

THE BUBBLES THAT CRIPPLED A KING:

2002 TOYOTA LANDCRUISER SAHARA SERIES 100 IGNITION SWITCH SHAFT FRACTURE. Dr H. Holden. 2015.

In my view the Toyota LandCruiser is the “King Of The Road”. Most people who have owned one would probably agree. We bought our beloved LandCruiser Sahara in 2002.

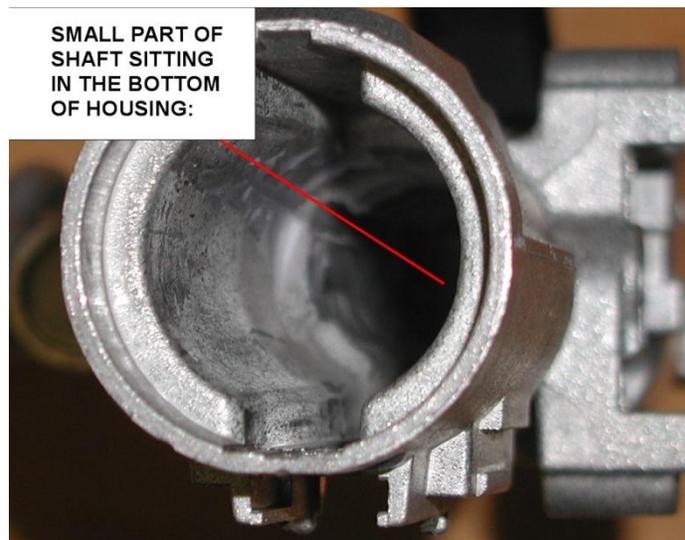
I was convinced from the physical design, safety features and mass of the vehicle that it provided a satisfactory level of protection for myself and my family well beyond that of an ordinary sedan. The vehicle had been astonishingly reliable. Over this past 13 years the only failures it had experienced were not the fault of the vehicle, a failed battery for example. Toyota Electronics is very reliable too, the only failure being the electric radio antenna due to normal wear. Also I had kept the vehicle in good order myself with regular oil & filter and coolant changes.

So I was astonished when the vehicle failed stranding my wife and I (luckily only at the local shops) and had to be towed home. The ignition key and barrel assembly had suddenly lost mechanical coupling with the electrical part of the ignition switch. A photo below shows the car on the back of an RACQ tow truck. A sad sight for such a great machine:



Once the vehicle was home I disassembled the fascia panel under the steering and ignition lock area. The Key and lock barrel were easy to remove by pushing on a pin in a hole on the top of the housing. The electrical switch in the rear is removed by undoing two screws. Then I reached in with long nosed pliers and pulled out the shaft linking the lock barrel to the electrical part of the ignition switch. The shaft had fractured in two and the smaller part of it remained in the bottom of the housing.

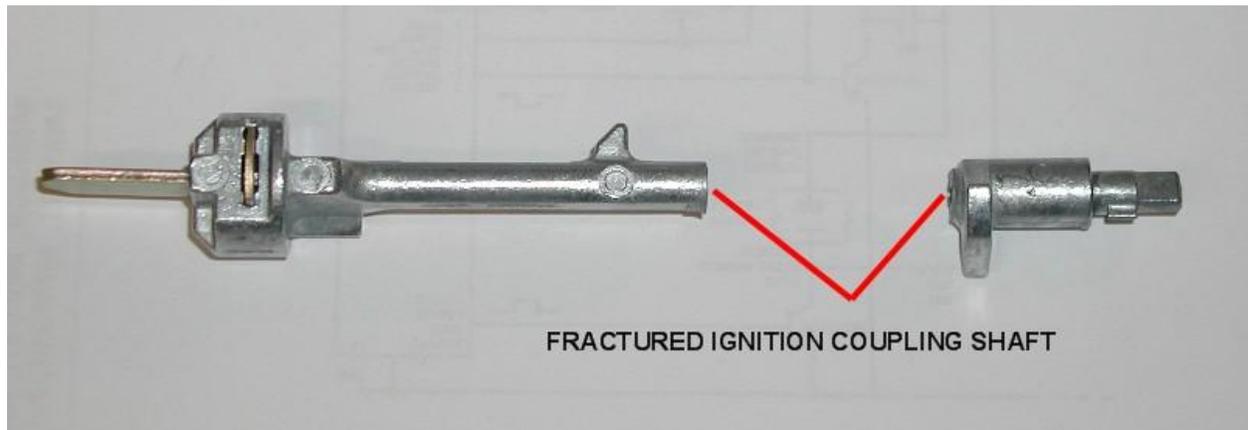
On attempting to remove the smaller section of shaft from the bottom of the housing it simply tipped over onto its side and remained loose at the bottom of the housing. It was well out of reach of any long nosed pliers and also it is made of non magnetic material:



So a Snare was improvised from some brass tube and copper wire to retrieve it:



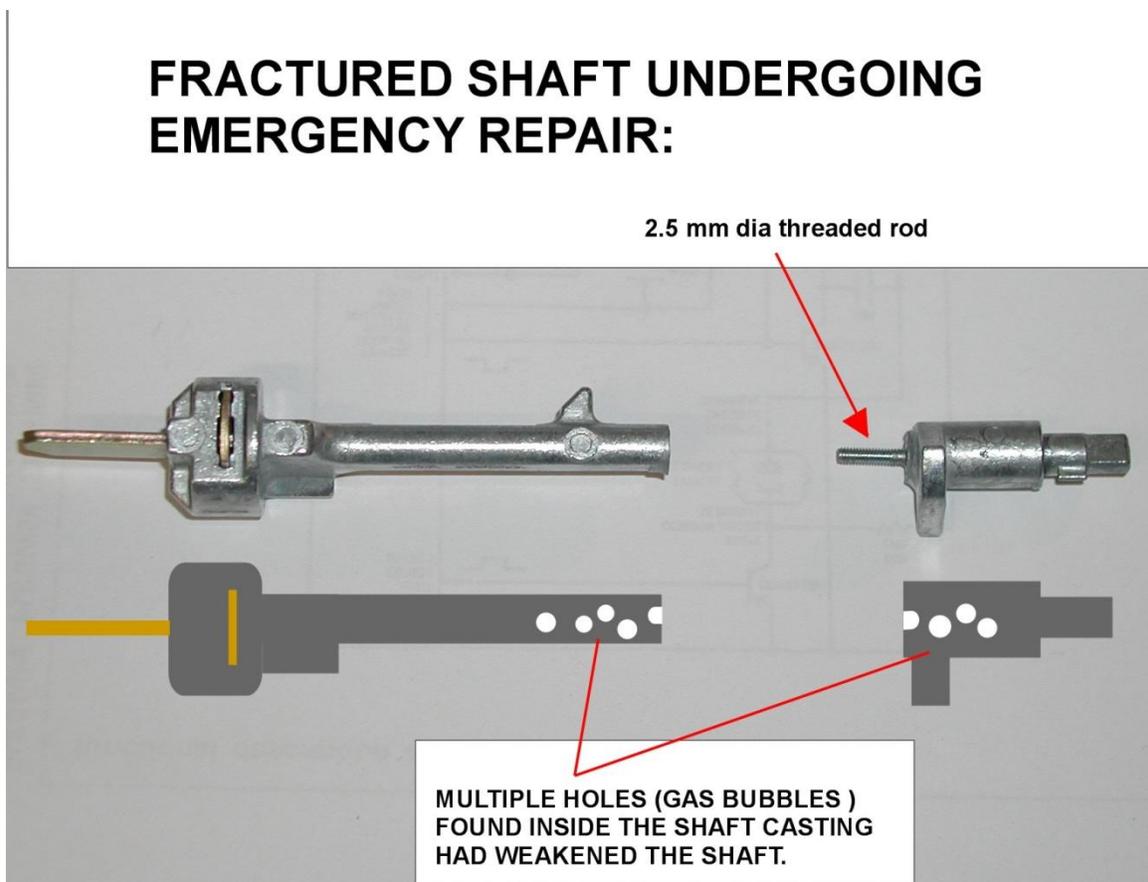
The small part of the broken shaft is the part that has a cam on it to operate the steering wheel lock and it also projects out of the rear housing to operate the electrical part of the ignition switch (which also must be removed to replace the shaft). There was a keyway on it which provided a convenient place to put the snare wire around it:



Once the small part was removed I decided to repair the shaft as I did not know how long it would take to get the replacement part. I drilled the shaft and fitted a steel 2.5 mm diameter x 20 mm long threaded rod with liberal application of epoxy resin on the threads.

On drilling the shaft and inspecting the holes and threads I had cut I found the reason why the shaft had fractured in the first place. There was a problem with the casting and the shaft was compromised by multiple internal cavities. This had weakened it and allowed it to fracture.

So this was in fact a manufacturing fault, not a design fault. I do not believe this shaft would have fractured if it were not for the many bubbles. Presumably there were some impurities in the metal that evolved gas during the casting:



Repaired shaft:

**SHAFT # REPAIRED WITH INTERNAL 2.5mm x 20 mm
LONG INTERNAL METRIC THREADED STEEL ROD AND
HIGH STRENGTH 24 Hr EPOXY RESIN.**



It is a much more satisfactory solution to replace just the fractured shaft, as otherwise the whole housing needs to be removed from the steering column. This is held on by SHEAR BOLTS. After they are tightened at the factory they have their heads sheared off. This means it is a painful process to drill them out and use Ezy -Outs. These sorts of "security features" were designed to stop car thieves undoing the housing, releasing the steering lock & stealing the car, but like many security features they in fact end up inconveniencing the owner or the service engineers when making repairs.

Unfortunately it is not possible to buy just the shaft from Toyota. The shaft comes complete with a new housing. However when I contacted the local Ken Mills Toyota dealership in Maroochydore the service & parts centre were very helpful and able to acquire a new shaft & housing assembly for me within 24Hrs. Not only that the price

was quite reasonable at \$217 for the whole assembly, but I only used the actual coupling shaft and left the original housing in place to avoid having to remove the shear bolts.

I have the repaired shaft as a spare, but I would have assumed Toyota would know about this problem by now and that the replacement parts would be free from bubbles in the casting.

So, have I ever regretted buying the LandCruiser Sahara ? The answer is no, it has exceeded my expectations and has been and still is a wonderful vehicle. And I would recommend the vehicle to anyone.

However, if you plan to take your series 100 LandCruiser to the Outback of Australia, or to a very remote place, and it is a similar year to my car, I would recommend sending it in to your Toyota service agents or you local mechanic and having this ignition shaft replaced or you might end up stranded.
