

Škoda Yeti Panoramic Sunroof Leak

Summary

This article describes locating and rectifying a catastrophic water leak into the nearside passenger compartment of a six year old Škoda Yeti, which had a standard-fit panoramic sunroof.

The leak was traced to the NSF corner of the sunroof by removing the top of the NSF door seal and the NSF screen pillar trim.

Subsequent removal of the headlining and testing of the sunroof showed the cause to be failure of the seal between the aluminium channel forming the nearside of the sunroof frame, and the plastic channel forming the front of the sunroof frame.

The sunroof was removed from the car in order to run a penetrating sealer vertically down into the defective join, using a syringe and needle. Upon re-fitting the sunroof, the remediation was found to be successful, however the corresponding join on the offside front had been compromised, presumably because of the mechanical trauma inflicted on the structure during re-fitting.

The offside join was subsequently sealed successfully with the sunroof in-situ, using the same method.

Experience showed that (once correctly identified) a repair could have been effected without any dismantling, although the seats, carpet and underlay were subsequently removed in order to dry them properly.

Introduction

Let's start from the beginning. This tale relates to a six year old Yeti Elegance which I'd just bought in the knowledge that it had an existing water leak into the nearside of the passenger compartment. The leak was catastrophic – I wet-vac'd over 5 litres from the NSF and NSR footwells. From the weight (more of that later) I'd estimate there was a similar volume of water in the 'soft furnishings'. There was however no ingress into the offside of the passenger compartment, or into the rear load-space.

Pulling the top of the NSF door sealing rubber down from the top showed the NSF corner of the sunroof to be the culprit. This was further confirmed by easing the N/S screen pillar trim back – everything behind it – the curtain air bag, the wiring, the drain tube and the screen pillar were all very wet.

Because I had just acquired the vehicle, I had no knowledge of how long the problem had pre-existed, but subsequent dismantling of the interior (see below) revealed that the leak, despite its severity had caused no underlying deterioration of the vehicle.

Initial Investigation

Running water into the front corner of the open sunroof showed there were no issues with the drain tube – it was capable of egressing water at a far higher rate than it could possibly enter the roof void in normal service.

I removed the headlining from the vehicle, and witness marks on the headlining and the NSF screen pillar trim collectively showed them to have funnelled the leak across to the NSF screen pillar, down the screen pillar, to the far left of the dashboard and into the NSF footwell. Drips were visible to the left and below the glove box when running a hose over the roof.

Digging deeper, I removed the headlining, and it was clear that the point from which the leak emanated was some ~60mm *inboard* of the drain tube, as shown in Figure 1 below (apologies for the poor quality).

Clearly then the much-villified drain tube wasn't the bad guy.

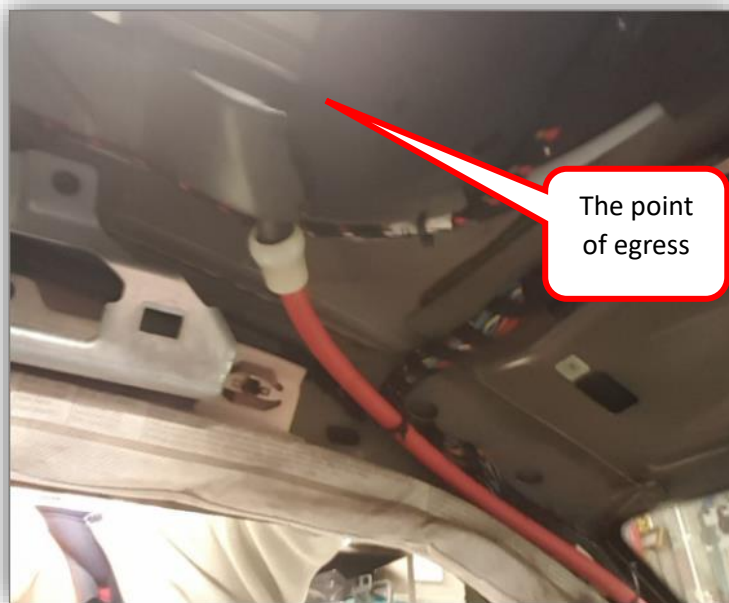


Figure 1: Picture looking up at the NSF corner of the sunroof from the inside

Analysis and Testing

I removed the drain tube and plugged the stub, so I could 'pond' water into this part of the roof, and get a clearer understanding of where the problem was. The drip started at the point when the water breached the interface between the plastic and the aluminium – see Figure 2 below.

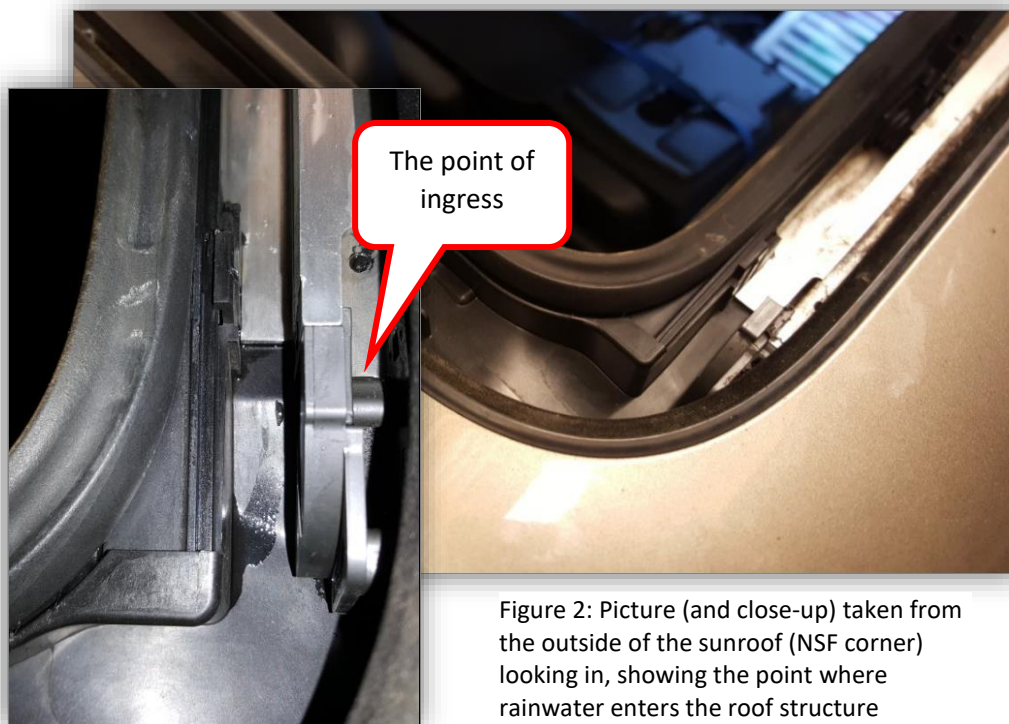


Figure 2: Picture (and close-up) taken from the outside of the sunroof (NSF corner) looking in, showing the point where rainwater enters the roof structure

Now let's have a sense-check. Surely if the drain tube was working effectively, water would never 'pond' up to this point? Yes, you'd be right in thinking that, *however* this area is constantly wetted by the rainwater draining past it. If the seal between the two components is compromised, capillary action *will* draw water into the interface between the plastic and the aluminium. Once it's entered, it follows a path through the structure, exiting at the point shown in Figure 1 above.

Let me talk briefly then about the structure of the sunroof. Think of it as a picture frame, with two aluminium side channels carrying the glass, and front and rear plastic channels which join the aluminium channels together, carry the electric motors and provide the drainage function. In profile, each aluminium channel is like a capital 'E', lying on its back, and hence forming the two separated channels you may pick out in Figure 2 above. Rainwater runs down the outside channel into the plastic channel where gravity will run it down the drain tube. I hope that all makes sense?

I appreciate this is just a car, not a passenger jet, but it was quickly apparent that we're looking at a design disaster here. Attempting to form a water-tight join between plastic and aluminium components, both of which are load-bearing, at such a critical part of the structure will, in mass production have only one outcome. And you're reading about it.

Effecting the Repair

So, how to fix it? The first question was what to use to seal the joint? Using any kind of silicone/mastic etc. was a non-starter. Firstly gaining access to the affected area with any kind of nozzle was impossible. Secondly, any build-up of sealer would restrict the flow of water, causing it to build up around the repair, and inevitably weeping past it.

After a bit of research, I found a product called *Captain Tolley's Penetrating Sealer*. This is an emulsion based copolymer product, with a very low viscosity, (and hence excellent penetrating properties) which has good adhesion and remains flexible once set. If you're interested, [here is a link to their website](#) and [here's the spec. sheet](#) for the product.



Figure 3: Captain Tolley's Penetrating Sealer

Because of the access restriction, I elected to remove the sunroof from the car, and stand it on end to run the sealer down directly into the crack. Removing the roof on your own isn't easy, but with some tackle and common sense, it doesn't take too long.

Handling the roof once it's out though is another matter though. Once again, its poor design means that it has little structural integrity when it's not screwed into the car. I improvised a frame to support it once it was out, allowing me to stand it on end, and run the sealer directly down into the gap using a 1ml syringe and drawing-needle.

The viscosity of the sealer is very low. It will run through the crack and out of the other side before you know it, so I applied six or eight separate treatments over the course of three or four days, allowing the sealer to cure properly and build up after each successive treatment.

When I reached the point that the gap was fully sealed (i.e. no more sealer was drawn into the join), and it had dried fully, I tested the integrity of each of the four corners by plugging the drain tubes, and running water into each corner to ensure that it retained the water. The testing was done before re-fitting the sunroof to the car - see Figure 4 below.



Figure 4: Testing all four corners of the roof for leakage before re-fitting

Now let's move on swiftly ...

I re-fitted the roof, connected the four drain tubes and left the car out in the rain. The repair was sound, however this time, a new leak appeared from the *offside* front corner. About as severe as if the roof had been left wide open. Clearly the 'trauma' of re-fitting the roof had compromised the already-marginal sealer on the other side. Figure 5 below captures 3 drips of water in a chain. Consider that one drip per second amounts to ~3 litres in a 24 hour period, leaving it out in the rain for a week won't end well.

It was apparent that the roof, in isolation from the car, was even more frail than I had envisaged, and so it was probably better to attempt sealing the O/S without removing the roof again. I cleaned and dried the OSF corner, blew it dry using an airline, and then administered the sealer using the syringe. This time of course the roof was horizontal not vertical, but the syringe enabled me to deliver a precise and controlled amount of sealer to exactly the right area. This time, it was drawn into the gap by capillary action, not gravity, but no less effectively.

Once again, I treated it twice-daily for around three days, and left the final treatment to dry for ~24 hours before moving the vehicle outside for testing. As luck would have it, the rainfall that day was of biblical proportion, providing a pretty extreme test. Without the headlining, any leak would have been readily apparent, but happily ... all was well.

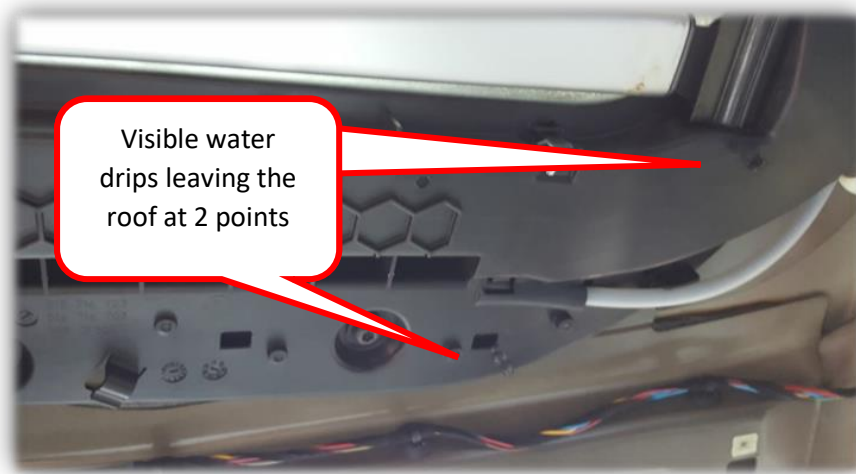


Figure 5: View of the OSF of the sunroof, looking up from the inside

Drying the Floor

I lifted the carpet and attempted to air dry it and the underlay, but 5 days on there was little improvement. The only viable option was to remove all of the seats, door pillar & kick-plate trims, centre console etc. to get the carpet and underlay out. I moved them into a dryer, warmer environment, where the carpet dried in a couple of days, but the under-carpet felt took a week to dry out completely. I mentioned earlier that the weight of the 'soft furnishings' gave me to believe that there was a further 5 litres absorbed there.

The one part I didn't remove to dry was the ~35mm thick piece of foam rubber lining the toeboard – see Figure 6 below. It was extremely wet, but pulling it out to dry it properly would have entailed removing the dashboard first, and I didn't have the appetite for that. Instead I used best endeavours to dry it over the course of a few days, by squeezing the water out of it, using cat litter and ultimately force-drying it with a



Figure 6: The saturated foam on the N/S toeboard

hair dryer. The result was adequate rather than perfect, but it's not in an air-tight environment, so it will dry out completely over time.

To Round-up



Figure 7: The naked interior

The cause of the leak was a design defect in the roof. Specifically the component manufacturer's attempt to join dissimilar materials in a critical part of the roof structure. It was *not* due to any issues with the drain tubes or their connection to the roof.

Experience proved that it wasn't necessary to remove the headlining or the sunroof to solve the problem - it can be repaired effectively from the outside only. In contrast however, attempting to dry the floor successfully without removing the carpet and underlay is not likely to be successful.

Do it Yourself?

I'm not going to go into minute detail of how to strip the interior, but with common sense and time, it's not hard - I'm an IT consultant not a car mechanic, and beyond finding the time, it wasn't challenging.

I figured though that getting a dealer to sort this mess out would cost most of the value of the car.

In the interest of saving money, I went with the old adage "if you want the job done properly ..."

If are going to pull yours apart though, budget for one day (or three evenings) to get the whole interior out, and about the same again to get it all re-fitted. As I mentioned above though, it'll take a week or more to get things properly dry.

Don't attempt to do the work without the following though, as a minimum:

- M8 and M10 XZN or 'triple-square' spline tools
- T20, 25, 30 and 40 Torx® drivers
- A set of sharp picks (don't think you'll be able to use screwdrivers instead)
- The usual box of tools
- A garage which will allow you to get the vehicle inside, with all five of its doors open.

If you're still hell-bent on doing it, here are a few points which might help you, and/or which bit me:

- Captain Tolley to the rescue! This was *exactly* the right product to use in the circumstances, and a syringe was exactly the right way to apply it. The instructions say 'Apply sparingly' - that's the truth. It probably only required 0.5 – 1ml of sealer on each side of the roof. Not much when you consider

the significance of it. Thank you Captain Tolley – you’ve made it straight to the top of my Christmas Card list.

- If you can’t work out how to remove something, search for it on-line and look at images of it – that will enable you to understand how it’s attached to the car and where to pull it/un-clip it etc.
- When you’re removing the seats, unplug the seat looms from under the carpet, just under the front-outside corner of each seat – the looms stay with the seats, not the car.
- When you’re removing the carpet, it’s not necessary to remove the throttle pedal from the floor – just remove the T25 Torx® screw hidden under the cap, and wriggle the carpet out from underneath it.
- Each of the upper roof pillar trims has a T20 Torx® screw concealed behind the ‘Airbag’ badge. Remove the badge using a pick behind its left side.
- In case you forgot to make a proper note, the handbrake lever goes back in *after* you’ve re-fitted the underlay and the carpet, not before.
- The bonnet pull lever is held on with a plastic clip, (just about) accessible when the lever is in the pulled position. When re-fitting the lever, fit the clip back into the lever first, then push the two on together.

Initialising the Sunroof

One final point - if you’ve pulled the roof apart and found that it no longer closes and/or opens as it should, it’ll need re-initialising. Now the driver’s handbook tells you how to do that, or rather it should do, but almost comically, you’ll find they missed that bit out.

Endless searching bore no fruit, so here’s how I did it after some trial-and-error:

1. Ensure that there are no fingers or other obstructions which will prevent the roof from closing.
2. Turn the sunroof knob to the closed position and wait for the glass to stop travelling (wherever that may be).
3. Close the sun blind by pressing the forward-facing arrow within the sunroof knob, and wait until the blind is closed.
4. Press and hold the forward arrow once again, whilst pulling the back of the sunroof knob down with your thumb – the glass should now motor closed (though there may be a delay before it does). Once it’s closed, you can release the arrow and the knob.
5. Disconnect and re-connect the battery (you could probably just pull the sunroof fuse momentarily to avoid tipping up the clock etc. but I disconnected the battery).
6. With the battery re-connected, repeat step 4 above (you may have to do Step 4 twice at this point).

That should complete the process.