

Battery Upgrade

I have completed my upgrade to 4 6V Lifeline Batteries. As others have stated, this is a big project. A lot of research has gone into this and I have received help from many forum members. Thank you for the experience. I am posting so that others can improve on the knowledge base. I was dissuaded from going to Lithium due to expense and the lack of data on lithium longevity with the stock charging system and once I priced out the other upgrades, felt that I don't have the time to do this on my own. RV Season is here!

Much has been written about the perceived lack of safety margin for the OEM style battery cases with the larger/heavier 6V batteries. I initially investigated custom boxes and thanks to Boxster's excellent work and input decided to make my own setup. I purchased two new OEM battery boxes, removed the old boxes by drilling 1/8 to 1/4 inch into the top of the rivets with a .250 inch drill and then using a cold chisel to pop the dome off the rivets. The shank was pushed into the hole and it fell into the recesses of the vehicle to be uncovered when it will be scrapped at some point in the future. I inspected the holes for size and shape since I would be reusing some of them and did not want the new rivets to pull through due to oversized or out of shape hole.

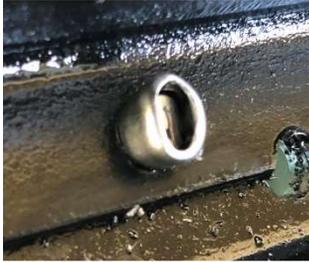
The battery boxes were modified by a hot rod shop that cut the boxes/covers in halves. They lap welded in a 3 inch wide steel sheet of identical gage material to increase the tray widths to accommodate the new 6V bats. This dimension was ~7.2 inches. The trays were painted and then I added seam sealer on all non-welded seams and repainted.



Before I installed the trays back in the coach I investigated the rivets and the technique to install them. I have pictures of the TRI-Fold steel rivets used by AS, Stainless steel rivets and the aluminum ones supplied with the inexpensive tool from Harbor Freight. The effort to install the rivets with the tool from HF was acceptable but I did find that the SS rivets were much harder. After inspecting the back side of the rivet (the part that holds the trays in the coach) I decided to stay with the TRI-Fold rivet due to the larger contact with the sheet metal. If this sheet were thicker, I may have made a different choice but with the thinner metal on the coach, I felt that the larger contact area would provide better pull out protection than the SS rivets even though the SS rivets have greater clamping and shear strength. The greater clamping may start to pull the rivet through the hole. I have no way of knowing

this without taking a cross-section. I also decided to add a seventh rivet to hold the trays in.

Stainless Steel



Steel Tri-Fold



Aluminum



Drivers Side Trays installed, Note 7th rivet in middle of tray. Gray is seam sealer to keep out moisture



aluminum angle.

I do not think this was needed but why not. I knew that I would add a secondary support to this install and finally settled on an approach that would counter the added weight and increased moment imparted to the tray attachment rivets. I used an aluminum angle (spanning both batteries on each side) to catch the front edge of the batteries and supported this through a turnbuckle that terminates to an eye bolt that is bolted to a stiffener rib on the underside of the floor. A second eye bolt is attached to the

Eye bolt installed on floor rib. Two aluminum backing plates



The eye bolt uses two backing plates that capture the rib. Once the batteries were installed, it was gravely evident that the coach sheet metal would flex a very noticeable amount. It is no wonder that these rivets may pull out under the dynamic load of these heavier batteries. Add compromised holes, lower strength rivets or poor riveting techniques and “battery detaches on the highway”.

As I adjusted the turnbuckles to support the front edge of the batteries, it was clearly evident that the panel flexing was eliminated. You really do not need to carry the whole weight of the battery, just enough to reduce the load on the fasteners to an “acceptable” amount. The turnbuckle is secured with a jam nut at the top of the assembly to prevent it from turning.



I installed the tray covers but I am not 100% happy with these. The covers do not come together completely due to the taller battery but also because of the molded handle standoffs on the battery. I am going to think about an alternate approach to ensure the covers will not loosen while on the road. I am not relying on the aluminum angle to hold the batteries in.



Front side of Rivet, Stainless, tri-fold and aluminum from left to right



Blind side of rivet, SS, Tri-fold and AL from left to right

Trial to Shear off Rivet

