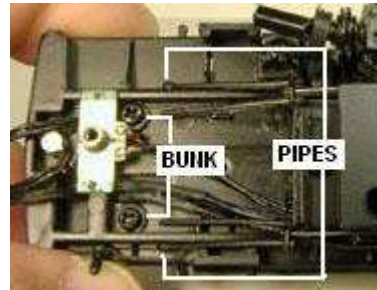
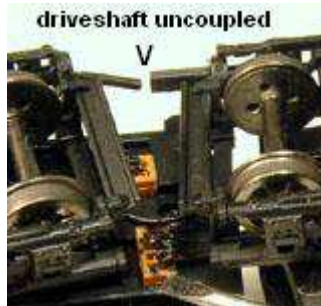


Before you begin: Wash resin parts, read notes on parts listing page, read instructions & consider your own preferences regarding painting, etc. prior to assembly.
Metric equivalents: 1" actual measure = 2.54 cm or 25.4 mm
 1" (inch) scale measure = 0.53 mm * 1' (foot) scale measure = 6.35 mm

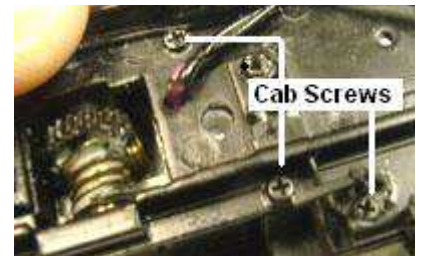
Preparation of Bachmann Chassis

- ★ **Test run** your Bachmann HO scale Shay **prior** to disassembly or modification in case any warranty work is needed. Break-in loco by running on a loop of track.
- ★ **Speckled castings?** Some components contain tiny steel balls (no lead!) to add weight for good operation. These castings should not be cut or drilled to avoid breakage.
- ★ There's nothing terribly difficult about working with the mechanism, but **CARE** and **PATIENCE** will be rewarded! Use small containers or zip bags to hold screws or small parts while you work. Use good lighting and take your time.
- ★ **Extra zip bags are included in pack #11 for temporary storage of small parts!** Save detail parts and screws from the HO Shay for re-use on this and other projects.
- ★ **Need larger photos?** If you have trouble making out the detail in particular photo(s), we can provide larger copies by email: on30resinkits@aol.com
- ★ For this project, we will "convert" the 3-truck Shay into a 2-truck Shay by removing the 3rd-truck/tender section. We'll replace the 2nd truck on the loco with the 3rd truck removed from the tender section to give the proper appearance for a 2-truck Shay.
- Gently disconnect the two orange electrical connectors from the 3rd truck / tender section, taking care not to damage the plugs or break wires.
- Remove drawbar screw shown below right. Remove auxiliary tender section. Set aside drawbar screw to be replaced on loco in just a few minutes.
- Remove the screw securing the front truck on the loco section. Turn the truck to release the driveshaft, then lift the truck to remove from bolster pin. Set aside truck and screw to be re-installed later ... mark these items for "front truck" position.
- Remove the screw securing the rear (2nd) truck on the loco section. Turn the truck to release the driveshaft, then lift the truck to remove from bolster pin. Set aside this truck and screw and mark as "extra". (The truck from the auxiliary tender will be replaced in this location during reassembly.)
- Replace the drawbar screw in its original location. This screw will be used to secure the new kit body to the mechanism.
- Keep the auxiliary tender and 3rd truck handy. The 3rd truck will be relocated to the main loco section after a few simple modifications.
- Photo at right shows rear of loco section. Remove



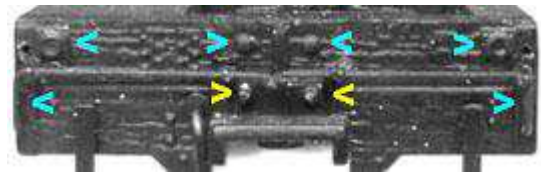
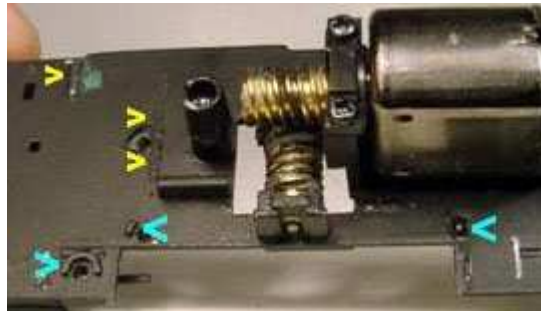
two screws securing the fuel bunk (small tender shell) and remove the fuel bunk. Release the ends of the plastic pipes that are pressed into the metal chassis -- two here at the rear of loco and two more near the front. Use small screwdriver to gently pry these loose.

- ★ **Use extra care during these next steps.**
- Remove the two screws on either side of the ash pan (large block on bottom of loco) as shown at right. Make sure you've released all four ends of plastic pipes as shown in previous photo.
- Grasp the bottom of the ash pan and carefully remove the ash pan / cylinder assembly as shown below right. This photo also illustrates the plastic pipes that should be freed from the metal chassis.
- Set aside ash pan / cylinder assembly and the two screws. It is **NOT** necessary to disassemble this drive assembly! We have only removed it to gain access to a screw that secures the HO body to chassis.
- ★ This photo shows the bottom of loco after the ash pan / cylinder assembly has been removed. Notice how the various wires have been pressed flat. The exact location of these wires may **VARY** on your loco. Take a good look at the wires on your loco. These will be gently lifted to conceal a hidden body-mounting screw. After that is removed, the wires will have to be restored to their flattened position to allow the cylinder assembly to seat properly.
- ★ The photo at right is a close-up of the same area. Notice the location of the greased drive gear in both photos.
- Gently lift the wires above the gear to reveal the screw shown at top of photo. Remove all three of the cab screws. Gently remove HO cab from chassis. Replace screws in HO cab for use on other projects.
- Lift electrical wiper pad from front bolster to reveal boiler screw indicated by white arrow at (next page). Remove screw; return wiper pad to position.
- Pry off smokebox front to reveal headlight. Use tweezers or fine pliers to grasp aluminum sleeve and slide forward. Use fine screwdriver to slide bulb forward in sleeve as shown. The goal is to have the rear of bulb in front of the aluminum sleeve so the wires can be released from sleeve. Pull sleeve forward, release wires and remove sleeve.
- Carefully lift boiler from body and work headlight thru opening in boiler. Remove boiler. Replace boiler mounting screw in boiler for use on other projects.



Boulder Valley Models #255 Silver City Sidewinder 16-ton Shay Assembly Instructions

- Study photo at right. Blue arrows indicate raised areas that will be ground or filed flat. Yellow arrows show residue from HO cab that will be ground flat. **DO NOT** grind these areas until motor / gears are covered as noted below.
- Study photo of front pilot beam shown below. Remove front coupler and set aside; replace coupler screw in original location. Remove lift bar assembly (not shown). This is the metal wire with metal posts pressed into the front of pilot beam. Use pliers to pull out metal posts. Remove air hose and front step.



- Blue arrows indicate raised details that will be ground or filed flat. Yellow arrows indicate raised detail that will be ground down to match the surface above the coupler box opening. **DO NOT** grind these areas until motor and gears are covered. (It is difficult to see the raised detail on photo -- compare with photo below showing where these details have been ground away. Basically, you'll be grinding down details that stick out above the wood grain detail cast into front beam.)



- Use masking tape to **fully cover** the motor and gears (top and bottom) before grinding the chassis! We used a variable-speed motor tool and a grinding wheel as shown above to grind down the raised surfaces. Work carefully and use **safety glasses** to protect your eyes! None of these surfaces will show on the finished model, so focus on removing the raised material -- slight pits, etc., it will not detract from the finished model.



- Photo at right shows the chassis after raised areas have been ground flat ... compare with photo at top of column.



- This photo shows the front pilot after raised areas have been ground flat -- compare with previous photo.

- Brush or vacuum away metal filings before removing masking tape. Use some sticky tape to pick-up any filings that remain. Remove masking tape. Inspect gears and other areas for loose filings. As a precaution, you could remove the grease from the large drive gear and replace with fresh grease. We found that the masking tape adequately covered our drive.



- Note: Photo at right shows the cylinders replaced on chassis, which will be described below. Study your

cylinder assembly, which is currently separate from the chassis. Notice that there is a plastic pin on the back of each cylinder (on the same side as the chrome screws). Clip off each of these three plastic pins -- photo at right shows cylinders with pins removed.

- Study second-to-last photo on page 1 and arrange the wires on your loco so that the ash pan / cylinder assembly will sit flat. Replace cylinder assembly and gently press into position. Check to see if it sits flat. **CAUTION / Important:** Do NOT "smash" the wires or try to force the cylinder assembly to fit. First, you don't want to damage the delicate wires. Second, it is important that the cylinder assembly is seated properly for smooth operation. We found that it took some fiddling and repeated test fits to find the right position for the wires. If you encounter frustration, take a break. We're very close to starting the "fun part" of building the new On30 Shay body ... so take your time and make sure the preparations are completed properly!

- Once the ash pan / cylinder assembly is in place, reconnect the ends of the plastic pipes to the receiving holes in the metal frame.

- Remove drawbar screw and drawbar from auxiliary tender. Remove screw behind drawbar, which is indicated by white arrow above. Remove ladder from rear of tender. Lift front of tender body and slide backwards to release body from mounting lugs at rear (these can be seen from underside). Replace drawbar and screw on auxiliary tender frame. The drawbar will be re-used in final assembly of your On30 Shay.



- Next photo shows underside of loco chassis, rear truck area. Lift electrical contact wiper from rear bolster pin. Feed both of the orange electrical connectors thru the rectangular opening at upper right of chassis (as seen in this view).



- Remove the three screws securing the PC board to the floor of auxiliary tender; remove PC board.

- Install the truck from the auxiliary tender in the rear truck position on loco. First, align driveshaft components, then set truck on bolster pin and secure with screw.



- Re-install front truck. Align driveshaft; set truck in place and secure with screw.

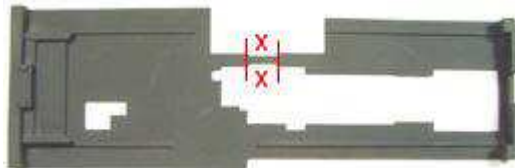
- Place electrical tape (ideal) or masking tape on bottom of PC board to **insulate** and avoid electrical shorts against metal frame! Plug in to electrical connectors, which should now be available on top of chassis as described above. Test run your loco. Stop immediately if there are any problems. Check to make sure driveshafts are properly aligned, cylinder assembly is seated properly, etc.

★ Now it's time to take a little break to make sure you're relaxed and ready for construction. If you haven't already done so, you should go ahead and wash the resin parts now. The overall body assembly is much easier than what you've just done with the chassis. Placing detail items takes some time and patience ... we'll guide you thru those ... take breaks as needed!

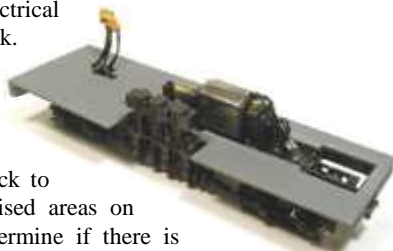
Begin Assembly of your "Silver City Sidewinder"

- ★ If you plan to kitbash or modify your Shay, please read thru all of the instructions to see how parts are intended to fit, interlock, etc., and plan your changes appropriately.
- ★ **Note:** We've pre-painted individual parts to improve photo quality -- we suggest assembling **unpainted** parts and following the painting tips given along the way!
- ★ **Reminder:** **Washing the parts is essential** for good paint coverage. Use powdered cleanser or denatured alcohol as described on Parts Listing sheet. Oils from the resin and/or silicone molds must be removed for reliable paint coverage.

- Trim thin film from interior of deck casting (Part 1a), including the L-shape opening shown toward the rear (left). Photo shows underside of deck. Note the thin strip of material marked with "X" -- this is used to keep the casting relatively strong for shipping and must be removed prior to assembly. On the underside of deck, this strip is slightly recessed (thinner than remainder of deck). Trim away this small piece.



- Place deck over chassis and feed orange electrical connectors thru L-shaped opening toward back. Fold headlight wires close to front of motor. Lower deck onto chassis as shown.



Important: Test fit and inspect before you continue assembly. The deck should sit **completely flat** on the chassis. If not: (a) check to make sure that you ground down all of the raised areas on chassis and pilot as shown on page 2; (b) determine if there is interference at the front or back and file out casting as needed -- for example, angled area inside rear of deck as shown in photo of rear coupler box below (white area has been filed back slightly).

- Trim front pilot beams (Part 1d) and rear pilot beams (Part 1e) from thin backing. If desired, lightly round the edges of these parts and also the corresponding parts on the deck -- this will produce a little more pronounced effect of separate beams on the finished model. Match front beams to molded beams on deck and glue in place (above left). Match rear beams to molded detail on deck -- make sure wood grain is on OUTSIDE and glue in place (above right).



- Test fit coupler box (Part 9e) between pilot beams at rear of loco as shown above. File edges of box if needed for a good fit. Note that the "ears" (lugs) on the casting are placed toward the INSIDE of frame, and that they fit against the lugs molded into bottom of deck. Glue coupler box in place.

- ★ **Important notes:** Deck MUST sit flat on chassis to insure proper placement of coupler boxes. Take care NOT to allow glue to contact the metal portions of the Bachmann frame when placing coupler boxes. **Orientation:** The top edge of the faceplate opening should

rest on the coupler box lip -- metal lip on front of chassis; resin lip on rear.

- Replace deck on chassis. Trim coupler faceplates (Part 9d) from backing. Test fit as shown and file out center if needed to clear coupler box lip. Insure that front of deck is flat against chassis. Glue front coupler faceplate in place as shown, taking care not to allow glue to seep between resin parts and metal frame.
- Lift deck and slide forward to clear coupler box lip. Remove deck and inspect for any glue on metal parts.
- Test fit rear coupler box faceplate. File out center if needed. Glue rear faceplate in place with top of opening resting on top of coupler box lip. The coupler faceplates are designed to approximate the appearance of prototypical multi-slot coupler housings, while using conventional model couplers.
- Remove deck from chassis. Drill #60 hole in center of rear coupler box, approx. 3/16" deep. Guide #0 x 3/16" screw (Part 5e) into hole and turn with small screwdriver to tap the hole. It may be helpful to support the screw with tweezers to keep it straight while making the initial turns. Remove screw and return to parts pack. (It's easiest to tap the hole now while the deck assembly is relatively flat; screw and coupler will be replaced in final assembly.)



Boiler Preparation

- ★ **Important:** During the following steps, the boiler will be placed on deck to test-fit components -- **DO NOT GLUE** boiler to deck at any point in this section. Final placement of the boiler will be determined after the cab is assembled in next section.



- ★ **Reminder:** If you're planning to kitbash or modify your kit, please read thru all of the instructions to see how the assemblies are intended to interlock and screw to the chassis so you can plan your changes accordingly.
- Replace deck assembly on chassis. Fold headlight wires ahead of motor. Test fit boiler on deck. Notice that the opening on the left (cylinder) side will fit over the gear on the mechanism. Also note that the motor may rotate in its mounts, so it may be necessary to turn motor slightly (by hand) to allow boiler to fit. Flat areas on bottom of boiler should fit flat against deck. Check for interference from headlight wires, etc.
- It may be necessary to lightly file bottom of front boiler rings or inside edges of deck opening to allow boiler to sit flat.
- Test fit boiler mounting ring (Part 2a) inside front of boiler -- DO NOT GLUE at this time -- the flat side of this part should face the outside of the boiler front as shown. This part is intentionally snug, so it may be necessary to lightly file the edges to fit this piece. The front (flat) surface of the ring should be flush with the end of the boiler.
- Test fit boiler with ring on deck, as shown above, and make sure that the boiler will still sit

Boulder Valley Models #255 Silver City Sidewinder 16-ton Shay Assembly Instructions

flat on deck. If not, it may be necessary to lightly sand the very bottom surface of the boiler mounting ring. **DO NOT GLUE.**

- Remove boiler and ring from deck. Stand boiler on front end as shown; set on wax paper. Press down on boiler mounting ring to make sure that flat surface is flush with end of boiler. Apply glue to joint **INSIDE** boiler between mounting ring and boiler. Allow to dry before moving.
- Use a push-pin or other sharp point to make a small dimple in center of smokebox front (Part 2c). Use a small drill bit like #60 to start a hole in this dimple. Then enlarge this hole with 1/16" drill bit and test fit number board pin (Part 7i). Use a small reamer or wiggle drill bit slightly to enlarge hole if needed. Make sure that surface of pin is straight and glue pin in place. Note: The number board (Part _) *could* be glued in place at this time, but we found it much easier to add a number by painting this piece separately and mounting it during final installation.
- Test fit friction ring (Part 2b) in smokebox (Part 1c) as shown -- **DO NOT GLUE!** This part will allow the smokebox front to press-fit in place. This allows easy removal for placement of headlight wires. The part should fit snugly, but may need some slight filing of raised ribs if it is too tight.
- **Note orientation:** The groove on the smokebox will align with the bottom of the boiler. The open area of the friction ring should go at the **TOP** (opposite groove) to allow room for headlight wires. The flat side of the friction ring should be flush with the end of the smokebox.
- Do not add glue -- test fit smokebox front against smokebox. Check orientation: (a) groove in smokebox at bottom; (b) opening in friction ring at top; (c) hinges on smokebox door at right.
- Again, it is important **NOT** to glue the inner friction ring to the smokebox. Glue will be applied **ONLY** to the surface shown in white at top right and should **NOT** be applied near the surface of the smokebox, shown in gray. Also, we recommend using 5-minute epoxy or slow-setting ACC in the next step to allow positioning of the smokebox front.
- Double check orientation of parts. Apply slow-setting glue to center of friction ring (shown in white at top), place smokebox front with hinges to right and check to make sure that it is properly centered. Allow a moment for the glue to "tack" -- then remove smokebox front and ring by pressing from back (inside smokebox) -- this will insure that the front assembly is not glued to smokebox. Set aside smokebox front and use only the main smokebox casting in the next step.
- Do not add glue -- do a "dry" test fit of smokebox against boiler. Notice that the boiler front is larger in diameter than the smokebox. Practice fitting smokebox against boiler front so that it is **CENTERED** against boiler front. Also make certain that groove on smokebox is located along **BOTTOM** center line of boiler.



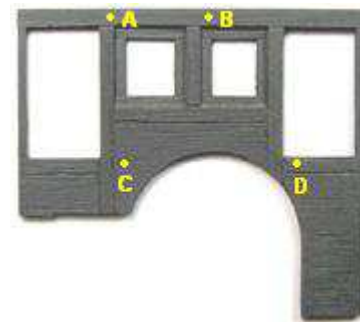
- Apply a bead of 5-minute epoxy or slow-setting ACC to back of smokebox. Press against front of boiler and check from all sides to make certain that (a) it is centered and (b) groove is on **BOTTOM**. Allow to dry.
- Optional: Loosely place boiler, smokebox and smokebox front on deck and get a peek at your loco's progress. (Do not glue boiler to deck!)

Assemble Cab for your new Shay

★ **Plan ahead for sound!** This kit was designed **prior** to the release of the Bachmann HO 3-truck Shay with **factory-installed sound**. After-market decoders like the Micro-Tsunami and LokSound Micro will fit into the tender shell provided. Electronics from the "factory-installed" version **MAY** require more space. Read thru all instructions and test fit components inside tender shell before assembling cab. It **MAY** be necessary to enlarge the opening in tender front and cab rear to accommodate larger sound components. Use email at end of instructions to check for updates. Cab doors may be mounted in the closed position if it is necessary to extend electronics into cab area.

★ Cab parts are delicate, so handle with care! Cab will become quite sturdy once assembly is completed.

- Pre-drill holes in cab front as follows:
 - Hole A: #75 drill; centered in top board, 1'9" scale from left edge. [Metric: Drill slightly larger than ultra fine wire, Part 11h, 11mm from left edge.]
 - Hole B: #75 drill; centered in top board, 3'3" scale from right edge. [Metric: Same drill size as "A"; 21 mm from right edge.]
 - Hole C: #66 drill; 3'2" scale from top; 2'2" scale from left edge. [Metric: Match drill to heavy wire, Part 11j; 20 mm from top; 14 mm from left edge.]
 - Hole D: #66 drill; centered in board below window; 1'3" scale from right edge. [Metric: Same drill size as "C"; 8 mm from right edge.]
- Test fit heavy wire (Part 11j) in holes C & D; enlarge holes slightly if needed.



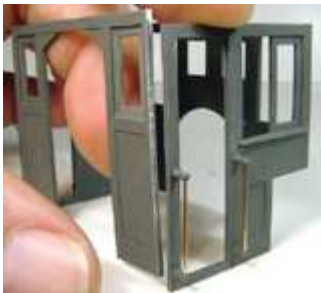
★ **Handrail stanchions: A neat little detail that might drive you nuts!** There's a mixture of humor and reality there. We've provided some nifty little stanchions to give your loco a prototypical appearance ... and there are enough extra pieces to allow for that fact that a few of these tiny pieces might "disappear" during handling. These are probably the "trickiest" little bits in the kit -- good lighting, tweezers and patience are extremely helpful!

Alternative: We suggest that you **TRY** the techniques suggested, but if you find the little pieces too troublesome, you can simply drill holes (#75) in the cab sides, bend pieces of fine wire to form grab-irons and glue those directly in place. **Practice:** Since there are extra pieces, try drilling and trimming out two stanchions, glue these to a piece of scrap material with the holes aligned, cut and fit a piece of metal wire and see how it goes!

★ **TIP for drilling handrail stanchions:** While stanchions are still on their thin backing, drill #75 holes thru the first row of stanchions, then trim as described below. (Hole is drilled in dimple as shown at right. Pre-drill each row before removing from backing.) Cut a small piece of the end of one piece of fine wire, test fit long piece into stanchion. Burrs left by cutting tool may require a slightly larger hole.



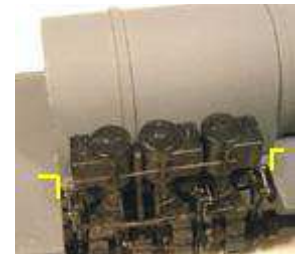
- ★ **TIP for trimming handrail stanchions:** Drill holes in one row of stanchions, cut that group away from the others. Place on rubber cutting mat and use a hobby knife to make cuts around the base of each stanchion. Diagram at right shows a white circle to represent the base of stanchion. The red octagon suggests a series of straight cuts made around the base of stanchion to remove backing. Use tweezers to hold part while making the last few cuts. The tiny "points" left around the base of stanchion may be sanded off, but if you make enough cuts around the base, the points will be small enough to "disappear" on the finished assembly.
- ★ The length and placement of grab-irons may be varied to suit your preferences. The metal rails may fit flush between the stanchions as shown, or cut slightly longer to protrude slightly beyond each stanchion.
- ☐ Mark desired location of stanchions on cab sides. We placed our stanchions approximately 2'6" scale [16mm], with the lower stanchion approximately 6" scale [3mm] from bottom. Make sure holes in stanchions are proper oriented (aligned) before gluing stanchions in place! **TIP:** Place a droplet of ACC on wax paper; hold stanchion with tweezers; touch bottom to ACC droplet; touch bottom to dry spot on wax paper to remove excess glue, then set in place on cab side.
- ☐ Cut a piece of fine wire to fit between each pair of stanchions -- these may be cut to fit flush as shown or longer to protrude slightly beyond each stanchion. Test fit and sand burrs off wire ends if needed. Guide into place with tweezers. Place a fresh droplet of ACC on wax paper and use a toothpick to transfer a tiny dab of glue to the joints between stanchions and wire.
- ☐ Repeat steps to add two grab-irons to each cab side as shown.
- ★ **Design note:** Cab ends fit BETWEEN cab sides! (Edge of cab front fits against flat BACK of cab side, likewise with cab rear.) Test fit and check alignment of parts BEFORE making the glue joints!
- ★ Pre-drill cab front as described above! Glue edge of cab front to back of cab left (Part 3d) as shown above. It may be easiest to do this with parts upside-down as shown in next photo -- but make sure you have the parts in the correct orientation!
- ★ Glue other edge of cab front to back of cab right (Part 3c) as shown -- parts may be inverted as shown to simplify alignment, but double-check orientation before gluing!
- ★ Cab rear (Part 3b) fits between cab sides. Glue one edge and allow to set. Flex out other edge, apply glue and align



- joint. Photo (above) shows edge flexed outward to allow application of glue.
- ★ Test fit inner cylinder shroud (Part 1f) to determine orientation. This casting has two thick panels and one thin panel arranged in an open-box design. The THIN panel mounts vertically toward the center of cab. Test fit, determine proper orientation and glue in place as shown in second photo.

Location of Boiler and Cab

- ★ Follow the steps for test-fitting components and marking locations -- **DO NOT GLUE** components until indicated.
- ★ Consider your painting preferences. We found it relatively easy to assemble the components as shown, then paint the (nearly) complete body assembly as a single unit. The steps suggested also give the body assembly maximum strength before it is handled for painting.
- ☐ Make sure that deck is sitting flat on chassis. Dry fit boiler and cab as shown -- **do not glue**. Position cab so front corners are aligned with corners on deck as indicated by yellow circles in photos at right. Position boiler so that rear boiler ring is butted against cab front. Double-check position of cab.
- ☐ Gently lift cab away and make pencil marks on deck to indicate the points at which the straight portions of the boiler meet the deck -- that is, mark corners of straight boiler portion as indicated here (yellow marks).
- ☐ Replace cab (do not glue) and double check positioning of boiler and accuracy of pencil marks. Remove cab and set aside.
- ☐ Test fit backhead (Part 2l) against end of boiler (shown on next page). It should fit flush. If not, check to see if it is striking the raised metal lug on chassis indicated by blue arrow in next photo. If necessary, remove deck from chassis and file back this metal lug. Replace deck and boiler, recheck backhead. Set aside backhead -- do not glue at this time.
- ☐ **Before gluing boiler in place**, note these tips: (1) Use a thick, slow-setting ACC or 5-minute epoxy to provide time to check alignment and to avoid getting glue between resin parts and metal chassis -- this is much more likely to



happen with thinner glues. (2) Apply glue only to the FLAT portions on bottom of boiler and avoid excesses that might squeeze out and contact metal chassis or drive components. (3) If in doubt, use just a few small dabs of glue on underside of boiler -- let that set, then remove deck/boiler assembly from chassis and apply additional glue along seams between deck and boiler.



- Apply modest amount of thick, slow-setting glue to FLAT portions on bottom of boiler. Place boiler on deck and align with pencil marks. Lower cab (no glue!) to double check positioning of boiler before glue sets; remove cab and set aside.



- Allow glue to set. If you used a very minimal amount, remove deck/boiler assembly and use a fine applicator to reinforce the seams between deck and boiler from inside and outside.

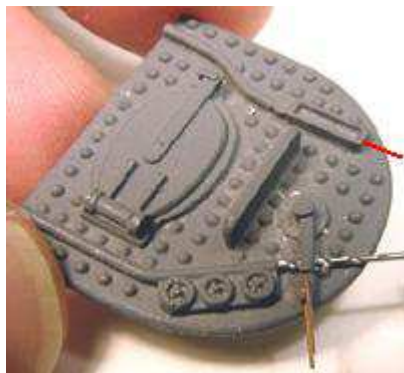
★ **Boiler & deck mounting screws** -- these are tapped in place now to avoid damage to delicate detail parts later!

- Turn loco upside down -- you may want to use scrap wood blocks or other handy items to stabilize it. Remove front truck; lift electrical contact pad to reveal the hole where the original HO boiler mounting screw was removed. (Shown in photo on page 2, next to headlight photo.) Use a #60 drill centered in that hole and drill into the new On30 boiler mounting ring. Place a new #0 x 3/16" self-tapping screw (Part 5e) into hole and gently tap into the resin boiler ring. Tighten just until snug. Replace electrical contact pad; realign driveshaft and replace front truck.



- Remove rear truck. Remove original drawbar screw from rear of chassis. Remove drawbar from original HO auxiliary tender. Insert drawbar thru slot in rear of metal chassis and replace original screw in chassis to secure. Position drawbar along centerline. Mark center of remaining hole on bottom of resin deck. Start hole with a small drill bit, like #60, then drill all the way thru deck with 1/16" drill. Install new #2 x 1/4" self-tapping screw (Part 5f) and tap into resin deck; tighten until just snug. Realign driveshaft and replace rear truck.

- Inspect backhead casting. Notice the angled throttle detail at top center. Drill a #80 hole in end of longer throttle extension; drill a second #80 hole in angled extension. Cut two pieces of ultra fine wire approximately 9" scale for rear and 11" scale for front. Glue in place -- see also photos of backhead on page 8.



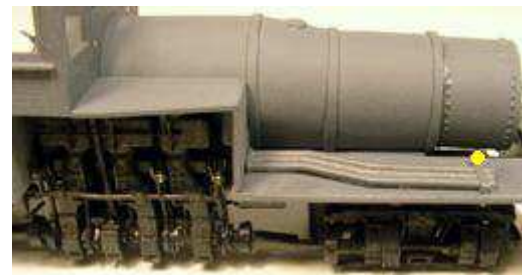
- Use a #75 drill bit to drill at an angle thru the throttle body in align with the pipe for the tri-cocks (pipe next to 3 knobs) -- as indicated by silver drill bit (previous page). Also drill a dimple into the top of the water sight glass as by red line in photo. These holes will be used later when additional backhead detail is fitted.

- Glue backhead to rear of boiler. If desired, use a bead of gap-filling ACC (applied sparingly) to fill the seam between backhead and boiler.
- Review the text and photos showing cab positioning on previous page.

- Practice lowering cab into position. **Option #1:** Apply a thin bead of slow-setting ACC to bottom edges of cab and carefully lower into place. **Option #2:** Apply just a few dabs of ACC to bottom of cab. Check alignment at front corners and around edges and adjust position before glue sets. Use a toothpick to wipe away any excess glue around outside. Allow to set; add a bead of ACC along inside edges of cab if needed.

- If desired, add a bead of gap-filling ACC to joint (inside cab) between boiler and cab.

- Test fit outer cylinder shroud (Part 1g) as shown. Apply glue to rear edge, where shroud meets cab, and lower front edge, where shroud meets deck. Glue in place.



- Lay cylinder exhaust pipes (Part 8f) on deck as shown. Draw a pencil line from the front cross-piece to the smokebox (line visible in photo at right). Set aside exhaust pipes to paint separately and install during final assembly.

- Note orientation of exhaust port (Part 8g). Curved side fits against boiler. Short flat side mounts against deck. Long flat side faces outward. Apply glue ONLY to curved surface (to avoid getting glue on metal chassis below) and mount in place, centered along pencil line as shown.



Add Domes and Begin Detailing

- Use a #60 drill to start a hole in center of flange on side of steam dome bottom (Part 2d). Enlarge with 1/16" drill into center of dome. Test fit steam pipe (Part 5a) into flange. Enlarge hole slightly if needed.

- Test fit steam dome cap (Part 2e) to steam dome base. Use slow-setting ACC or 5-minute epoxy to glue parts together. Check alignment from all sides before glue sets.



- Test fit sand dome top (Part 2g) to sand dome base (Part 2f). Use slow glue to fasten parts; check alignment from all sides before glue sets.

- Photo shows placement of domes, smokestack base and headlight bracket.

- Test fit steam dome to boiler -- make sure that flange for steam pipe is on the same side as the cylinders! Dome should be centered on rear boiler section as shown. Apply slow-setting glue to bottom of dome; set in place; check alignment from sides AND sight down front of loco to check vertical alignment before glue sets.

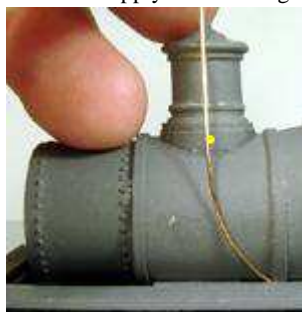


- For a "pro" finish, apply a thin bead of gap-filling ACC to

joint between dome and boiler. Use the small end of a flat toothpick to wipe away excess at the joint. Cut the other end of a toothpick at an angle for any larger clean-up.



- Drill #75 hole in each side of sand dome base to allow for sand pipe -- indicated by yellow dot in photo at right. Test fit sand dome to boiler; dome should be centered in boiler section as shown. Apply slow-setting glue to bottom of dome; set in place; check alignment from sides AND sight from end of loco to check vertical alignment before glue sets. Apply gap-filling ACC around seam if desired.



- Shape sand pipes from fine wire. We curved wire around finger tip and held against boiler as shown to check shape, then made a bend at top to align with hole in sand dome. Bottom of pipes should be directed to "outlet" behind front truck. Do not glue bottom end, as this may cause accidental gluing to chassis. Shape pipe, tuck bottom end between boiler and deck opening; glue end into base of sand dome. Repeat for other side.

- Smokestack saddle (Part 2h) should be positioned toward rear of smokebox (against back row of rivets) to allow room for headlight bracket. Test fit; use slow glue and check alignment from sides AND end before glue sets. Tip: Loosely place stack on base to help check vertical alignment.

★ **Two smokestack choices are provided:** (1) "Typical" Shay stack and (2) straight stack with flared cap.

- **Option 1 / "Shay" stack:** Shape screen (Part 11d) to fit inside stack cap (Part 2j). Screen may be set flush with top or bulged slightly above top. Use just a couple dabs of thick ACC applied to inside to set screen in place. We recommend painting cap with screen separately and installing AFTER loco has been painted -- this makes it easier to paint inside of stack cap. Stack bottom (Part 2k) may be mounted to loco at this time ... or wait and decide which style later.



- **Option 2 / Straight stack:** Check stack tube (Part 5b); make sure that ends are straight. If desired, drill 3/32" hole (or slightly larger) thru dimple in flared cap (Part 2i). Glue cap to tube; stack may be glued in place at this time ... or wait and decide which style later.



- Test fit headlight bracket (Part 7f) to smokebox as shown (page 6). It may be necessary to shave a rivet or two to allow straight alignment. Glue in place and double-check alignment.

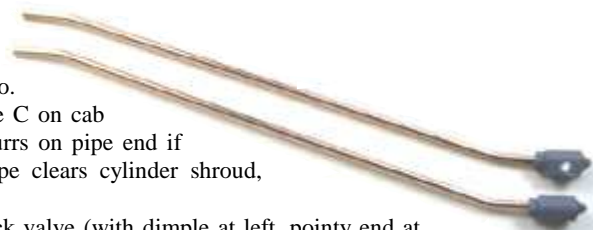
★ **Tip:** The tiny check valves (Part 7c) are very difficult hold and file at the same time. However, these are mounted to wire pipes that make good handles when smoothing out casting marks on these parts.

- Note that the check valves come in left and right variations, with spares in case of loss. Cut the casting sheet in half down the center. Drill #67 hole in the dimpled end of each check valve casting before trimming the casting from backing.

★ The two Z-pipes (Part 11e) are the same; the "Z" should remain vertical when mounted (forming a straight line when viewed from above -- "Z" when viewed from side).

★ **Top (next column):** Z-pipe and check valve for LEFT side of loco -- pin faces up in photo (in toward boiler).

★ **Bottom:** Z-pipe and check valve for RIGHT side -- pin faces down in photo.



- Test fit Z-pipe pipe into hole C on cab front (see page 5) -- sand burrs on pipe end if needed. Make sure that pipe clears cylinder shroud, adjust angles if necessary.

- Trim out one right-hand check valve (with dimple at left, pointy end at right and mounting pin toward rear). Test fit on Z-pipe; double check against photo. Glue in place with mounting pin perpendicular (90-degrees) from top view as shown in photo. Repeat with left-hand check valve and second Z-pipe. Allow to set, then use pipes as handles to file casting marks off of check valves. Then, CUT pins from back of check valves -- we will NOT drill into the boiler on this model, because of the steel weight.



★ **Note:** When mounting pipes, the "plain" end should be pressed into the cab front so that it is flush with inside surface of cab front. Wire does NOT protrude into cab interior; this is necessary for fitting backhead detail later. If needed, sand burrs from wire ends to fit pipes into cab front.

- Touch wire end of right-hand pipe to droplet of ACC and insert into hole on cab front. Put a droplet of thick, slow-setting ACC on back of check valve, press against boiler and check alignment from side. (See photo below.)



- Repeat steps for left-hand check valve and Z-pipe.
- Test fit steam pipe (Part 5a) in steam dome and make marks on top of cylinder shroud at bottom of pipe. Drill dimple in that location with small bit (like #60), then make a larger dimple with 1/16" drill, about 1/64" deep. Test fit pipe again and trim long end if needed.
- Drill 1/16" hole thru pipe flange (Part 7e) before trimming part from backing; trim out flange and slide onto long end of steam pipe. Put a dab of ACC on each end of pipe and install as shown, with flange midway on pipe. Add a droplet of ACC near base of pipe; lower flange onto top of cylinder shroud.

Backhead Details made (Relatively) Easy!

★ We've provided components to provide the essential backhead details while keeping assembly relatively easy. Take your time handling the delicate parts, and your efforts will be well rewarded -- these details are readily visible thru the cab windows!

- With backhead pipe (Part 6a) on backing, drill two #67 holes thru dimples in backhead pipe -- indicated by red dots at right. Carefully trim out pipe.



Boulder Valley Models #255 Silver City Sidewinder 16-ton Shay Assembly Instructions

- Cut two 14" scale lengths of 030 styrene rod (Part 5c). Insert into holes drilled previously from back (flat side) of pipe assembly. Handle gently. Press rods thru pipe assembly so approximately 2" scale sticks out on front side. Add a droplet of ACC to each rod at back of pipe.
- Trim out four knobs (Part 6c) and glue in place on pipe assembly as shown. Tip: Lightly sand back of backing to make it easier to trim out knobs.
- Test fit in cab as shown; styrene rods will align (approximately) with holes in cab front for check valve pipes. Add a droplet of ACC to each end of pipe and rods; glue in place.
- Bend and cut a piece of fine wire as shown ("n" shape between water sight glass and boiler). Long end is approx. 8" scale; short end 4" scale; center section should match front notch in your smallest pair of needle-nose pliers. Long end fits in hole in top of water sight glass (last photo, page 6); short end fits against top of boiler. Test fit and glue in place.
- Drill a #67 hole in back of lubricator (Part 6b); approx. 1' scale from bottom and 1/16" deep. Add two knobs to front of lubricator as shown.
- Bend and cut heavy wire (Part 11j) as shown to form lubricator mounting pipe. Glue short end into back of lubricator. Drill a #75 hole in left side of lubricator -- indicated by white dot.
- Drill a #67 hole in top of boiler behind center knob on pipe (indicated by drill bit in photo). Test fit lubricator, but do not glue. Lubricator should be angled toward engineer (cylinder side).
- Bend another piece of fine wire to go from hole in throttle (last photo, page 6) to hole in lubricator. This one is a little tricky; it's likely to take multiple attempts at bending and fitting; omit if desired. Once set, apply droplets of ACC to each end of fine wire and to base of lubricator mounting pipe.



Additional Details

- Carefully trim out boiler braces and mount one on each side as shown; base rests on deck.
- Make marks on front of deck approx. 6' scale apart, as shown in next column. Pre-drill two stanchions and trim out as described on page 5. Glue END stanchions in place with holes aligned. Cut a piece of fine wire to fit between end stanchions -- do not glue!
- Pre-drill and trim out two more stanchions. Slide one end of wire thru first stanchion on deck; slide two loose stanchions onto wire. Slide other end of wire into other end stanchion on deck. Apply ACC to base of loose stanchions and locate as shown below. Add dabs of ACC to wire at each stanchion.

- Carefully trim out one pair of end steps (Part 9c) and glue in place as shown.
- Notice that the raised ring on poling pockets (Part 9f) are angled -- these should be positioned with the higher surface toward the center of loco. Glue two to front pilot.
- Repeat steps to install steps and poling pockets on rear beam of loco.
- ★ **Notes:** Whistle (sold separately) and pop valves may be installed now as shown, or painted separately and installed during final assembly. Bell may be painted separately or installed in frame as described here. We found it fairly simple to brush paint "brass" details after loco was painted near-black. Ultra fine wire is provided for whistle and bell cords. Substitute fine rope (not included) if desired.
- We installed BVM #438 whistle, sold separately. Carefully and SLOWLY pre-drill #75 hole in whistle arm; support arm on thin cardboard to avoid bending. (Alternate: Attach whistle cord to arm with glue, no hole.) Drill #60 hole in top of steam dome, toward the rear and allowing space for pop valves. Test fit, check height and trim bottom post if needed. Glue in place.
- Trim out pop valves (Part 7d) using technique described for stanchions on page 5. Glue in place ahead of whistle.
- Pre-drill two holes in bell frame before trimming part: #75 hole in arm for cord; #66 hole in top of bracket for bell. Carefully trim out bracket; glue bell in place and mount in place with arm on cylinder side of loco.
- Form bell and whistle "cords" with ultra-fine wire. Use fingers to create a gentle curve. These may terminate at the cab front, or you can extend them into the cab interior and notch the roof insert to clear.

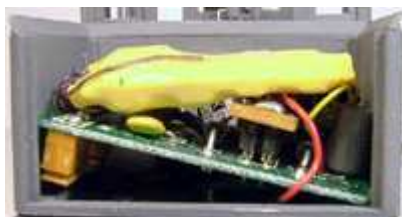


Plan for Sound Components & Assemble Tender

- ★ **Additional weight recommended:** For best operation, we recommend adding weight to the right (cylinder) side of loco. If possible, allow room for weight in tender. Ideally, you'll add 1/4 oz. to fuel bunk as noted below plus an additional 1/2 oz. inside tender or cab on right side. Sheet lead may be helpful in tight spaces.
- ★ **"Factory Sound":** As noted, this kit was designed prior to the release of the HO Shay w/ factory-installed sound. Fitting the electronic components included with that loco may require some alteration to kit. Electronics could be extended into cab, and optional cab doors mounted in the closed position. A taller fuel bunker could be built to replace or extend the tender top and allow increased vertical space.

Boulder Valley Models #255 Silver City Sidewinder 16-ton Shay Assembly Instructions

- ★ **DC-only or "simple" DCC:** You can re-use the original circuit board ... but the light should be re-wired and relocated to illuminate rear light on kit tender. For DCC, you can retain the original circuit board, plug decoder into 8-pin plug and relocate light.
- ★ **"Hard-wired" DCC:** To increase available space, you can eliminate the original circuit board and solder the wires to a female 8-pin connector. Trace the wires on circuit board to determine which wire goes to which pin on plug. **MAKE SURE** to enlarge L-shape opening in deck so body assembly can be removed and clear any alternate connector!



- ★ **AT LEFT:** Original PC board, small Soundtraxx decoder, 3/4" dia. or 1/2x1" speaker.
- ★ **ABOVE RIGHT:** PC board omitted; small Soundtraxx decoder; larger 3/4 x 1-1/2" speaker and two 1/4 oz weights. This version requires "hard-wiring" female 8-pin plug.
- ★ **Speakers:** Soundtraxx shown; various types may be used. 3/4" round or 1/2 x 1" oval will fit with original circuit board., 3/4 x 1-1/2" oval will fit if PC board is omitted.



- **IMPORTANT:** Check available space, test fit desired components and complete your "electronics" planning BEFORE completing assembly of tender.
- **Pre-drill tender shell and deck:** Look inside tender shell (Part 4) and notice two small dimples on the lip at either side. Drill #60 holes thru these dimples. Place shell on deck behind cab with double-sided tape; double-check position and drill thru these holes into deck. Remove tender shell and enlarge holes in deck **ONLY** with 1/16" drill.
- Turn tender shell upside-down and tap a #0 x 1/8" screw (Part 5d) into each of the holes, from bottom. Avoid putting excess pressure to delicate flared lip at top of shell. Remove screws and set aside for final assembly.

- Opening in tender front (Part 8c) will fit a 1/2 x 1" oval speaker. Cut out scribed arcs for 3/4" round speaker or larger opening for larger oval.
- Test fit tender front to tender shell; position rivets at top; glue in place.
- Test fit tender top (Part 8d) with beveled edges down. File as needed for good fit; glue in place. Add bead of gap-filling ACC to fill seam if desired.
- Use ultra-fine wire to form handle for water hatch (Part 2m) as shown; drill #80 holes and glue in handle in place.
- We suggest painting the fuel bunk (Part 1h) separately and placing during final assembly. Loosely place fuel bunk to determine space available on tender top. Determine location of water hatch and headlight bracket (left rear) and glue those in place as shown. Set aside fuel bunk.
- We placed grab-iron stanchions 2'6" scale apart; mark desired locations. Pre-drill two stanchions and trim backing;



align holes for wire and glue in place. Cut fine wire to fit. Repeat for second grab-iron.

- Drill #75 hole in bottom of each funnel on rear sander (Part 10d). Test fit against straps (Part 10e) -- note that straps should align with molded detail on sander and rivets on straps should face outward. Glue sander to straps; use slow ACC and check alignment before glue sets. Glue completed sander to rear of tender as shown. Outlet pipes can be added after final assembly of loco.
- Select coal load (Part 10c) or wood load (Part 10b) for fuel bunk ... or use plain top (Part 10a) and add your own fuel. Test fit selected top. Set aside top and bunk to paint separately.



Final prep

- **Roof prep:** Test fit roof insert (Part 8a) in top of cab; file edges if overlay snug. Carefully center roof insert on bottom of roof form. Use slow setting glue to allow time for proper alignment.
- Cut opening in roof overlay (Part 11c) as shown on page 2 of Parts Listing. Test fit on roof form (Part 3h). This piece may be glued in place now or set aside to paint separately. Test fit roof hatch (Part 8b); file bottom of front edge for desired mounting angle and set aside to be painted separately.



- **Headlight prep:** Use fine wire to form headlight door handles as shown; drill #75 hole in circle on left side; glue in place. We suggest pre-drilling holes for LED's in back (or bottom) of headlights. Fit LED; fit headlight to locomotive and drill matching holes in smokebox and tender shell for leads. Trim out headlight bezels (Part 7g); remove LED's from headlights. Set aside headlights and bezels to paint separately.



- **Door prep:** Trim out doors (Part 3ef) and test fit. Lips on two sides of door allow for "closed" mounting. Trim away lips for "open" mounting. Form handles (left/right) from fine wire; drill #75 holes; glue handles.
- **Window prep:** Use knife edge to scratch wood grain into back of each window; trim out center of each window; trim around window. Set aside windows to paint separately.



- **Tender fuel boards:** Trim out boards, test fit on front of tender; set aside to paint separately.
- ★ **IMPORTANT:** When body assembly is removed from chassis, be **VERY MINDFUL** of all the delicate details and support body appropriately and carefully during handling/painting. Wood scraps may be helpful to prop body for painting; and to support body prior to reassembly.



- **Remove body:** Remove front truck; lift electrical contact; remove boiler-mounting screw; replace front truck. Remove rear truck; remove rear drawbar screw (brass); replace rear truck. Gently lift rear of body assembly; feed connectors thru deck; slide body forward to clear front coupler lip. Remove body. Set aside boiler and drawbar screws.
- Invert body and add ACC to joint between smokebox inlet (Part 8g) and deck -- indicated by yellow arrow above right.



Boulder Valley Models #255 Silver City Sidewinder 16-ton Shay Assembly Instructions

- Add side steps:** Trim out center of side steps (Part 9b); carefully trim around steps to remove from backing. Position step so front edge is even with edge of deck; glue in place; cut short lengths of flat brass strip (Part 11k) to form braces; glue in place as shown; repeat for second step. Be specially mindful of these DELICATE parts when handling body for painting and reassembly.



- At this point we had painted the following as separate components: body assembly (removed from chassis), roof & hatch, smokebox front, number board, cylinder exhaust pipes, stack cap, doors, windows, headlights & bezels, tender shell, fuel bunk & load, fuel boards. We also dry-brushed the trucks & cylinders on mechanism prior to reassembly.



Painting & Final Assembly

- ★ **Important:** Allow paint to dry between coats; allow paint to fully dry before final assembly. We used a basecoat of Krylon primer, followed by flat black and a light overspray of Model Master FS36081 Euro 1 Gray to create a dark charcoal gray finish. Most detail items were brush-painted with various Polly S paints. A variety of painting and weathering techniques are illustrated on our web site.

- ★ **Handle carefully** during detail painting and final assembly; be mindful of the various delicate details.

- ★ Read following steps; final details may be installed before or after body is replaced on mechanism.

- Install connectors for LED lights (not included) and finalize your DCC selections.

- Angle body assembly over front coupler lip. Feed headlight wires thru boiler; feed electrical connectors thru hole in deck and make sure body is properly seated. Remove front truck; install #0 x 3/16" screw thru hole next to bolster to secure boiler. Install front coupler; replace front truck.



- Remove rear truck; install #2 x 1/4" hole thru drawbar to secure rear deck. Use #0 x 3/16" screw to install rear coupler; replace rear truck.

- Glue cylinder exhaust pipes in place; for Shay-style stack, glue cap in place; add decal or dry-transfer number (not included) to number board; glue number board in place.

- Paint backhead knobs. Install window glazing in cab; use a clear-drying adhesive like Micro-Scale Kristal Kleer. For a "pro" finish, we cut window glazing slightly smaller than window opening, then applied a bead of Kristal Kleer around the edge of opening and "floated" the glazing in place.

- Use pieces of ultra fine wire to form props for roof hatch; test fit with hatch. Paint props; glue roof hatch in place.

- Additional weight** (not included): We suggest adding 1/2 oz. or more to right side (cylinder side) of



locomotive. Install in tender, fuel bunk, cab, etc.

- Install fuel boards on front of tender -- leave SPACES between boards as shown if mounting speaker in tender. Add fuel bunk and load. Set DCC/sound components in place and test. Add connectors for rear light; install rear light. Tuck components into tender shell. Screw tender shell in place with four #0 x 1/4" screws beneath deck.

- Connect wires to front headlight; press-fit smokebox front (do NOT glue).

- ★ Congratulations! You've just built a great little Shay for your On30 railroad! PS -- The Artista #1306 "Brakeman Holding on" makes a great engineer for this loco.



Disassembly of On30 Shay for servicing

- ★ Follow these steps if you need to disassemble your On30 Shay for repair. Carefully support the finished model to avoid damaging delicate details.

- To access electronics, remove screws securing tender to deck. If you need to remove the body to access motor and drive, disconnect electronics and set aside.

- Remove front coupler, cover plate and screw. Remove drawbar and screws from underside behind rear truck. (It may be easiest to remove rear truck to access these.)

- Remove front truck; lift electrical contact wiper; remove boiler mounting screw.

- Remove smokebox front and disconnect wires from headlight.

- Lift rear of body assembly and feed orange connectors thru opening in deck. Slide body assembly forward slightly to clear coupler-mounting lug on front of chassis. Remove body assembly from chassis. Set body assembly aside using some support beneath center to avoid bowing.

- Service chassis as needed and reverse steps to reassemble.

- ★ Boulder Valley Models is owned & operated by Dallas Mallerich -- an On30 modeler who shares your interests and enthusiasm. Please feel free to write or email with any questions or ideas that you may have! Thank you for your continued support, interest, ideas and encouragement! -- Dallas

Boulder Valley Models

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