

Roof Inspection Report

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On October 15, 2012, the owners of a property in Atenas, Costa Rica asked me to conduct an inspection of the roof leaks they had been trying to repair for years. Their main residence and guest house both had water infiltrating into the interiors of the dwellings through gaps between the roof laminates and under the flashing materials.



On both dwellings there are several types of flashing materials in various locations. The lower roofs have flashings installed where the roof surface meets the exterior vertical walls. Because of the nature of the corrugated metal laminates, there are gaps under the flat flashing materials where driving rain water enters underneath and filtrates below into the home. Additionally, the top of the flashing material is attached to the vertical wall with nails and a silicone type of sealant has been applied at the joint. This sealant dries out quickly in Costa Rica because we are less than 10 degrees from the equator and the ultraviolet radiation prematurely deteriorates most exterior construction materials. When the sealant dries out, it cracks and water can infiltrate in the cracks.



Both roofs have identical roofing laminates and some areas have been dented by workers walking on the roof in between the metal supports. Near the television antenna the dents are deeper and water accumulates in them and causes premature corrosion.



I conducted water tests on both roofs by bringing a garden hose up on the roof and first letting the water run down the roof laminates to determine if there was water infiltration occurring on the laminates. On the guest house there were no leaks on the laminates, but when I diverted the water pressure against the vertical walls and the flashing, the water leaked into the ceiling of room below.



On the main residence, the roof laminates leaked during the water test in gaps at vertical joints where the laminates overlap and under the edge flashing where it sits on top of the laminates. The laminates have been dented by people standing on them and the best method to repair them is to remove the laminates and repair the dents or replace the laminates with new ones.



Additionally, on the main residence, the [thin gauge roofing laminates](#) have expanded and buckled up at the ends of the horizontal joints and driving rain can enter underneath. These laminates should be removed and replaced before applying a waterproofing product. In other areas of the roof on the main residence, [small stainless steel screws](#), commonly used to assemble lightweight metal structures, have been installed to close the gaps where laminates have buckled up. These screws are small, without any rubber washer and can unfasten themselves with slight movement of the laminates and then water can enter the holes.



The television antenna installation was completed by amateurs and they damaged several roof laminates. There are irreversible dents as well as screw holes on the laminates where silicone sealant has been applied. The winds that blow at higher elevations in Costa Rica, like in Atenas, cause movement of roof mounted antennas and the screws become loose and penetrate the sealants, allowing water to enter. The damaged laminates should be removed and replaced prior to installing a new waterproofing product.



The gutters and downspouts are small and do not permit the rainwater to flow out of the gutters quickly enough to avoid the water backing up inside the gutters and flowing underneath the roof laminates and onto the fascia boards. There are watermarks on the underside the fascia boards which indicate this problem. Because the fascia boards are wood, they warp when exposed to extensive moisture. A flexible waterproofing membrane product can be installed on the surface of the laminates and then folded down into the back of the gutters to seal the gap between the bottom of the roof laminates and the back of the gutters, thereby preventing moisture from entering in the gaps.

Furthermore, some of the gutters are filled with debris near the downspout openings and they need to be cleaned in order to avoid further obstructions.



LOCAL REPAIR METHODS

While I was inspecting the roofs, the local contractor who installed the roofs arrived to apply some quick fix repair products. I explained the problems to him and what needed to be done to stop the leaks. He brought a ladder and a tube of a common exterior sealant called [Duretan](#) that the locals use to try to repair roof leaks. They typically apply this sealant into holes and in between the loose edges of the laminates, in order to attempt to fill the gaps and adhere one loose laminate to the other. This repair method is like applying a bandaid to a serious wound that needs stitches. I explained to the contractor that the laminates have buckled up and separated and they needed to be removed and replaced or covered with a durable membrane product. Once he understood that I was uncovering long term defects of this type of roofing system, he left, as he has no experience with permanently solving roofing problems. These local workers are accustomed to installing new sealant when the leaks occur. Even the local architects and engineers with college degrees are accustomed to these quick-fix applications rather than designing roof systems that prevent water infiltration. Over the years I've confronted some of these so-called professionals with the fact that their roof designs continue to leak. After trying to avoid my constructive suggestions with unacceptable excuses, more than one of them has told me; "this is part of the maintenance of owning a home in Costa Rica."

In Costa Rica we receive intense wind-blown rains that attack dwellings horizontally. Because the roof leaks depend on the direction and intensity of the rains, all of the gaps under corrugated roof laminates and flashings need to be sealed where driving rainwater can enter. When foreigners purchase homes in Costa Rica, with inexpensive corrugated metal roofs, they are disappointed when their new homes roofs leak. The application of sealants and anti-corrosive paint quick-fixes are not a solution. They are a cheap method to temporarily stop the leaks that will continue forever until the entire roof surface is sealed with an impermeable product that closes all gaps on the corrugated laminates and flashing materials.

GUARANTEED SOLUTION

In order to completely stop the infiltration of water in the gaps under the flashings and between the metal roof laminates, I recommend the installation of an SBS reinforced polyester fiber membrane to be heat welded with gas torches in order to seal the new membrane to the existing roofing laminates. Additionally, this same membrane needs to be applied over the flashings, onto the fascias and walls as well as inside the gutters in order to seal all gaps where water infiltration has been occurring. The membrane product that I recommend is guaranteed for 10 or 15 years, depending on the thickness of the material. If you would like more detailed information about my roofing solutions, send me a message.

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