

# **BUILDING LOCOMOTIVES**

NMRA BR Convention 2014

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# WHO ME?

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- ✘ Modelling since birth (almost)
- ✘ D&RGW & RGS NG in HOn3: 1970s
- ✘ DCC & Sound since 2000
- ✘ NMRA AP certs: Cars, Author
- ✘ 3 Merit Awards for Locomotives
  - + And your Contest Chair
- ✘ Trustee of Pendon Museum

# WHAT WE'LL COVER

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- ✘ Approach to Modeling
- ✘ Research and Planning
- ✘ Tools & Techniques
- ✘ Look at some examples of detailing
  - + Mostly steam.....
- ✘ Painting & Weathering

# APPROACH

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# MODELING APPROACH

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- ✘ Always aim for perfection
  - + Be continuously critical of your work
  - + Redo if you aren't happy
    - ✘ Else it will niggle you for ever, and ever, and ever
  - + Merit Award judges will spot your imperfections!
- ✘ But be realistic
  - + Is this a fleet model, layout standard, or contest special?

# MODELING APPROACH

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- ✘ Do it in little bits
  - + Easier to envisage, plan and do
  - + Less depressing than the whole thing
  - + Make real achievement in an evening
- ✘ Enjoy the process as well as the end result
  - + Isn't that why we're in the hobby?
- ✘ Don't rush the paint phase
  - + It finishes off the model one way or another!

# BE COMFORTABLE

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- × Comfort
  - + Decent chair and proper workspace height
  - + Look at a cheap office chair?
- × Space to work
- × Space for fixed tools
- × Plenty of light
- × Plenty of power sockets
- × Distractions?
  - + Trains passing, music, radio, TV(?), glass of wine....



www.thingiverse.com

Model 1100

4000 4000 100

# ACCURACY

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- ✘ State of Mind
- ✘ I aim for 1%
  - + Which is one inch in 8 feet (approx)
- ✘ Proprietary models compromise that goal
  - + Which may be why you're here!
  - + But they may need to for operability reasons
- ✘ Don't lose sight of the objectives
  - + And be sure to keep the proportions right
- ✘ May affect your choice of materials

# ACCURACY: EXAMPLE

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- ✘ 1 inch handrails:
  - + .083 of a foot: in HO, that's .291mm
  - + But remember the paint film, both sides
    - ✘ Ours is proportionally thicker than theirs
  - + 2 thou/.05 mm, x 2 = 0.1mm paint
  - + Which means you should use .2mm wire
    - ✘ .2mm + .1mm = .3mm ~ .291mm
- ✘ Actually I use 0.254 wire (10 thou)
  - + Phosphor Bronze is more rigid than brass or N/S
  - + Acceptable compromise, even when painted.

# ACCURACY: EXAMPLE

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- × Steam loco cab sides
  - + ¼" plate
  - + In HO, that's .07mm
    - × Too thin to handle
  - + 10-thou brass (0.254mm) is however, fine here
  - + 10-thou styrene will be a little delicate

# RESEARCH AND PLANNING

# RESEARCH

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## ✘ Resources

- + Books

- + Photos

  - ✘ Dated

  - ✘ Nirvana is:

    - \* both sides and both ends all on the same day

    - \* And your modelling year/era

- + Plans

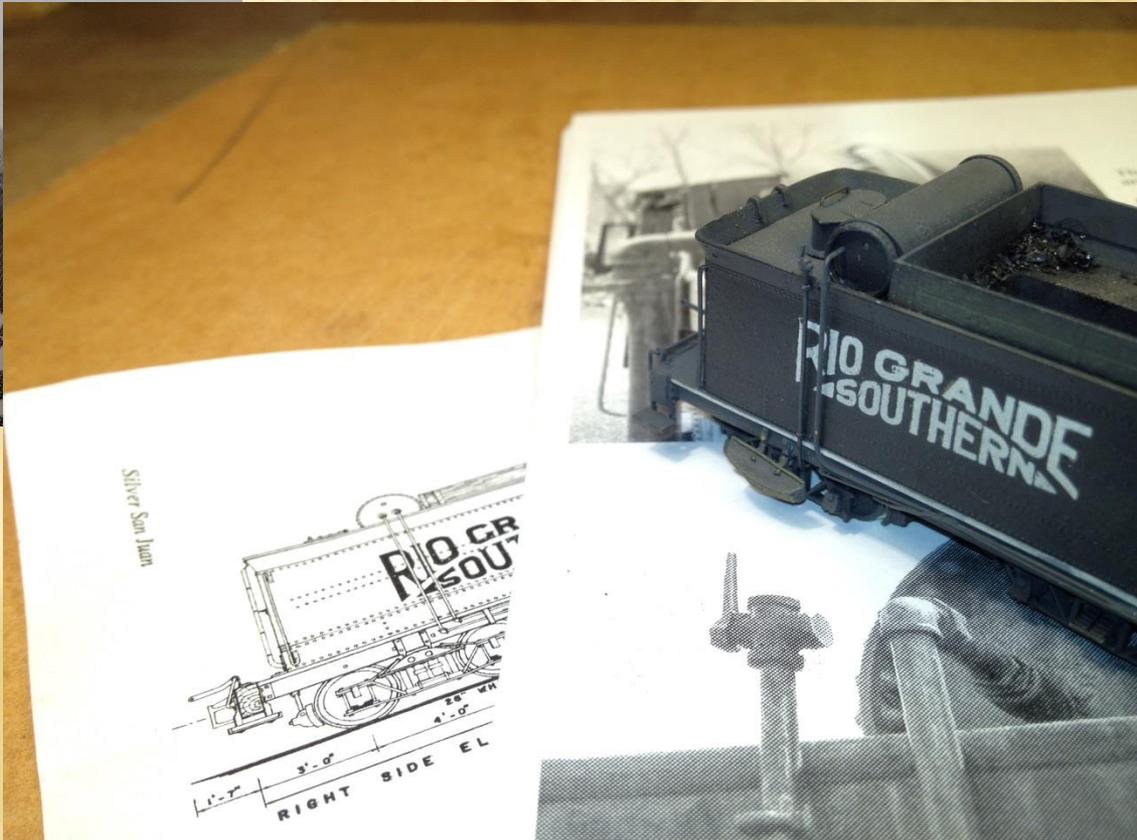
  - ✘ Don't trust details unless you can verify them

  - ✘ The bit you can't understand, the draftsman probably couldn't either

- + Google

  - ✘ You never know what you might turn up!

# DON'T TRUST PLANS ON THEIR OWN!



# PLANNING

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- ✘ Fix a date for the model
  - + Know what features and livery details it had
- ✘ Select an RTR base model (if you can)
- ✘ Make an ordered list of work items
  - + Where relevant, list source info
  - + Make a parts list of stuff to buy
- ✘ Order the parts
  - + Catalogs, and the web



# PLANNING

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- ✘ Make sure you know where the DCC parts will go
  - + Including speakers
  - + Lighting parts
  - + Use microconnectors internally to aid future maintenance
  - + And I like them between loco and tender, too.

# TOOLS AND TECHNIQUES

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# TOOLS

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- × Files: keep separate sets for metal and plastic
- × Emery boards
- × Scalpel/modelling knives: and lots of blades
- × Rail cutters, decent scissors
- × Drills and broaches
- × Tweezers: lots of these, Pliers, Sprue Nippers
- × ACC, styrene cement, other adhesives
- × Glass fibre and/or metal bristle brush
- × Measuring tools
  - + Ruler – scale rule is best here
  - + Engineers dividers
  - + Vernier gauge – preferably one that does mm and inches

# SPECIALIST TOOLS

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- × Gear and wheel pullers, quartering tool
- × NMRA Wheel gauge
- × Coupler Height gauge
- × Drill press/Motor tool
- × Taps and Dies: taps particularly useful
- × Piercing saw and blades
- × Tinsnips
- × Rivet press
- × Hand vice, bench vice
- × Blu-tak
- × Cocktail sticks and Pate dishes
- × Your Smartphone camera

# SMARTPHONE CAMERA?



# THE MOST IMPORTANT TOOLS

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## × Practice

- + 10000 hours to proficiency?

## × Patience

- + Don't rush. Enjoy the process

## × Personal Standards

- + If it's not good enough, do it again

- + Use the AP and Merit Awards for inspiration

# SOLDERING GEAR

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- ✗ Don't mess with namby-pamby irons
  - + 50W **minimum**, temp controlled can help
  - + Enables you to get in and out of the joint **fast**
  - + Saves messing with different melting-point solders
- ✗ Use cored solder
  - + Lead solder is better than lead-free
  - + Just don't eat it (wash hands after using it, tho)
- ✗ Or Solder Paint

# SOLDERING GEAR

- ✘ Use an RSU for serious work
  - + Invaluable when soldering large castings
  - + And replacing bits fallen off brass models!
- ✘ Use with Solder Paint
  - + I use plumbers stuff:
  - + cheaper (by far)



# SOLDERING

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- ✘ Only two important things
- ✘ Cleanliness
  - + Clean materials
  - + Fresh solder to make the joint
  - + Clean up afterwards
    - ✘ That includes your hands!
    - ✘ Chisels and scrapers ground up from old files.
- ✘ Plenty of heat
  - + Get the joint made properly, quickly
  - + Get out of the joint before you heat it **all** up.

# JIGS

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- ✘ Jig requires you to be accurate once only
  - + And then you repeat it
- ✘ Use for
  - + Drilling parts
  - + Cutting to size
  - + Bending grabirons
  - + Etc, etc, etc.

# DRILLING SMALL HOLES

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- ✘ Need:
  - + **Sharp drills** and some spares!
  - + **Pin vice:** one that holds the drills tightly
  - + Center marker: mounted needle will do
  - + Patience
- ✘ Tip: small piece of masking tape, mark center on that, drill to center
- ✘ Tip: use small piece of rubber eraser as breakthrough buffer
- ✘ Tip: only show enough drill in the pin vice as needed for the hole

# TAPPING SMALL HOLES

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- ✘ Drill to appropriate size
  - + For Metric taps, 0.3mm under clearance
  - + Vernier the screw thread and go 0.3mm under
- ✘ Make sure tap is clean
- ✘ Hold securely in tap wrench or collet
- ✘ Go slowly, back out often
  - + Broken taps are (almost) impossible to remove
- ✘ Know the depth of blind holes
  - + And don't go right to the bottom.

# CHASSIS ASSEMBLY TIPS

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- ✘ Keep it clean
- ✘ Add a part at a time, check how it rolls
  - + Must roll freely
- ✘ Polish moving parts as much as possible
- ✘ If it feels stiff, **it is stiff**
- ✘ Nice if it can roll down a sheet of glass on the flange tips
- ✘ Place assembled frame on layout, pull/push with loco around the layout, make sure it rolls freely.
  - + Any stiffness, find and remove
- ✘ And only then, lubricate it.

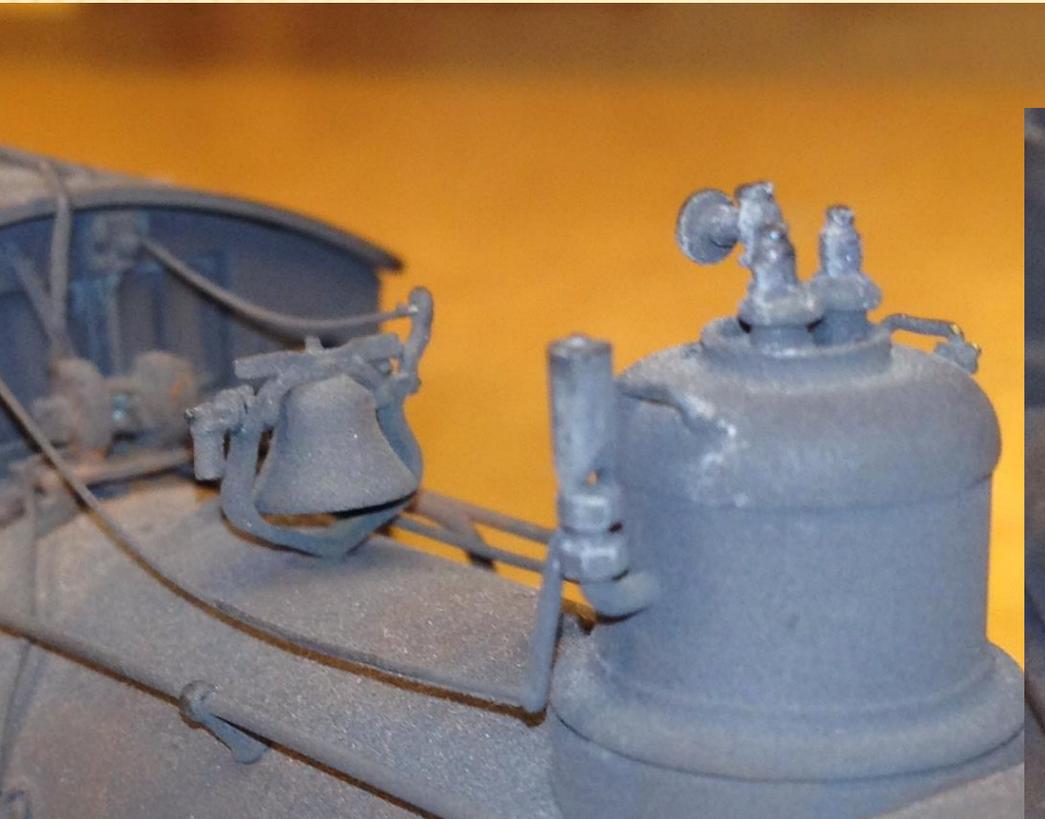
# SOME EXAMPLES

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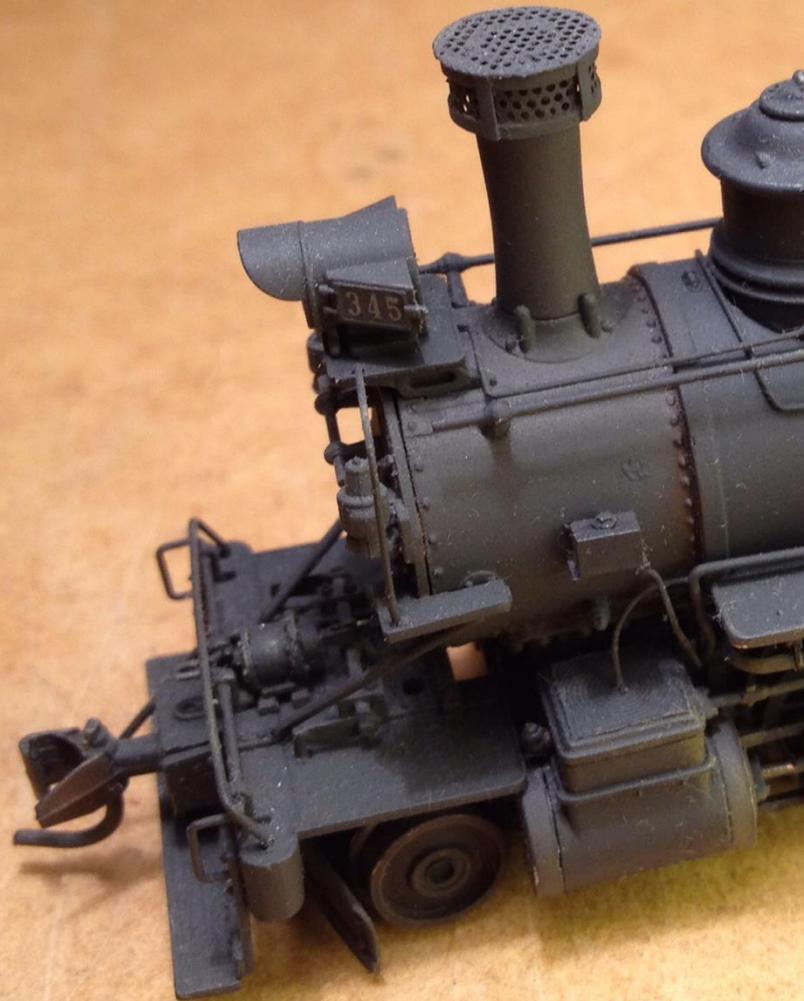
# PATCHES ON TANKS



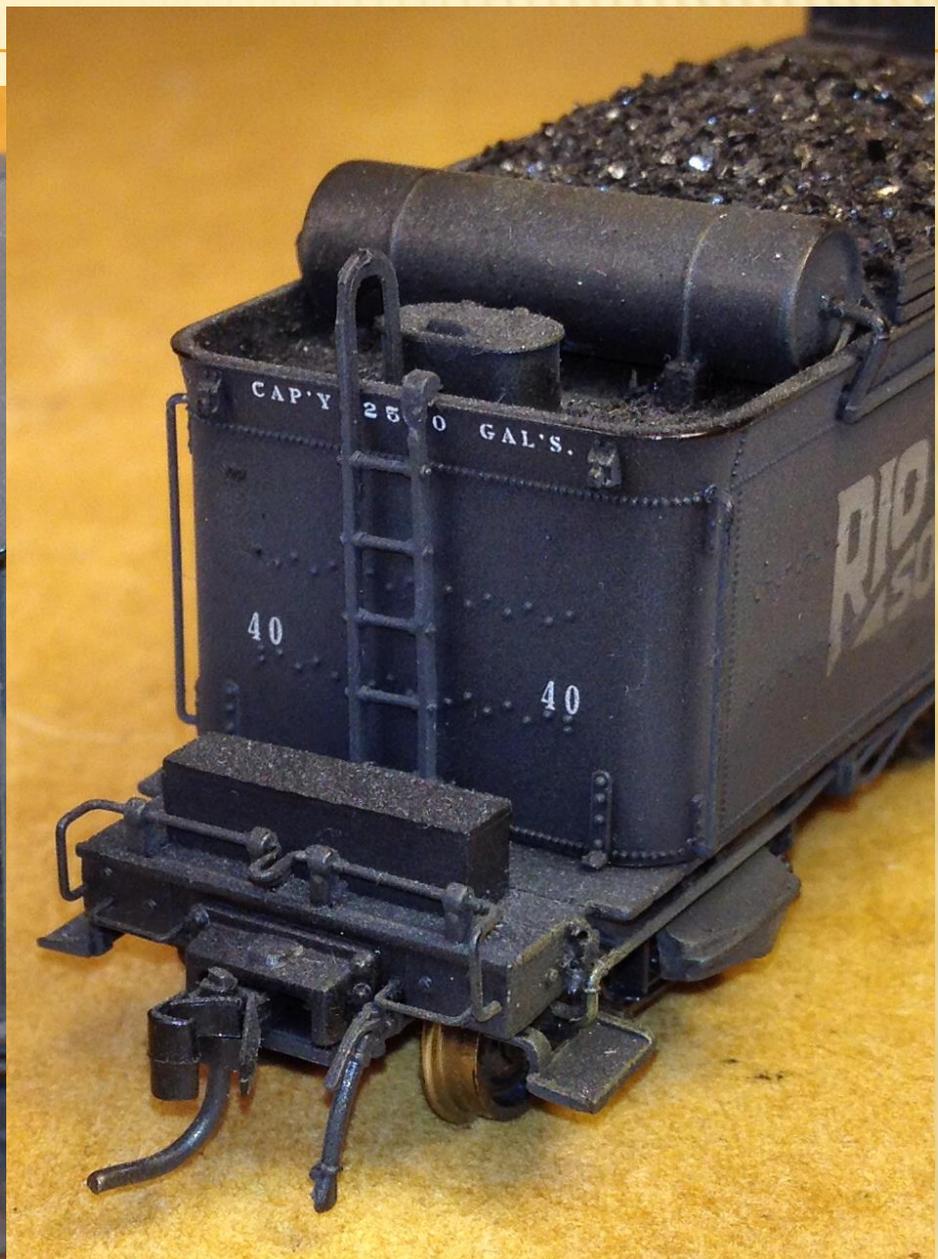
# WHISTLES



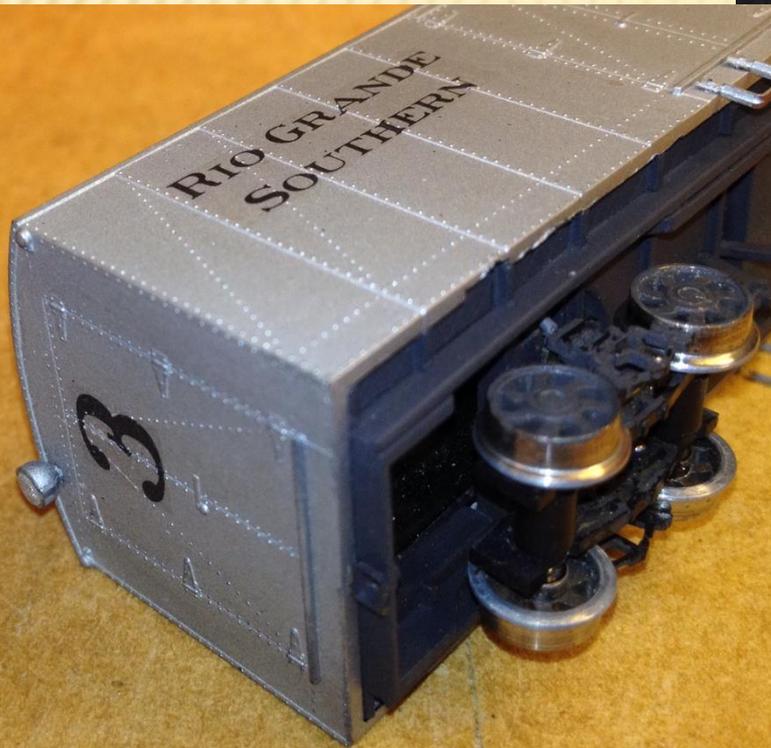
# DETAILING RTR



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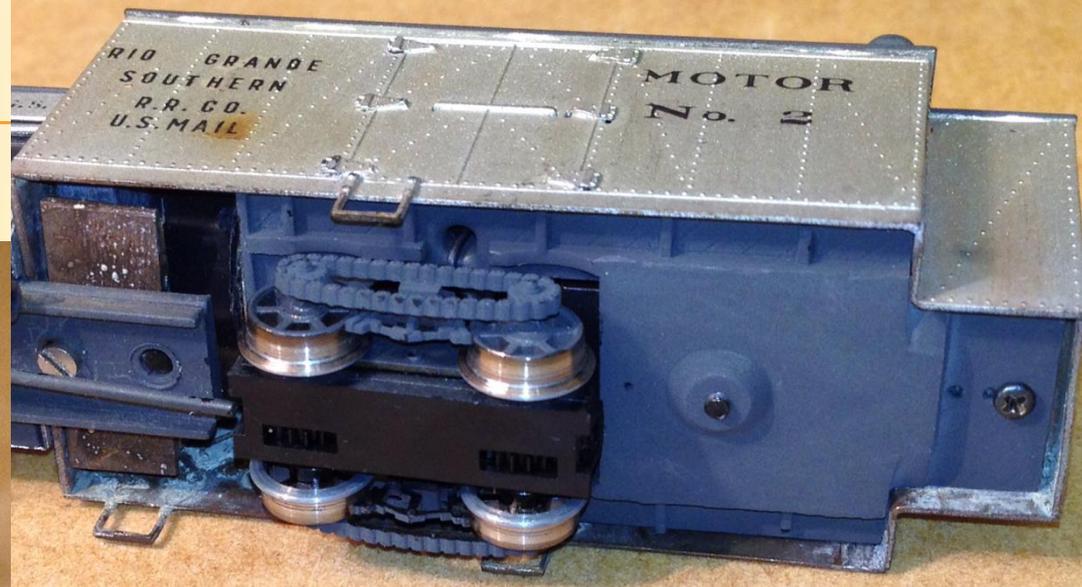
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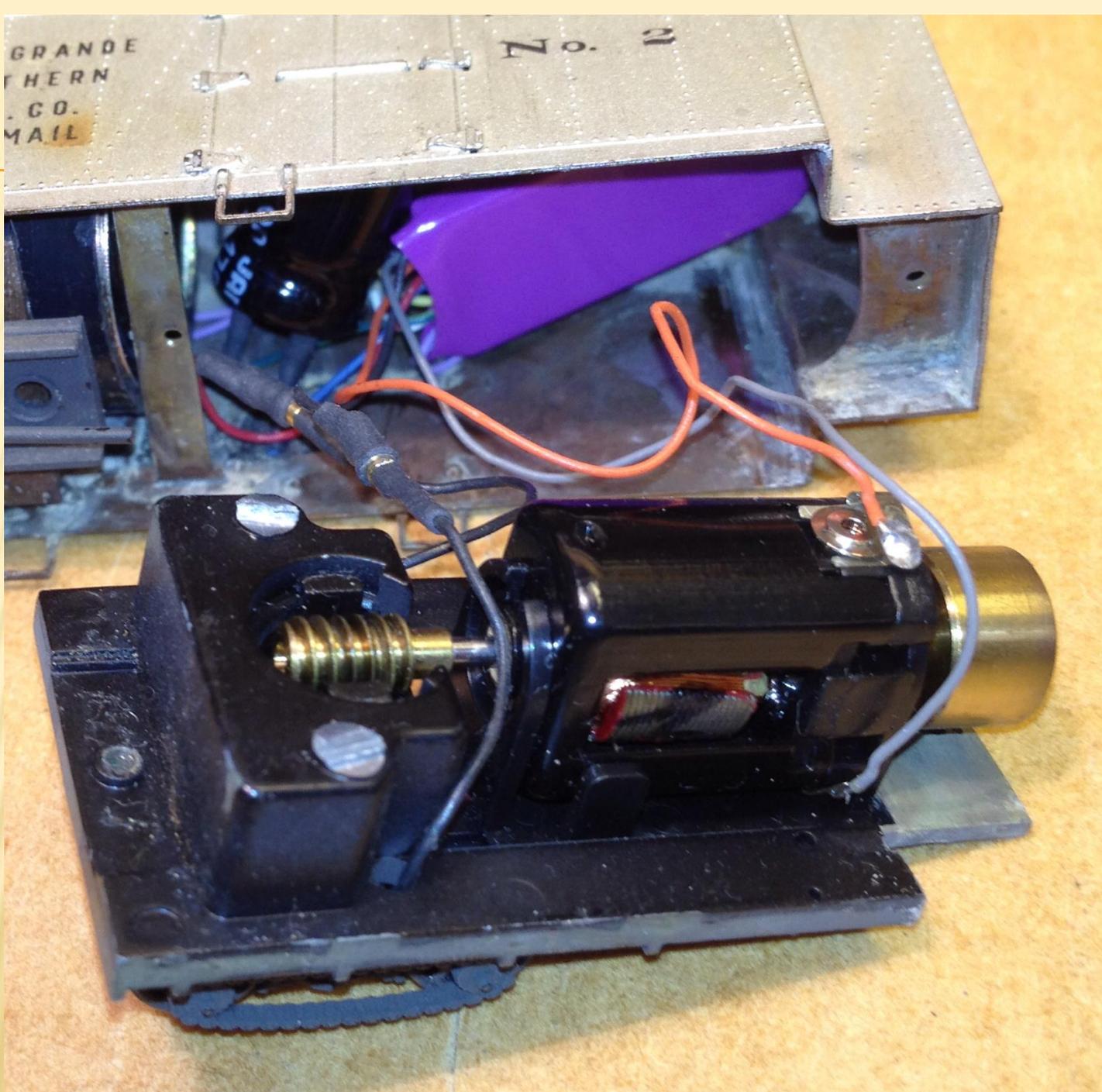
# BRASS



# BRASS



**BRASS**



# MORE FLANGERS



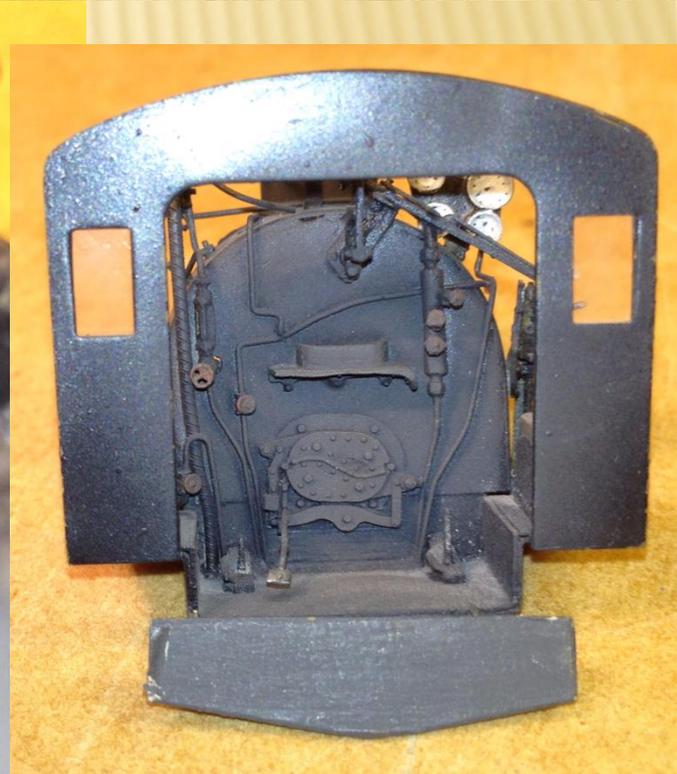
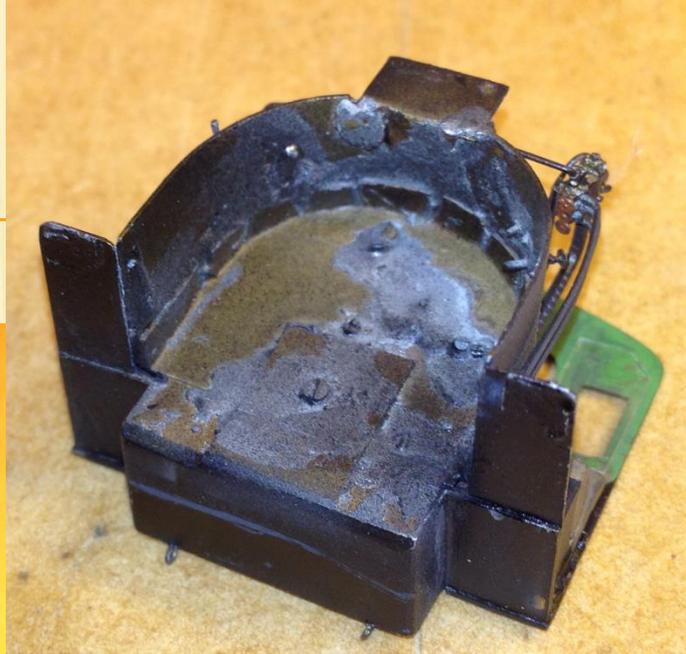
# UNDERFLOOR

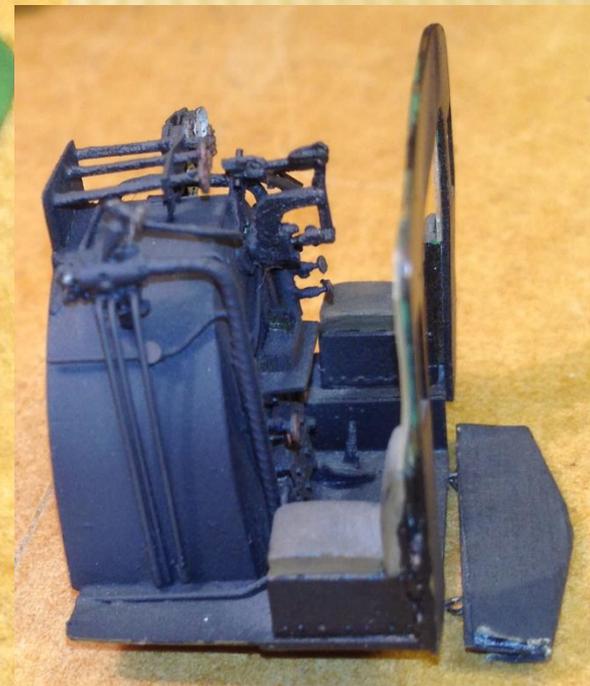
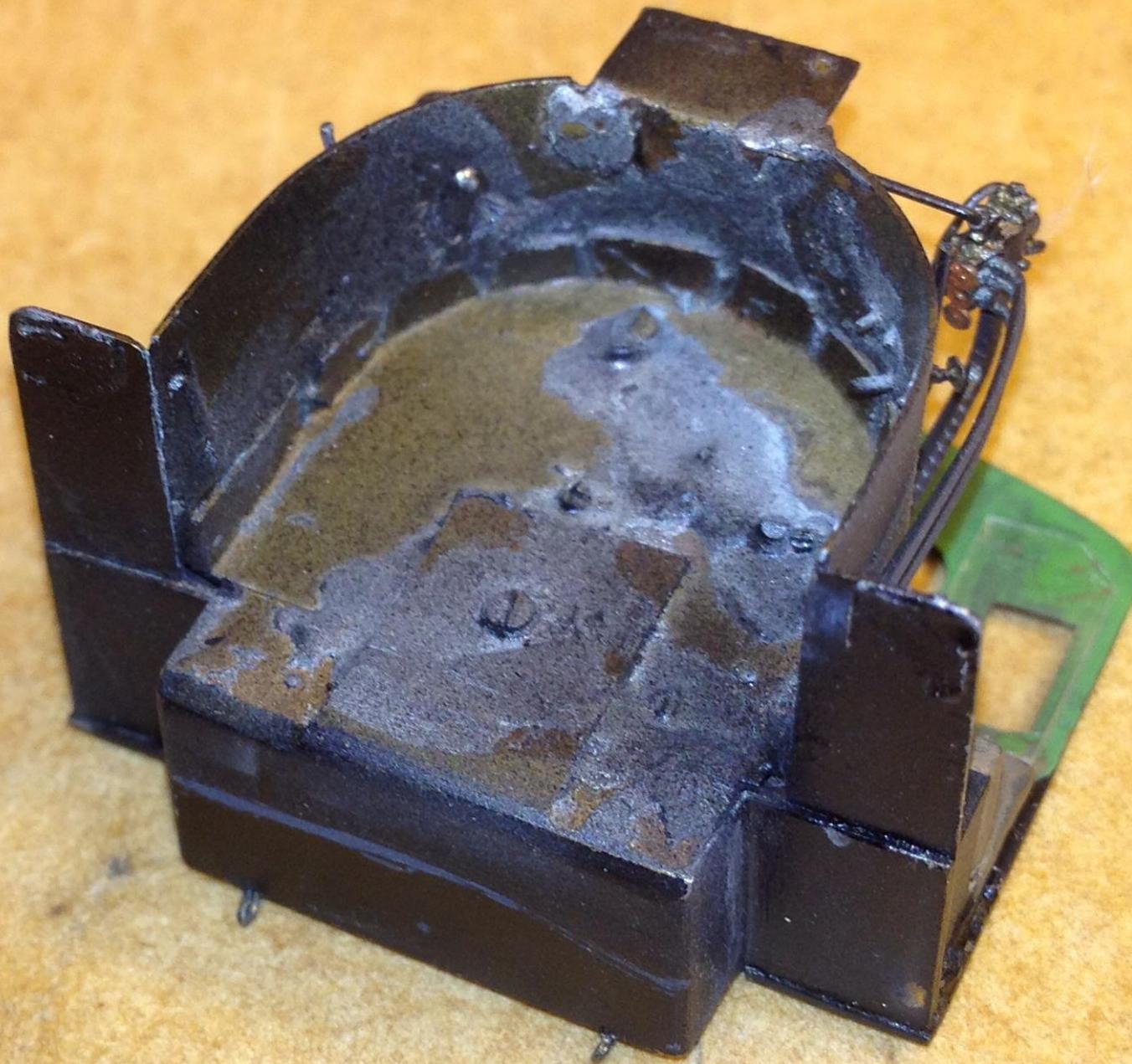


# CAB DETAILS



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# PAINING AND WEATHERING

# PAINTING

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- ✘ Finishes the model off
  - + One way or the other
- ✘ Don't skimp or rush it
  - + I've known painting take as long as construction
- A good paint job will vastly improve the most mediocre of models
- A poor paint job will ruin the most excellent of models

# PAINTING

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- ✘ I recommend a double-action airbrush over anything else
- ✘ I prefer enamel paint
  - + But both Acrylics and Cellulose work well
- ✘ Plan the paint job carefully
- ✘ Paint the model in pieces
  - + Avoid masking as much as possible
- ✘ Plan for the decaling, too

PLANNING...



PLANNING....



# WEATHERING

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- ✘ Finishes and adds realism
  - + But no time to discuss here
- ✘ Final completions
  - + Glazing
  - + Crew
  - + Clean the wheels
- ✘ And enjoy your new loco!

# Questions?



# RESOURCES

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# PARTS SUPPLIERS

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- × Caboose Hobbies: the parts wall
- × NWSL: wheels, gears, tools
- × Mainly Trains: Mashima motors
- × PSC, Details West, Detail Associates, Cannon & Co: parts
  - + Can take some searching online
- × Most will supply direct
- × UK suppliers work mostly with Walthers
  - + Deal with the import duty/VAT hassle for you
- × Or order direct via Walthers, Caboose Hobbies, others
  - + And maybe get it all in one shipment!

# MATERIALS AND SUPPLIERS

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- ✘ Evergreen Styrene
  - + Can't see any other make
  - + LHS, many other sources at shows
- ✘ Brass & Nickel Silver sheet, wire, etc.
  - + Eileens Emporium
- ✘ Small Tools
  - + Eileens
- ✘ Fastenings
  - + Microfastenings.com
  - + M1.4 and M1.6 screws: as used in brass models!