing the Caliper Setting, Scribe a mark on the Styrene Sheet
- Then Score and Snap Along the Line

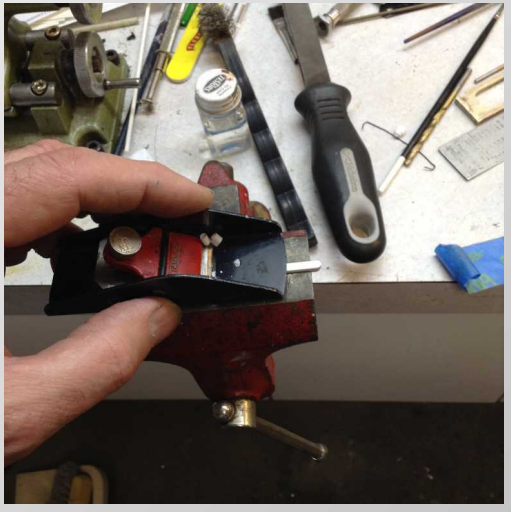
Plane for a Perfect Fit

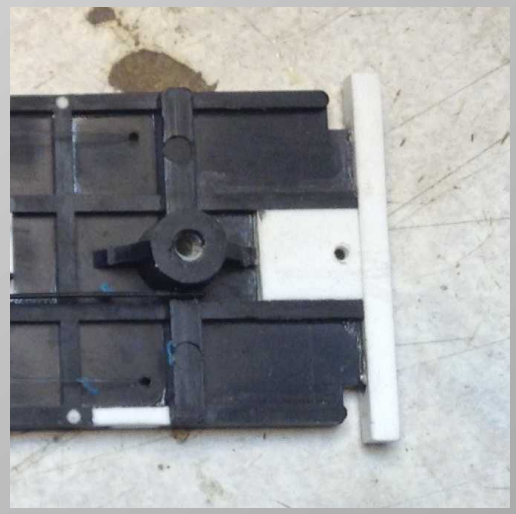
Tool For Locating Coupler Pockets





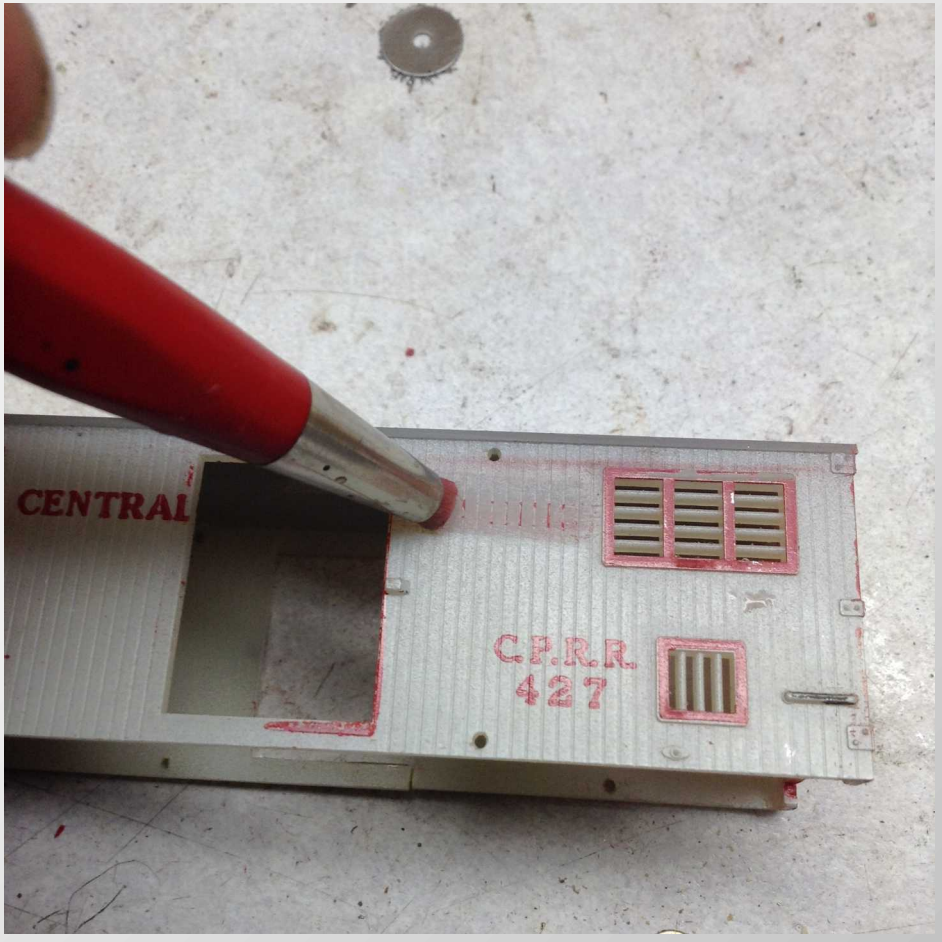
Fixing the Broken End Beam

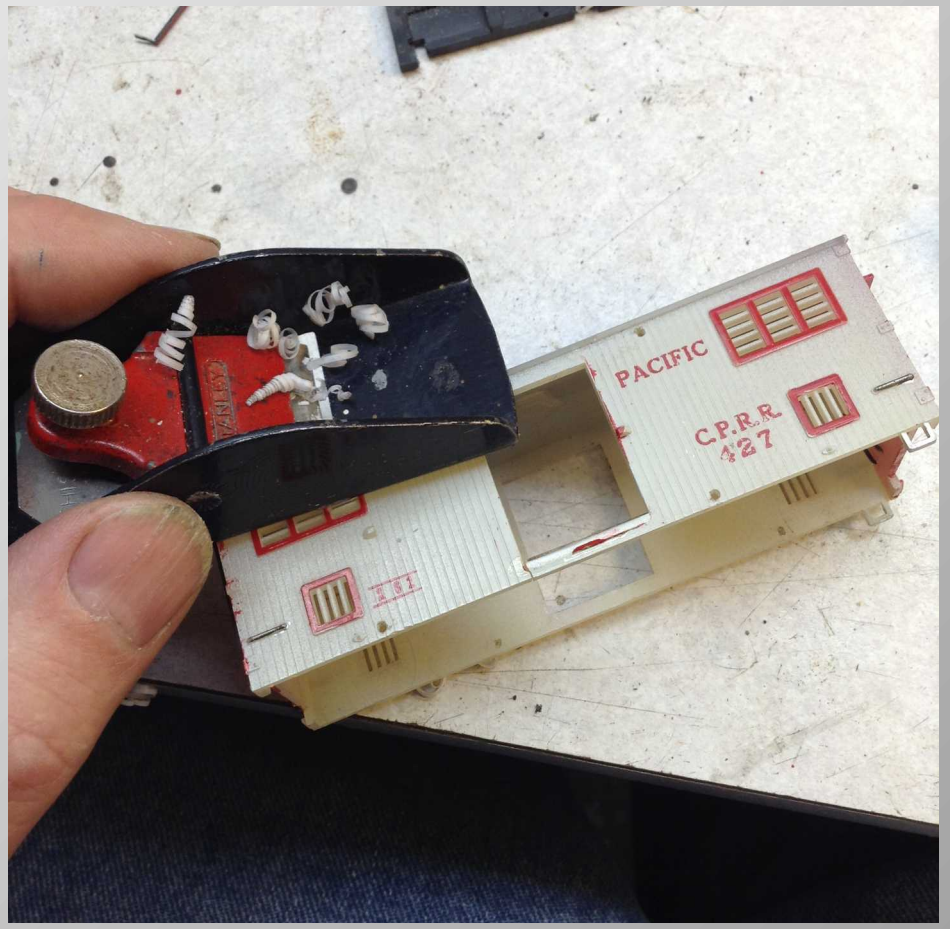




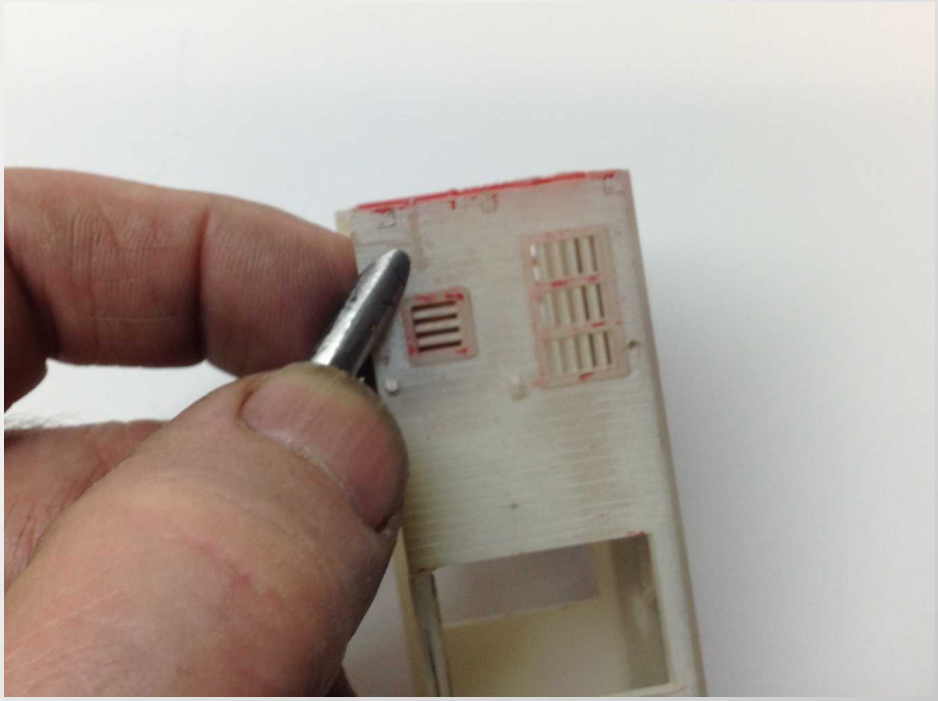
Filling in the Gaps

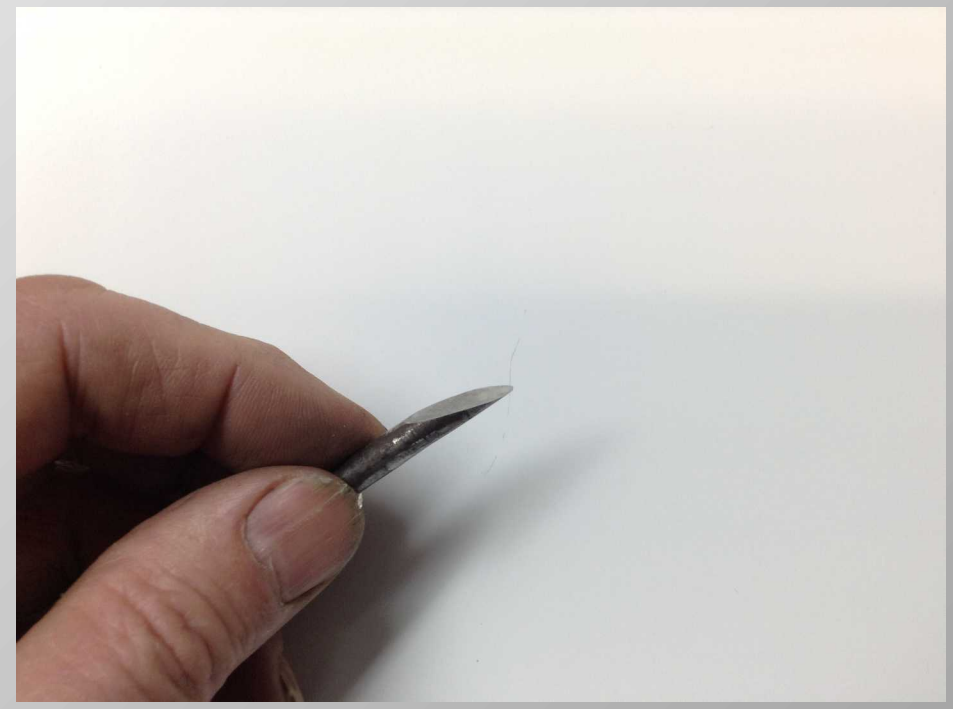
Scuffing Paint and Trimming Roof





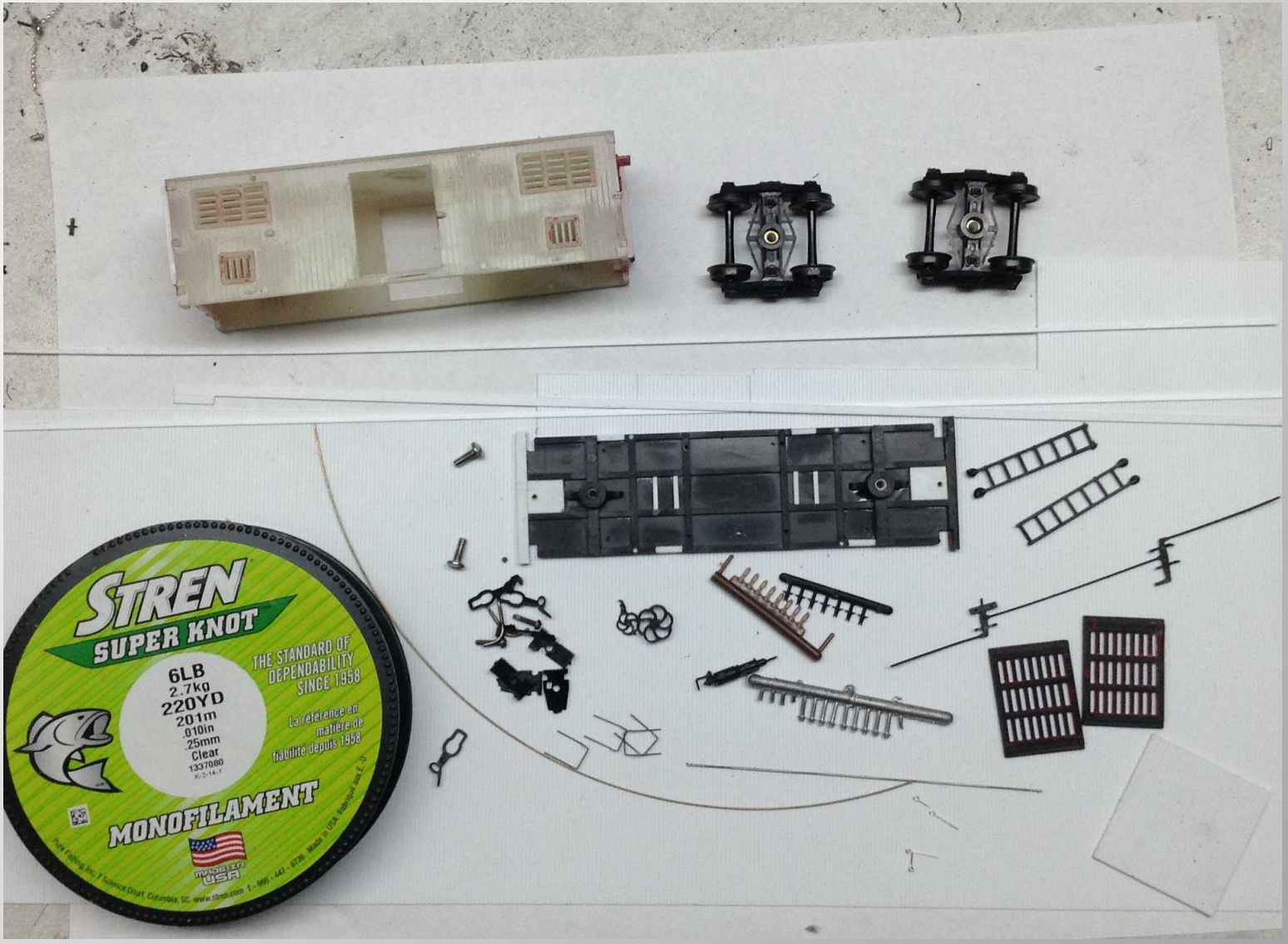
Shaving Off Details



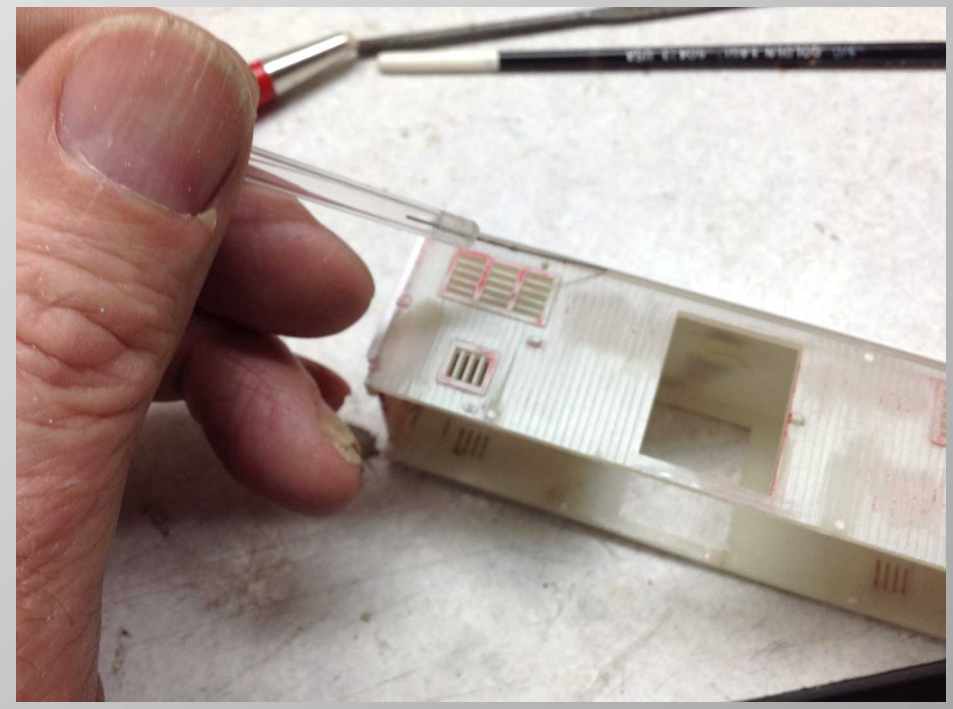


Plugging Holes

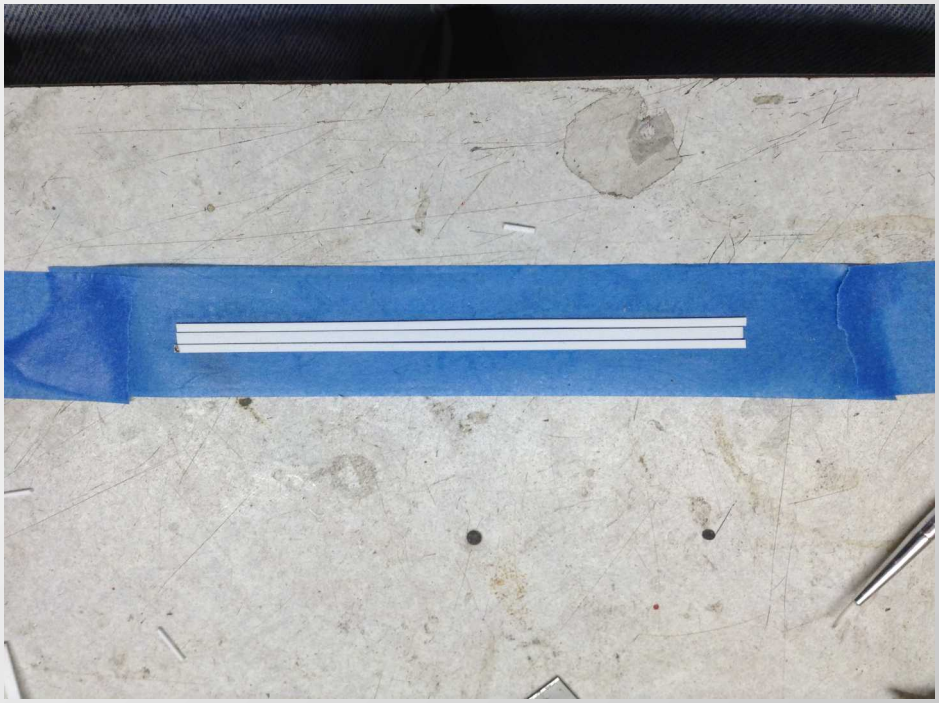
Adding the Details

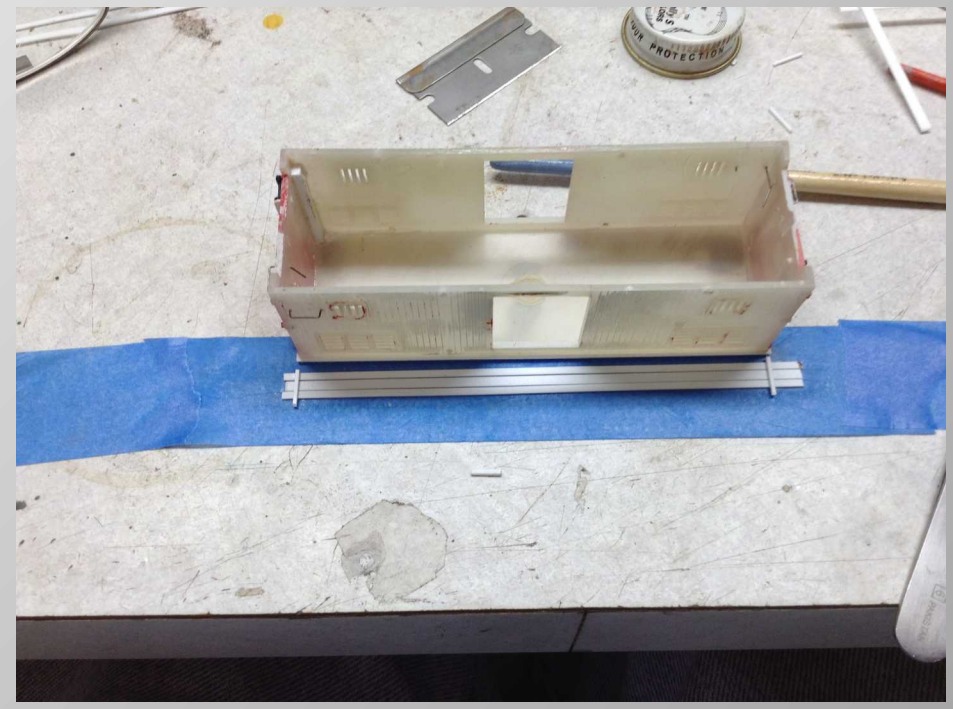


New Scribed Roof



Making the Roof Walk

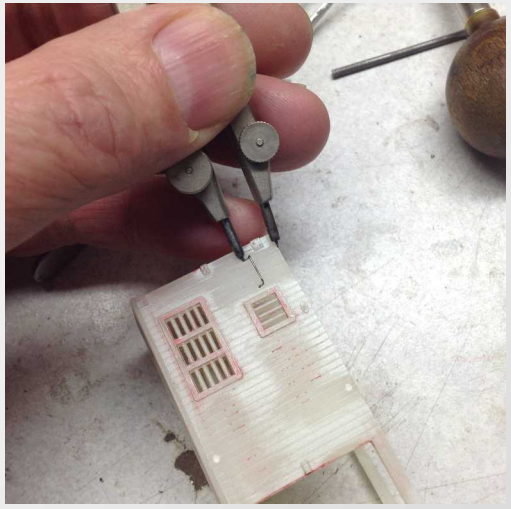


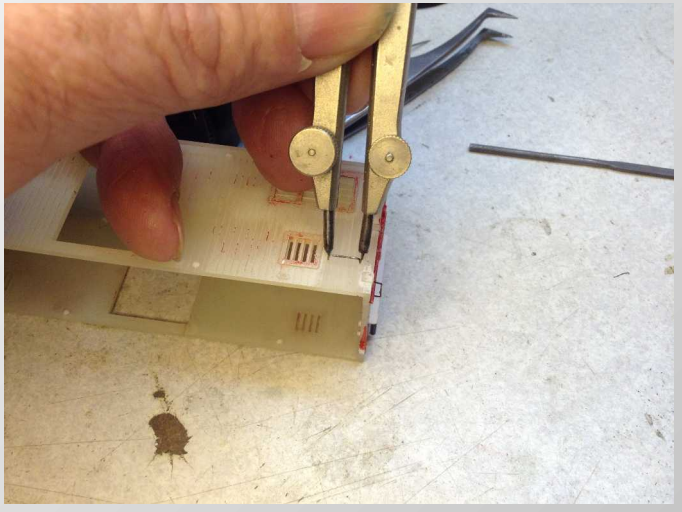


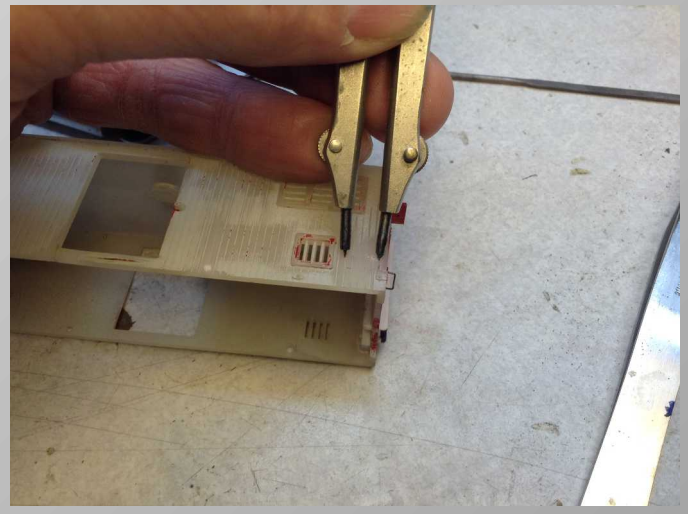
Don't Use MEK for the Walk Ribs
It Will Run All Over
This is Styrene Dissolved in Toluene

Sand Reliefs in the Walk Ribs

Using Dividers to Measure Spacing

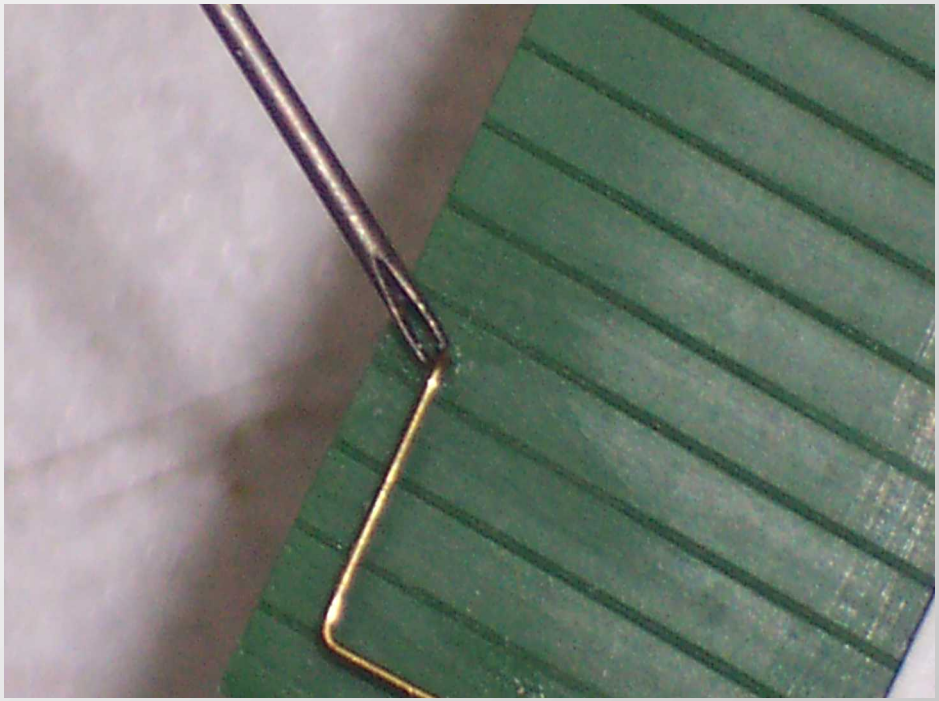


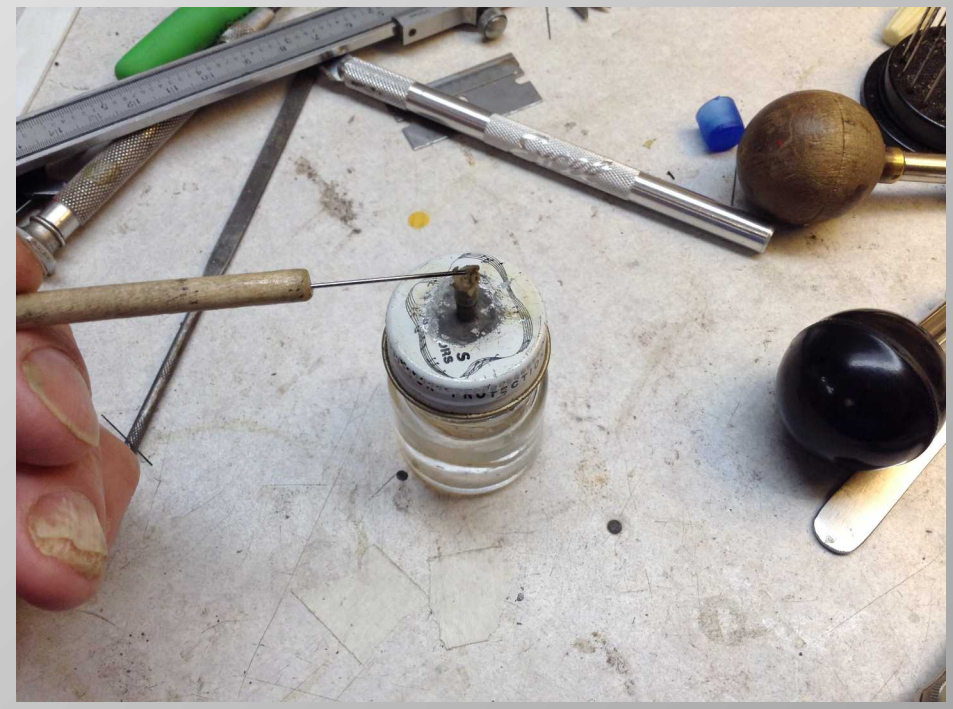




Making the Forked Applicator
Grinding the Forked Applicator

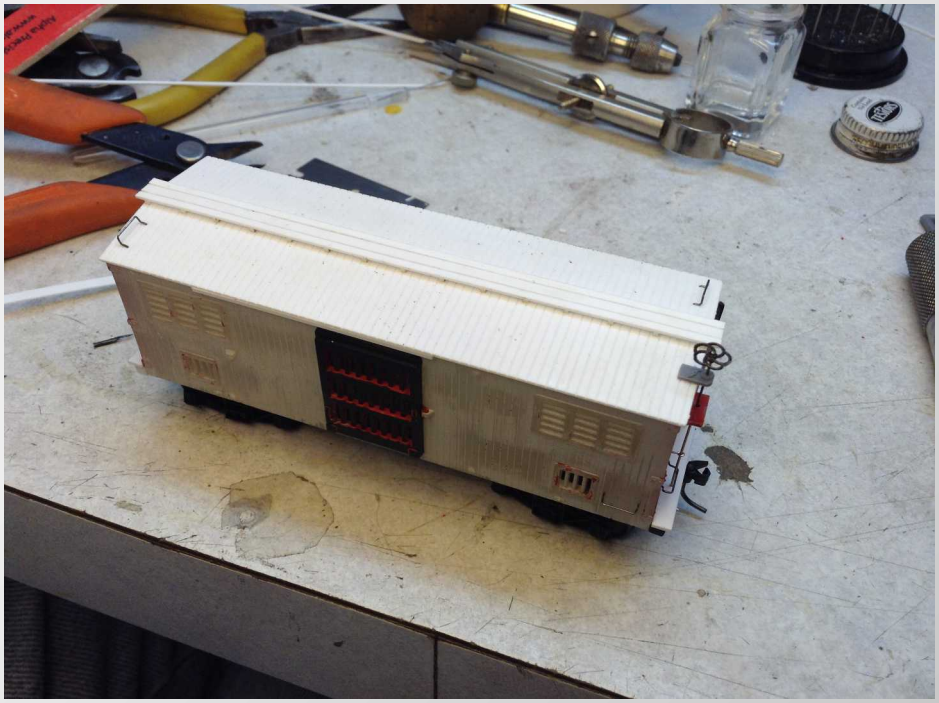
Applying ACC
Cleaning the Forked Applicator





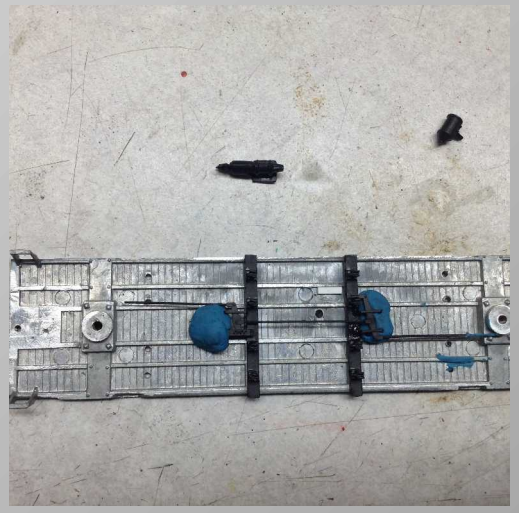
Details, Details, Details
Ladders, Brake Wheels, Platforms

Details, Details, Details
Roof, Doors

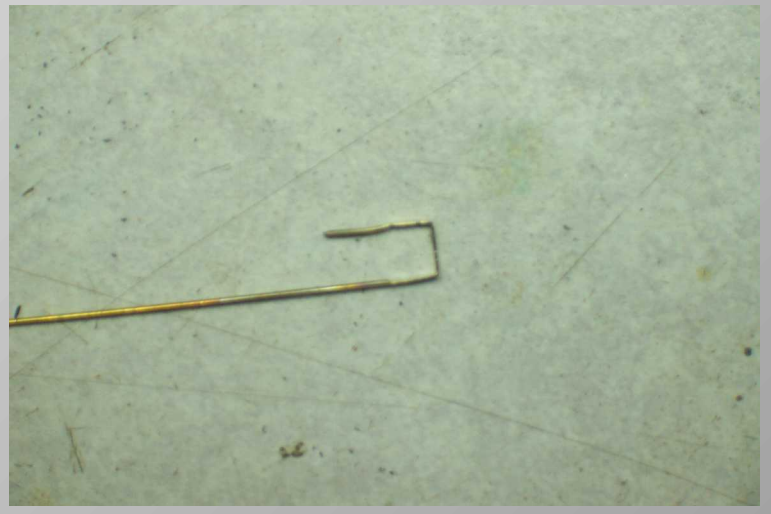


Details, Details, Details
Turnbuckles

Details, Details, Details
Brake Rigging

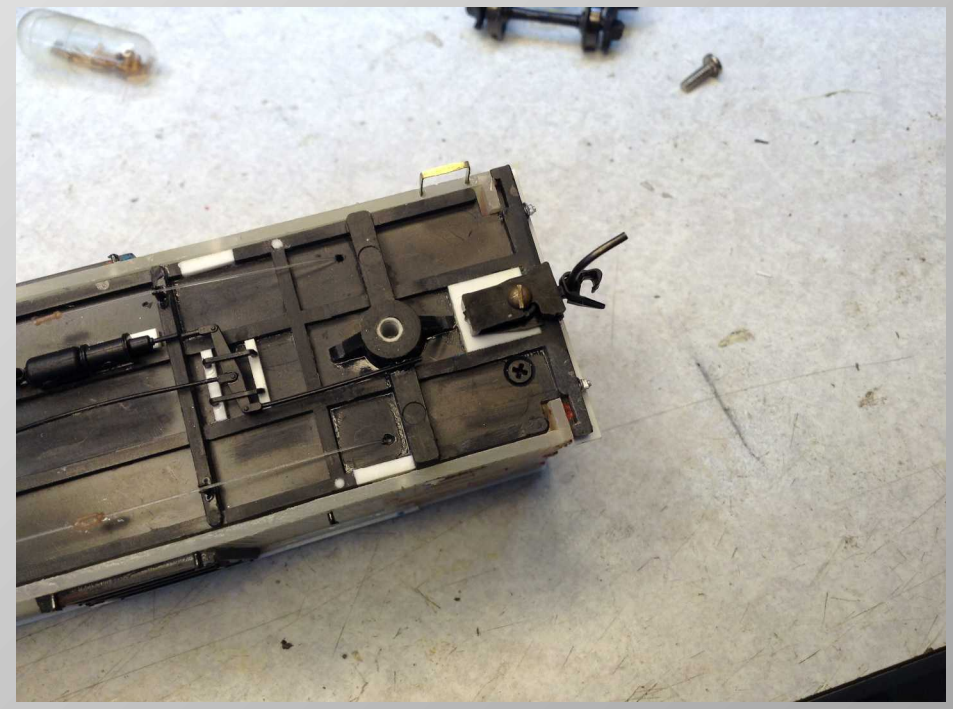


Details, Details, Details
Steps



Finished Underframe and Shell

Body Mounting Screws



Adjusting the Weight

- My standard weight for ordinary 35'-40' cars is 75 grams, 2.8 ounces.
- NMRA recommended weight would be 82 grams, 3.0 ounces for this 4” long car.

Ready for Painting

The End

Go salvage that junk box find and turn it into something you can be proud of.

Thank You