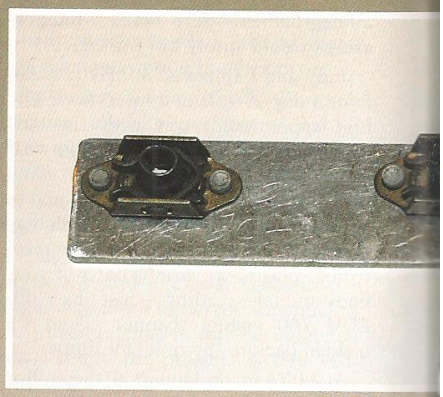
Feature

An Easier Way: Nut Plate Strip for Mounting Main Landing Gear Doors



by David Clark, ICS #8592, AP

If you have ever removed the main landing gear doors on a Comanche, either to work on the hinges or to repair a crack, etc., and then wished to re-install the doors, you know how difficult it can be to get the nuts started on the three attaching screws. With the airplane on jacks and the gear retracted to get the strut out of the way, you must hold a washer and a nut between your fingertips in an impossibly narrow cranny trying to thread them on the screw while working blind. A mirror only seems to get in the way and offers little help. This can be a very frustrating chore.

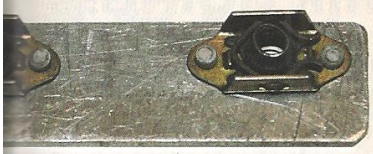
Thinking that there should be an easier way, I fabricated a small aluminum strip with nut plates mounted on it that could be dropped into the deep narrow slot up in the gear well. Then by using a scratch awl or a drift pushed in from the bottom, and after slipping the door hinge in place, I could easily line up the hinge and the nut plate with the external holes. After that, it was no problem to get one of the screws started which then automatically lined up the other two nut plates. Using this strip certainly made it easier and much quicker to re-install the main gear doors after their removal.

How it is made:

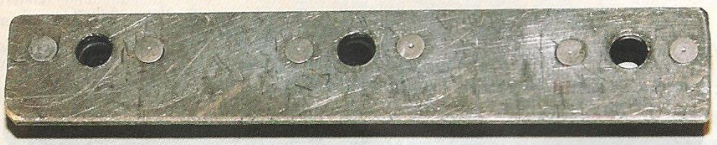
The strip itself needs three nut plates mounted on it to accommodate the three #10 screws normally used to hold the gear door hinge in place. It took me about an hour to make the two prototypes, one for each door. I cut a piece of scrap aluminum making it 0.75 inches wide by 4.5 inches long, and then placed it in the deep recess where the nuts and washers are normally screwed on. While holding it in place, I went through the external screw holes in the wing with a scribe and marked the nut plate hole locations on the strip. Following that, I removed the strip from the airplane and drilled the screw holes required for the nut plates. I then re-inserted it in the wing and made sure that all three screws would line up properly with the new holes. I then drilled the smaller lateral holes for the rivets used to secure the nut plates on the strip. I used a counter-sinking tool on the rivet holes because I planned to hand squeeze counter-sunk rivets.

I discovered that I would need some slightly longer #10 screws than the original ones, because the strip adds one additional layer of metal for the screws to traverse. I also learned that the screws do not all pass through the same number of layers of wing structure along with the hinge. In addition, in the original setup, Piper used a screw with a grip on it and then "custom fit" it to each screw hole by using an appropriate number of washers to keep the

Nut Plate Strip, top view.



Nut Plate Strip, bottom view.



screw grip from bottoming out. Because I used nut plates, I couldn't use washers, and it was much easier to use full thread screws of adequate length. This did not present a problem, however, since the screws themselves are not used specifically to line up the structures through which they pass, but rather to hold the hinge in place by sandwiching it between two layers of aluminum sheet. Thus there is no need to have a grip on the screws.