

Question. Which materials are suitable for the construction of a tiny house on wheels, which will be useful on the road and in stationary placement for a minimum of 30 years.

Trailer

For the construction of our first tiny house on wheels we have chosen a trailer made of galvanised steel by the Dutch company Vlemix. It was delivered by a French dealer who also took care of registration. Along came U-brackets of stainless steel (unfortunately without counter plates and/or screws), to be used to fix the house on the trailer.

Soon protection of the tiny house against wind and rain became topic #1. To safe guard the underside against splashing water and penetration of stone chips from the road, a layer of perforated galvanised sheet metal was mounted directly on the trailer's frame, using short screws. To date it is not evident whether glue was added to screws holes, which obviously have cut through the galvanisation. Question, take all off and make it new? Or risk corrosion?

Underflooring

On top of the sheet metal a layer of plywood (1.5 cm waterproof marine quality, coated with wood preservative and linseed oil) will be placed. It will come to sit on top of the heads to those screws, which fasten the metal sheets to the trailer frame. These may damage floor boards in the long run. Another reason to reposition the galvanised sheets, using flat screw heads. In addition, the edges of the plywood, milled to properly join, must be properly glued.

Glue

"...if the applied stress exceeds about 20% of the breaking stress, the life of the joint decreases exponentially with the intensity of the stress if it is applied permanently..."

My thought : Since a tiny house on wheels is exposed to tensions during transport, it seems important to judge these tensions correctly. Tensions occur selectively during driving. Nevertheless the adhesive should not go stiff, but be permanently elastic.

Furthermore, "...the most important parameter seems to be humidity: a glued joint loses 90% of its ability to resist failure when saturated with water. Fortunately, on the one hand, water impregnation is reversible, i.e. the joint, provided it does not deteriorate, regains its original properties as soon as the moisture content returns to normal, and on the other hand, water diffusion is very slow. The prediction of the life span of an adhesive joint (does not exist up to now...) ... is something for tomorrow! Quotes are from: <http://culturesciences.chimie.ens.fr/content/le-collage-un-moyen-ancestral-moderne-et-durable-dassemblage-article-741#d0e704>, translated from DeepL.com

The question arises, what happens to the joints if one gets into persistent bad weather conditions during relocations or in stationary placements?

Solution Underflooring

To prevent the plywood floor panels from being damaged by the screws and their heads used to pin the metal sheets to the frame of the trailer, we consider applying a fibreglass roofing to the galvanised metal sheet and fix it permanently with a latex-bitumen adhesive. Advantage: This will add another layer of water protection. Question. Can water diffuse sufficiently?

The same glue may (if nothing else turns up) be used for gluing plywood panels and fill drilling holes.

We are at this point investigating natural resins and/or a glues based on starch. The adhesive must not crack. Under tension it must react with elasticity. It must not dissolve under the influence of heat or humidity. Processing over large areas must be possible. It also should functions as a filler (e.g. for drillings ...). If at all possible, it should consist of proven age-old components only....