



# TECHNICAL TIPS

## ON THE SUNBEAM TIGER

March 1999

### Rear Spring Mount Failures and Repairs

Last month we showed you a teaser picture of a typical cracked rear spring mount in a Tiger about to undergo structural repairs. That picture and others are shown on this page in their original “as found” condition.

Figure 1 shows an “as found” shot of the inside of the spring hanger. It’s hard to spot the damage with all the road grime and undercoating. In Figure 2, you can see the separated metal inside the spring hangers and Figure 3 shows a crack in the triangular shaped tie plate.



Figure 1. Inner Tie Plate Fracture

The structural faults depicted here include complete cracking and failure of the inner tie plates, substantial cracking of the triangular tie plate to the perimeter of the floor pan, and failure of the welds inside the spring hanger that tie the rear sub frame to the X member.



Figure 3. Crack in Triangular Gusset Plate

Failures of this nature are not at all uncommon and their occurrences seem to be increasing. This leads us to the conclusion that every owner ought to do a through examination of these areas the next time their Tiger is up on a rack for service. While catastrophic failures which would cause lack of control are not a likely scenario, once the damage starts, it continues to get worse with use. The more horsepower you attempt to put on the ground and the harder you use your Tiger the more likely it becomes that you have or will have this kind of damage.

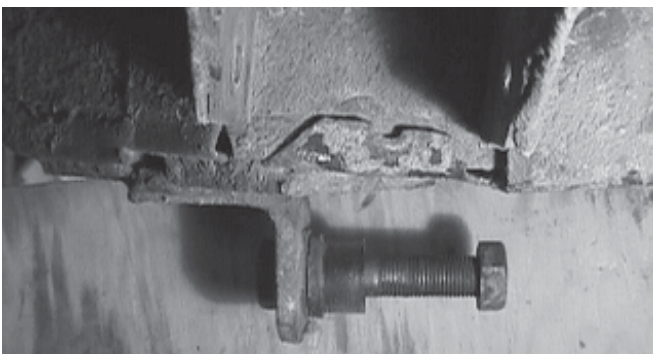


Figure 2. Broken Weld Inside Spring Hanger

It doesn’t take a lot of use before this damage shows up; I first found and repaired some of these same cracks when I first installed traction bars on my Tiger in 1969.

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In Figure 4 we have the recommended method to get at these areas in order to make the optimum repairs. The rotisserie is not a necessity, but it sure makes for a better repair process. The ability to thoroughly clean the chassis and to weld in comfortable positions can make a world of difference to the quality of the job.



Figure 4. Tiger on the Rotisserie

Now that we've got the bottom of the Tiger accessible, a through cleaning is in order. The undercoating is removed most easily with a propane torch, a putty knife, and a wire brush. At that point, your preference of paint remover (Jasco chemical stripper or a wire brush) gets you down to bare metal.

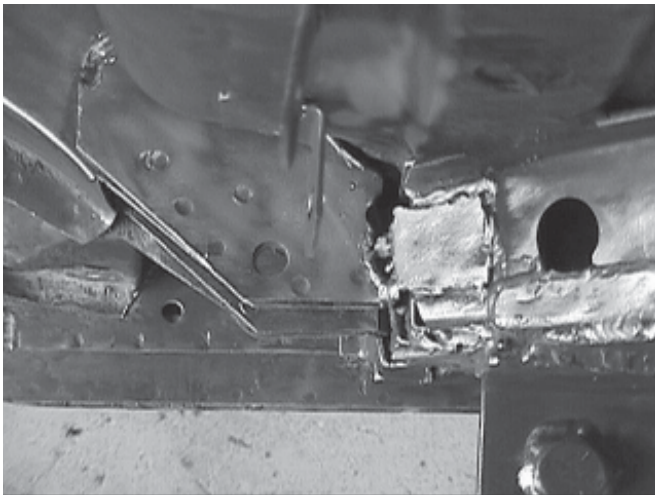


Figure 5. Broken Inner Tie Plate

Now we can really see what's been going on!. Figure 5 shows the clear separation of the inner tie plate with a gap of about a quarter inch. Careful observers will also observe the gap above the spring mount where the rear sub-frame is beginning to pull away from the floor pan. This damage was detected just in time to prevent severe dislocation problems.

Figure 6 indicates the crack on the opposite side which has not moved as far from it's original location.

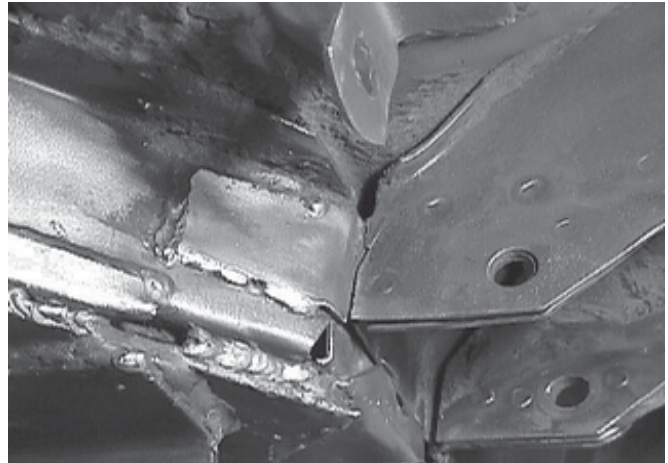


Figure 6. Tie Plate Failure on the other side

Figure 7 shows the failed weld inside the mount between the vertical wall of the spring hanger. Look closely and you'll also see the crack in the triangular plate. You can also see in these shots, a reinforcing plate that was added to remount the "Weld on" traction bars. If you find damage to this area and intend to re-install the bars, appropriate repairs not covered here are recommended.

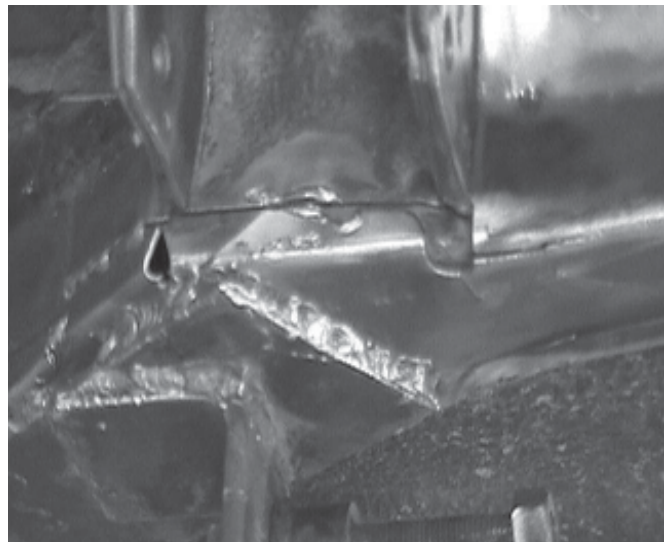


Figure 7. Cracked Gusset Plate

Moving inside the body, Figure 8 is an "as found" photo of the spot welds that hold the front of the rear sub frame to the floor pan. Don't see much in this photograph? Wait till we get this area cleaned up.

In Figure 9 and 10 we've done our cleaning and have circled the spot welds we found connecting the floor pan to the rear sub-frame.



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Figure 8. The "Other Side" of the spring mount

We're up into the high teens in weld count and careful observation of the inside weld group indicates major sheet-metal failures on both sides of the chassis.

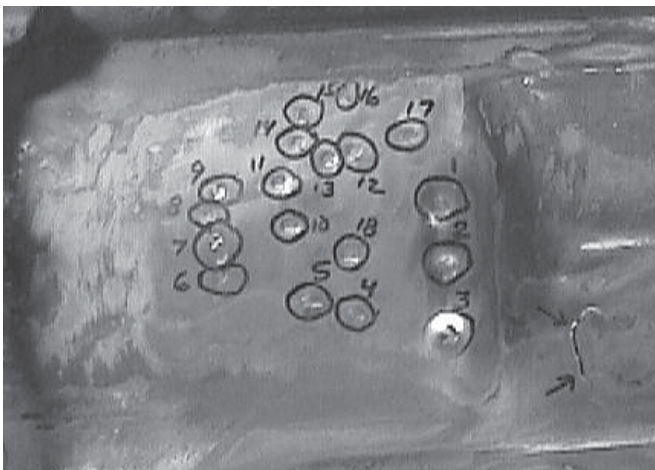


Figure 9. This is the same area after cleanup

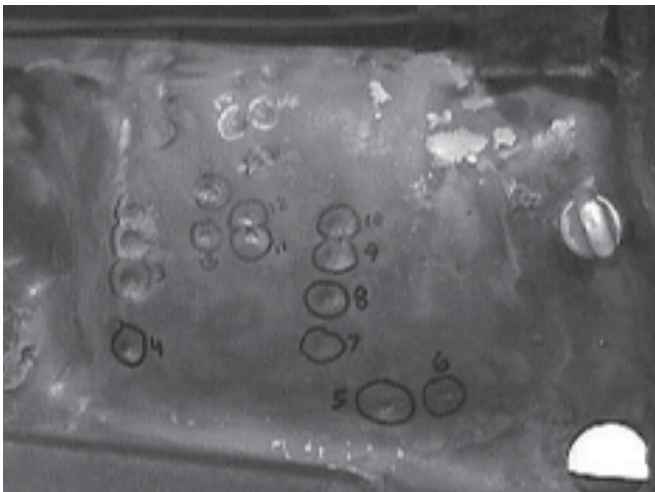


Figure 10. The Left side Spot Welds to the Sub Frame

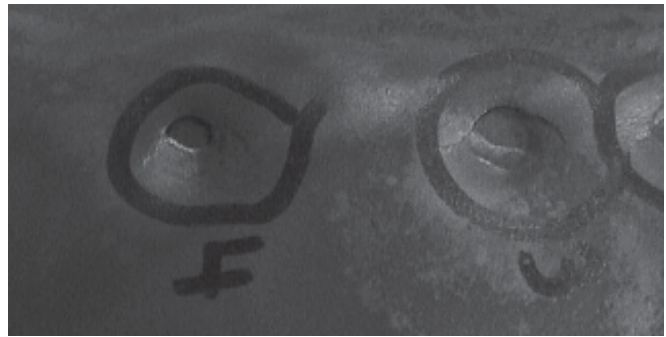


Figure 11. Closeup of Fractured Spot Welds

Figure 11 is a close-up of one of these areas. The tearing of the floor pan at the perimeter of the spot welds is obvious with the worst damage at the bottom.

The Tiger Chassis was essentially manufactured from assembled sub-components welded together to create the complete unibody. The Spring Mount Area under examination here, is a major structural hinge point between the rear sub frame and the central X shaped stiffening frame. This "hinge" allows the minor movements which eventually lead to metal fatigue failures. When the Tie plates and welds in this area fail, relative component relocation is to be expected. The judgment of how far the chassis sub-components have moved and the decision to attempt to return them to the original location is left to the observer on a case by case basis. In this instance, the repairs will be made without attempts at component relocation.

The recommended repair methodology for this kind of sheet-metal failure begins with TIG or MIG welding at the edge of the rear sub-frame flange to the floor pan from the bottom and plug welding the failed spot welds from the top. A low or pulsed weld heat should be used to prevent burning through the floor pan (except at the plug welds). A skip welding technique would be preferred to continuous welding.

Figures 12 and 13 show the proposed reinforcements to be added over the repaired areas. The pieces shown here are cardboard templates. When these pieces are made they will be cut from a mild steel stock from 0.108 to 0.120 thick (12 and 11 gage). They will also be cut with several 3/4" diameter holes to allow for plug welding to the sides of the frame sections. Again, skip welds would be preferred.

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Keep in mind that you're going to have to drill the two 7/16" holes for the spring mounting bolts. It's pretty easy to drill the outer hole from the inside of the chassis by going through the existing holes, but unless you have a right angle drill handy, the inside reinforcing plate should be marked, drilled and aligned with the existing hole before you weld it into location.

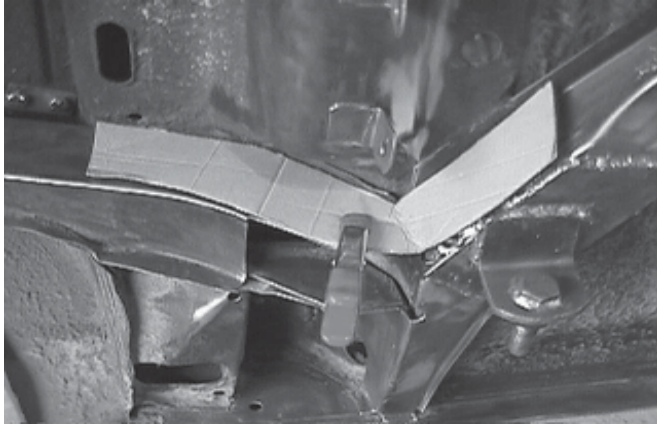


Figure 12. "New" Inner Tie Plate

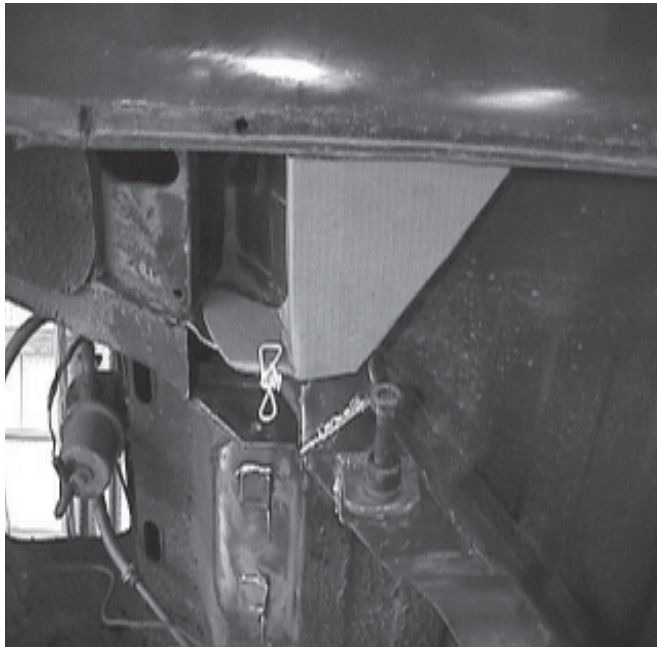


Figure 13. "New" triangular exterior plate

The new plate simulations shown should give a substantially increased load bearing area to prevent further damage to this chassis. It's a good idea to get the base metal in the area of your welds good and clean, free from rust. The minimum should be a good wire brushing. The cleaner your weld areas are, the better your welds are likely to be.

The standard safety lecture applies to this project. Make sure that you remove all trim, insulation and similar combustable and flammable in the work area before you apply heat or welding techniques. You don't want to burn up your Tiger in the process of trying to repair it.

Hopefully next month we'll have some shots of the actual repair pieces and installation.

Tom Hall

