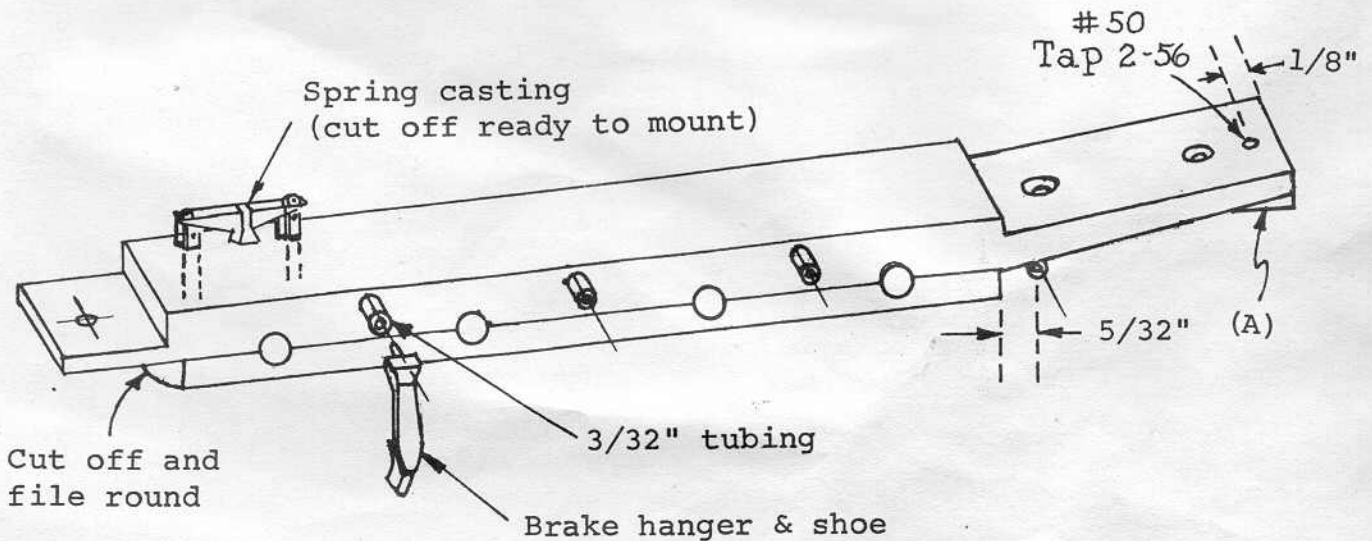
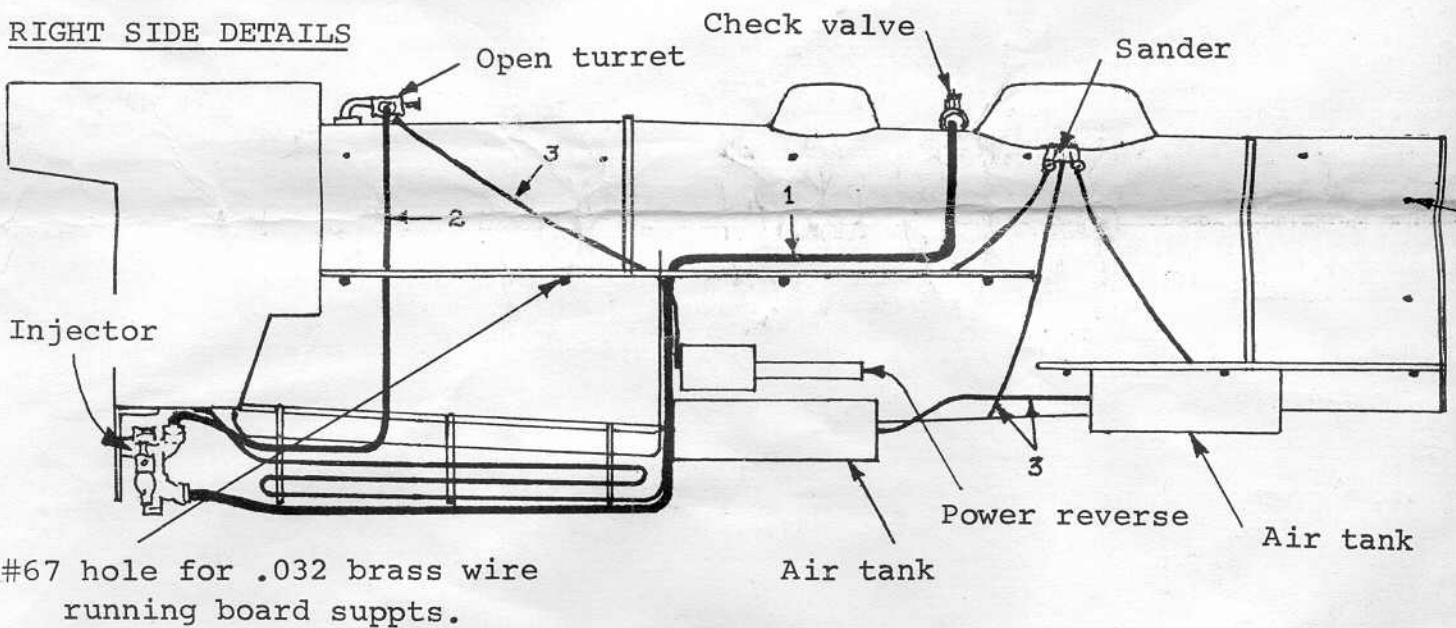
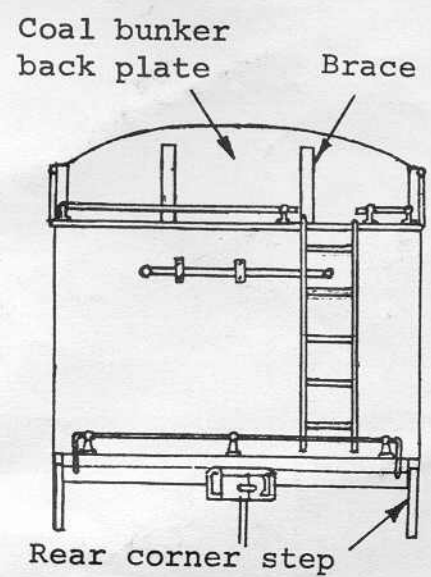
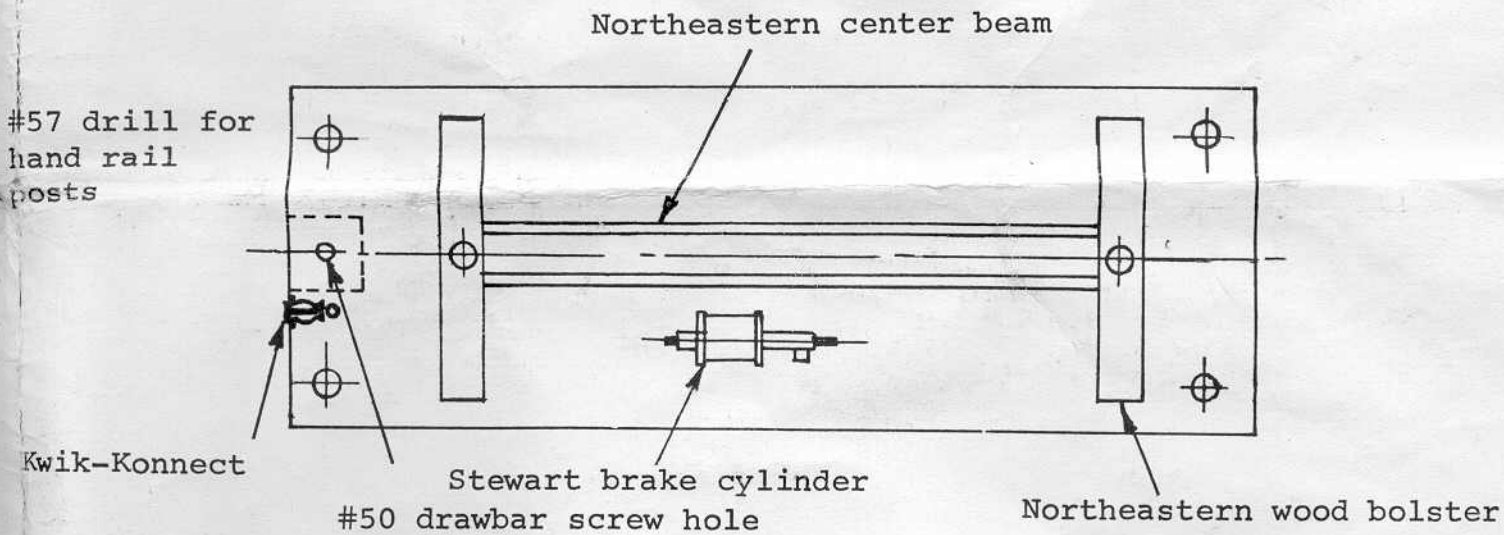
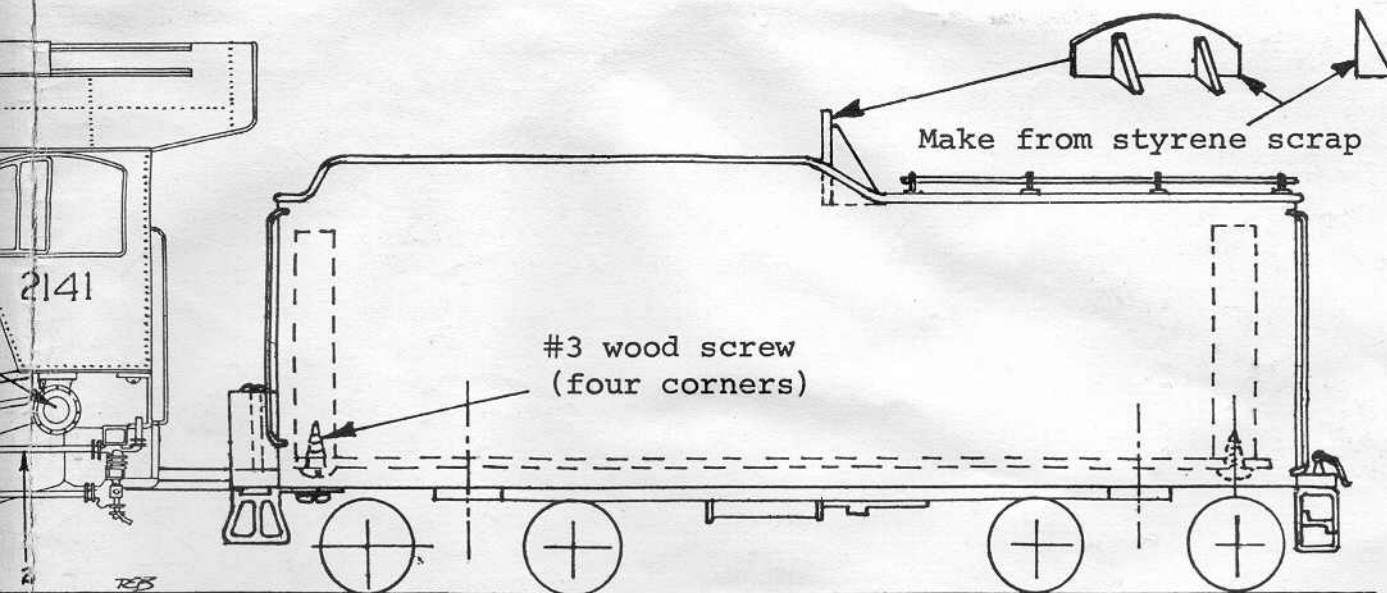


RIGHT SIDE DETAILS



READING I10sa CONSOLIDATION



ALL DRAWINGS ON THIS PAGE ARE DRAWN TO 3/16" SCALE EXCEPT THE 3/4 VIEW OF THE FRAME

REAR VIEW OF TENDER

Lehigh Valley Models

1225 N. Arch St.
Allentown, PA 18104

LVM 10 2-8-0 READING LOCO

INTRODUCTION - The Lehigh Valley Models' loco was designed to represent the Reading's 2000 series heavy consolidation with various liberties taken to simplify construction. A.F. plastic shells allow easier construction and less soldering. It must be kept in mind that solder joints are preferred especially on mechanism joints, but epoxy is mentioned whenever useable. Cynocrylate ("Crazy Glue" has best dispenser) adhesive can be used for tight fits and on most tender and super structure parts. Since many S Scale Loco & Supply parts are used, you may wish to purchase their "PARTS INSTALLATION BOOK-LET" for 75¢. Familiarize yourself with all the parts and castings. Most mechanism, boiler detail, and tender parts and screws are contained in 3 bags as marked. Do not mix them up.

MECHANISM ASSEMBLY

1. **COUNTERWEIGHTS** - Remove these crescent shaped castings from sprues, file and fit, then epoxy them to each driver opposite side crankpin holes. See large loco drawing.

2. **FRAME** - Remove cover plate screws from frame. Saw off forward end of cover plate where scribed and round with file. From scrap brass 1/8" x 5/8" x 1 1/4", fashion a tapered piece (A) 3/8" x 5/8" to solder flush with rear of frame. Taper should make bottom surface level with frame for tender drawbar hook up. Drill #50 and tap as shown. Insert drivers so insulated wheels (marked with dye on inside crankpin hole) are on fireman's side of loco. Geared driver is last, flangeless in center, and flanged driver forward. Replace cover plate and screws. All drivers should spin freely. If not, check for burrs on inside driver hubs and axles. If axles are tight, place paper between cover plate, or loosen screws slightly until engine wears in from use. Check on layout for short from driver on wrong side.

3. **SIDE RODS** - You will find all three side rod castings and pins in one package. Assemble these as per large loco drawing. File off sprues and any surfaces smooth that touch drivers or that mate. Remember, there must be a right and left hand set. Insert pins with head outside, cut off close inside, and carefully pean or rivet the inside with light taps from a small hammer, being careful not to bend the pin. File off the oilers (hump of metal beneath each crankpin hole) and you now should have a set of side rods.

4. **INSTALLING RODS** - One package will contain 6 steel 2-56 fillister head screws, 2 long flat head screws and 8 steel bushings to fasten your side rods to drivers. Install both side rods using long screw and long bushing in the thick shouldered hole. Tighten screws, place on track and roll back and forth. If there is any bind on side rod and crankpins, remove both rods. **CAUTION:** From here on, never mix crankpin screws or rods. When dismantling, place screws and rods so you know exactly where they came from. This is important! Now paint inside of holes in rods with layout dye, lacquer, or marker pen dye. (A pipe cleaner will work nicely.) Reassemble rods on drivers and roll back and forth on track quite often. Remove rods one at a time and observe where dye has worn off. Lightly file these areas in each hole. Redye, reassemble and repeat until bind is removed. Be patient and do a thorough job to insure a good smooth running loco.

5. **DRIVER SPRINGS** - Straighten spring castings carefully and file off rough sprue on top and mounting pin below on mounting pad. Cut end arms off even with bottom of mounting pad with side cutters or tin snips to allow lowest possible spring height. Epoxy to frame above first 3 driver centers.

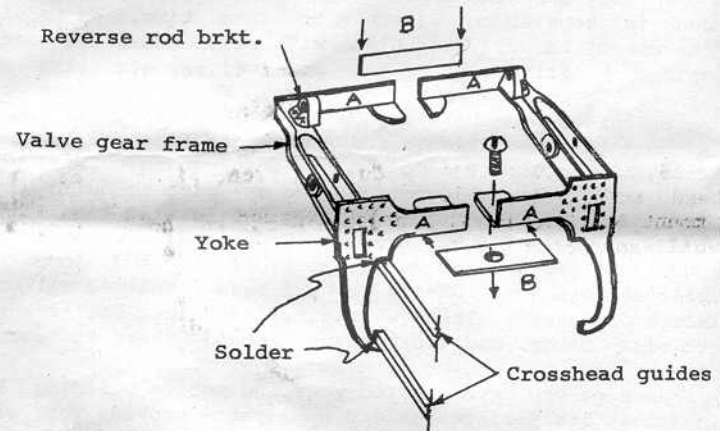
6. **BRAKE HANGERS** - In separate package find six 3/32" x 5/16" long brass tubing. Remove burrs in tubing ends.

Tap these in holes in frame between drivers. Epoxy in place. Epoxy 11/16" long tubing beneath frame as shown for rear brake hanger. Fit Kemtron brake hangers in place. If they are out too far from drivers, file tubing down required distance. "Crazy Glue" each hanger in place being sure they are straight before applying glue.

7. **STEAM CHEST** - File off sprue on side of casting. Check and straighten both sets of cylinders on casting by using a vice and pliers if they aren't even to your eye. Fit the plastic smokebox tubing extension unto steam chest saddle by marking, cutting and filing away steam pipes for good fit. Now fit chest to frame. Rear of casting must be filed to allow rearward movement until F.H. 4-40 x 1/2" screw can be entered through middle hole to fasten casting to frame.

8. **CROSSHEAD AND VALVE GUIDES** - Drill out the upper hole in rear of steam chest to accept the valve guide pins. File and get a good fit. Four nickel silver crosshead guides must be placed into the holes above and below the piston rod opening. These go in until the bolt projection is tight against the opening. You can place the alligator crosshead positioned in place as a guide to hold them square and straight. A clamp type wooden clothes pin is handy to hold guides, and crosshead in place while soldering. The valve guides can be soldered at the same time.

9. **CROSSHEAD** - Straighten the piston rod, and file the slots on both sides of the crosshead so there is no roughness where it slides back and forth between the guides. Place on guides and by bending and squaring guides obtain a smooth running crosshead.

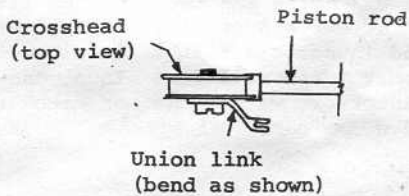


10. **CROSSHEAD YOKE & VALVE GEAR MOUNTS** - Straighten castings. Cut crosshead yoke in half where shown. Assemble valve gear to yoke with alignment pins and solder together. Install assembly on the frame. Adjust from side to side to get proper alignment of crosshead yoke to crosshead guides, holes in steam chest, etc. You may have to shim under A or bend down. After all is in order, part B made of scrap can be soldered to the valve gear to make all into one unit. Use 2-56 x 1/4" R.H. brass screw to fasten in second tapped hole in frame. Now solder the ends of the crosshead guides to the yoke. Be sure crosshead can slide back and forth easily.

11. **MAIN ROD** - Straighten and file off burrs on main rods. File out forward hole and reshape rod end so it causes no bind when screw holds it in crosshead. Now remove flat head crankpin screw and slip on the main rods. Remove any binds that may occur.

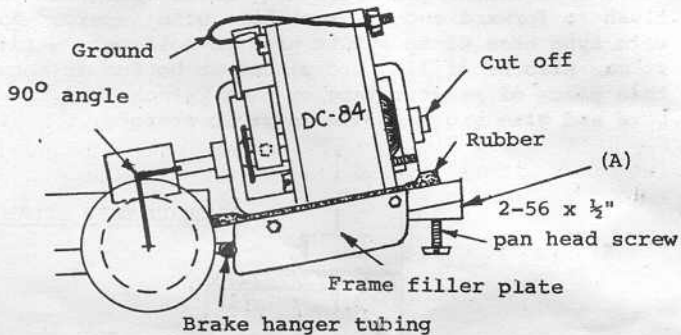
12. **VALVE GEAR & ECCENTRIC ROD** - Assemble valve gear into valve gear hangers using pins provided. All valve gear parts and rods can be checked from full size drawing. This is a fit and fuss operation which takes time. Attach eccentric rod to eccentric crank with pin. Pins may be peaned, or soldered to one rod to fasten. Set crank 30° ahead of driver axle and tighten flat head screw. Assemble all units and fit them in place before fastening eccentric crank. Check for binds and remove. Reverse levers can be glued in place.

13. **UNION LINK & COMBINATION LEVER** - These are packed separately. You may have to bend the union link as shown to prevent its striking the cylinder head. Pin together



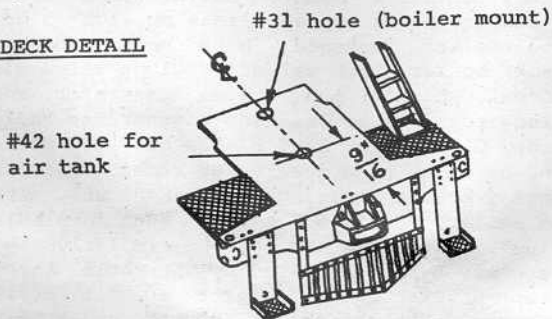
and join to valve gear.

14. MOTOR MOUNTING - When all bind is removed, and you can easily push your mechanism along the track, you can mount your motor to the rear of the frame. Trim foam rubber to fit frame and fasten sticky side down. Poke holes in rubber, and mount motor with two F.H. 4-40 x 1/4" screws. Slip steel worm gear on shaft and mark where it should be soldered with pointed tool. See sketch. Remove motor, protect motor from torch flame with wet rags and solder worm gear to shaft. Cut off opposite end of shaft with Dremel tool disc cutter. Fasten frame cover-plates beneath motor with 00-90 hex head screws. Trim to fit around rear brake hangers.



15. FRONT PILOT DECK - Cut out front pilot steps and bend step at 90° angle. Using cast on mounting pins, mount pilot to deck. The steps must be held in place while soldering or gluing with spring clamps. The uncoupler bar brackets can be attached at the same time in their corresponding holes and everything soldered at once unless you prefer using epoxy or "Crazy Glue". The front ladders are cut where shown and glued or soldered per sketch. If you intend mounting Kadees, drill #50 in hole provided and tap 2-56. File the soft metal air tank to smooth finish. Drill #50 hole where shown and mount tank using small brass pan head 2-56 screw. Set with "Crazy Glue" to keep solid. The coupler lift bar is formed from short piece of .020 brass wire (in screw pkg.). Small pieces of .032 wire can be used as flag holders if you desire. The pilot deck assembly should slip between the frame and steam chest casting lining up the hole in the pilot deck with the front hole in steam chest casting. This can be clamped, then glued or soldered to steam chest and hole drilled through it for the F.H. 4-40 steam chest mounting screw.

PILOT DECK DETAIL

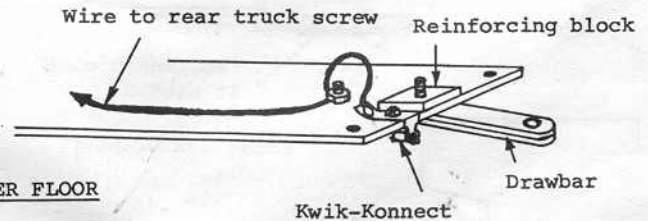


16. PILOT TRUCK - Place wheelset into groove in pilot casting and bend tabs over to hold axle in place. This is a poor arrangement, so if you prefer, file them away, cut a piece of thin scrap brass or tin and epoxy it over axle. Be sure brass wheel (insulated) is on fireman's side when truck is fastened to frame with R.H. brass 2-56 x 1/4" screw and brass bushing provided. File elongated

hole to accept bushing loosely.

TENDER

1. PLASTIC BODY - This has already been cut for you. Apply several coats of plastic cement to both cut end joints. This will soften plastic so it squeezes together. Hold sill dry with heavy rubber bands. Sand joint with fine sandpaper. Apply epoxy on inside of joint for strength. Cut off all corner steps flush with bottom. Attach front steps with epoxy (apply heavily). Straighten rear steps and attach with epoxy. Make coal bunker back and braces from scrap styrene furnished. See drawings. Glue in place with plastic cement. Locate and drill ten #63 holes around top of tender tank for brass handrail posts. Drill 3 more across back end beam for coupler lift bar. Straighten .020 brass wire, bend and fashion railing thru posts. When everything is straight and in line, "Crazy Glue" posts and railing. Make coupler lift bar from .020 piano wire, insert hand rail posts, set them in holes and "Crazy Glue" posts in place. Drill #75 holes at top and bottom of all four corners, make corner hand rails from piano wire, insert and "Crazy Glue" in place. You may wish to glue coal in coal bunker to complete your tender.



TENDER FLOOR

2. FLOOR - Carve away the plastic reinforcing ribs on inside of body to allow styrene floor to fit into place. File floor for good fit. Use full size drawing to locate wood bolsters and centersill. ~~Drill #44 hole and glue wood bolster and centersill. Glue in place with several coats of plastic cement. Drill #44 hole and glue Stewart brake cylinder in place. Locate and drill #20 floor mounting holes in each corner and countersink for #3 wood screw heads. Cut a 3/8" sq. piece of scrap styrene and glue on inside of floor centered above tender drawbar hole for thickness. Drill #50 hole and tap 2-56 for pan head steel 2-56 x 1/2" tender drawbar screw with bushing. Locate Kwik-Konnect (electrical connector) position on drawings. Notice how it is mounted by notching out styrene with file. Drill #53 hole and tap for phillips head steel 1-72 x 1/8" screw. Mount in place. Locate and drill #42 holes thru center of wood truck bolster and styrene floor for brass R.H. 2-56 x 5/8" truck mounting screws and nut.~~

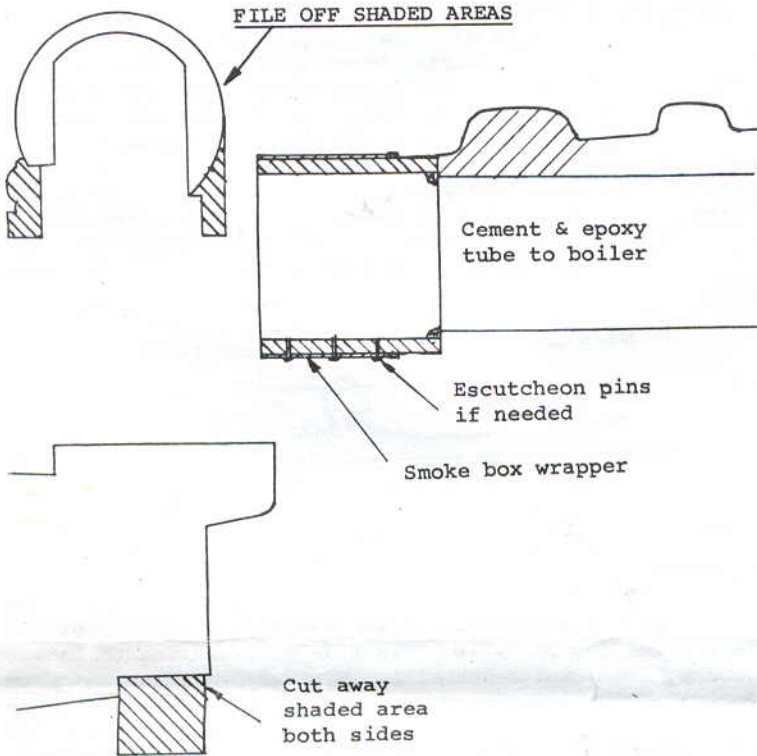
3. TENDER TRUCKS - If necessary, cut castings from sprues and file any flashing, projections, and axle bearing surfaces smooth. Observe that wheelsets have one side insulated. This is a black area around axle. All insulated wheels must be kept on same side of truck. Slip bolster into position in side frame, place wheelset axles into bearing holes while sliding other side frame in place on the bolster. Once you have truck assembled, bolsters sliding up and down freely, use tweezers to insert two springs on tiny projections on bolster and side frame. Check truck on track for shorts. If short results, insulated wheels are not all on same side.

4. TENDER ASSEMBLY - Mount trucks using R.H. 2-56 brass screws with steel bushing. Make sure that pick up wheels are on fireman's side. Attach wire to both truck screws and solder to hole in Kwik-Konnect. Fasten nuts to screws to hold wire and trucks in place. Attach tender drawbar to floor with steel pan head 2-56 screw and brass bushing. Fasten floor with #3 wood screws. You will find that lead weight should be added to tender to reduce derailments. This can be epoxied to inside center of tender floor. Connect the male end of your Kwik-Konnect wire to the left hand brush motor lead and the right hand brush should be grounded to the motor. This can be

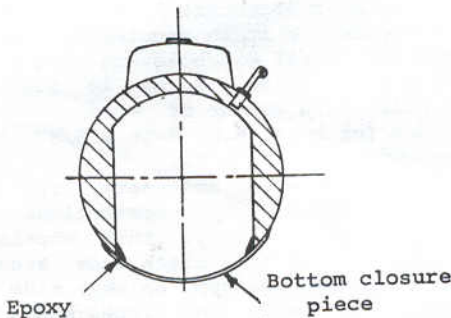
done by wrapping around extending motor screw and a 2-56 nut used to fasten it. Set your mechanism and tender on track and try it out.

BOILER ASSEMBLY

1. PLASTIC SHELL - Carefully file away all cast on piping, pop valves, whistle, generator, railings, tanks, reverse gear, etc. Some parts can be carved away with an X-Acto knife. Leave cab rivets, ash pan detail, firebox stay bolts, steam & sand domes, and all boiler bands except front one (ahead of sand dome) as they are. Use a fine file when finished to obtain smooth surface. Cut

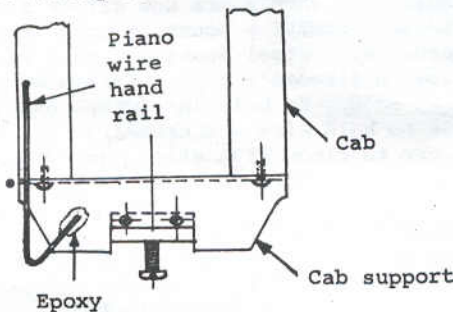


away square area under both sides of cab (See drawing). Using plastic cement, glue plastic smokebox tube to front of boiler shell. Be sure it is straight with boiler and even all around where it touches. Add epoxy to inside joint later for strength. Close the big gaping hole on

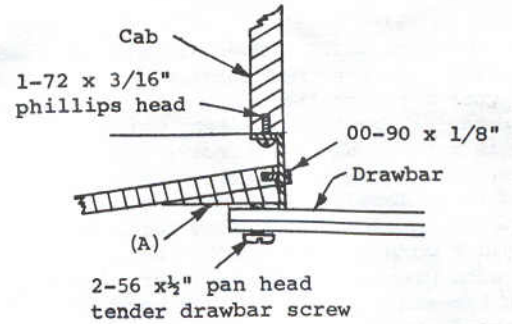


the bottom of boiler with prefabricated tin piece. This must be curved by hand to fit the boiler tightly. "Crazy Glue" in place. Later add epoxy to inside joint for strength. The edges can then be smoothed with auto putty and a file to be hardly noticeable.

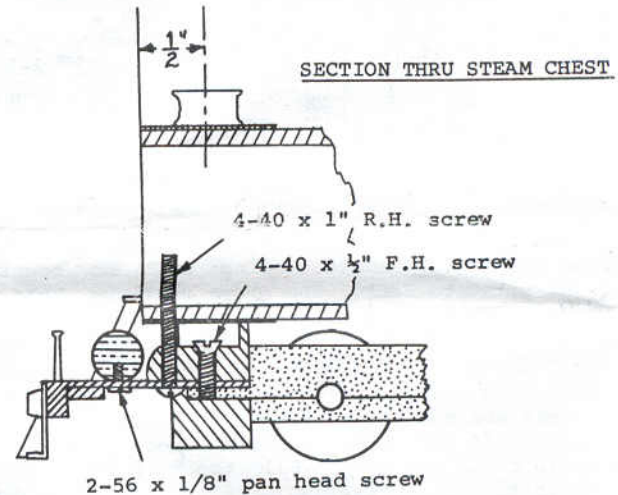
CAB SUPPORT



2. CAB SUPPORT - Center and epoxy cab support to bottom of cab. Drill #53 holes and tap for phillips head steel 1-72 x 3/16" screws and fasten. Epoxy or solder right and left hand injector castings on lower outside corner of cab support. See full size loco drawing. Be sure they do not interfere with frame or stoker engine which gets mounted under cab.



3. SMOKEBOX WRAPPER - Secure brass smokebox wrapper flush to forward end of smokebox with epoxy. An auto worm type hose clamp can be used to hold this until dry. It can also be drilled and pinned at bottom as shown. Cut thin piece of plastic tape or card stock for a boiler band and glue around boiler next to wrapper.

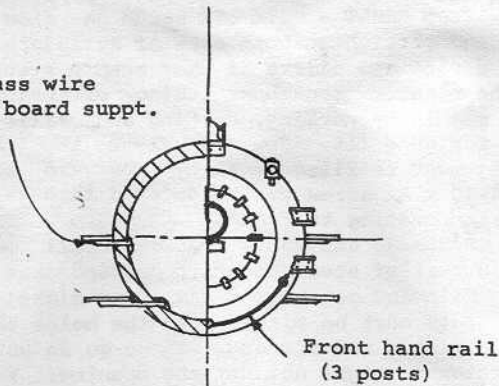


4. MOUNTING SCREWS - Set boiler upon steamchest saddle and fasten cab support to rear of frame temporarily to check for level, clearance of motor, and driver springs. Shim up in saddle for level by cutting a metal plate or relocate cab support holes. Holding boiler firmly to saddle, and using hole in underside of pilot deck directly ahead of frame drill a #43 hole into plastic boiler and tap 4-40. The R.H. steel 4-40 x 1" screw is used here to fasten front end of boiler.

5. BOILER DETAILS - Remove boiler from frame and scribe a centerline on top and lines on each side where running boards are fastened. Note both sides differ. Mount stack, boiler check valve (6" globe valve with shut off removed), whistle, pop valves, generator, and open turret along top line by drilling appropriate holes and using "Crazy Glue". Cut 3/8" pieces of .032 brass wire and solder or epoxy to underside of running boards. Position running boards along scribe lines and mark wire points on boiler. Drill #67 holes. Push into holes and "Crazy Glue". Air tanks are mounted similarly by using .032 wire. Air pump is mounted by #50 hole tapped for 2-56 screw. Reverse must be filed to fit boiler and glued in place. Stoker engine mounts under cab. Use large .040 brass wire for water supply lines (1); .032 brass wire for steam lines (2); and .020 brass wire for air, sand and others (3). Use the two different sized brass eyelets where ever practical to secure piping to boiler. Use .020 piano wire for all hand rails. Pre-drill all holes to engage piping before mounting your castings. "Crazy Glue" can be used for most anything in-

cluding securing air lines to hangers and openings. Where piping goes thru running boards drill carefully. Hangers are made from .032 wire bent and glued under running boards or inserted (as on fireman's side) into holes drilled into plastic shell. Check constantly by setting boiler in place to be sure nothing hits frame members.

.032 brass wire
running board suppt.



6. SMOKEBOX FRONT - Layout points for mounting pins on bell bracket, marker lights, and headlight. Drill proper holes, fit castings and secure them with "Crazy Glue". If you wish to install a headlight, drill holes for wires before mounting casting. Three hand rail posts and a piece of piano wire complete the smokebox front. "Crazy Glue" front to the front of smokebox.

Nothing has been said about painting. This can be done in steps as you assemble to save time. We advise the use of Floquil flat black with white added for weathering. A little rust at the pop valves, etc. also enhances the appearance of your loco. Kadee couplers can be purchased from Delaware Valley S Scale & Supply and we suggest the cast fireman and engineer figures be used from S Scale Loco & Supply. Now that you have tried your hand at building a locomotive you may wish to build more. The S Scale Loco & Supply Catalog has several kits listed and many parts you may desire. Body lead bars should be purchased and used to weight your tender and loco for best performance. One and a half bars furnished all the weight necessary. These were cut, fitted into boiler shell to clear motor, and epoxy poured around them to secure them.

We hope you have enjoyed your locomotive building kit and that its performance and appearance provide you with many hours of enjoyment.

Lehigh Valley Models produces and carries a line of quality kits for your S pike that are fun to build. Why not try one of the following:

- LVM1 Branchline Station
- LVM2 50,000 Gal. Water Tank
- LVM3 100 Ton Coaling Station
- LVM4 Gantry Crane
- LVM5 Crossing Gate
- LVM6 Electric Utility Pole Kit
- LVM7 Continental Canning Co.
- LVM8 Mack Tank Truck
- LVM9 Track Bumper
- LVM11 Water Column

 **Lehigh Valley Models** 

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