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WATER VAPOUR PUMPING INTO SUBFLOOR SPACES

With the massive increase in the use of wood as a non structural coating on concrete substructure floors the number of problems due to moisture has increased. The nature of wood is that it will move when it changes in moisture content. The ancients used to use drive dry wood into cracks in stones and then wet the wood to crack the stone. This demonstrates it is not realistically possible to prevent the movement so preventing sub floor moisture ingress is essential.

Concrete starts life being wet and to properly cure is meant to be kept wet [at least internally] for 28 days from when it is poured. Most concrete floors are coated with decorative surfaces before the concrete is dried to the 3% specified and required for wooden floors. This is overcome by using a moisture barrier.

There are two types of barriers generally available: The painted on coating and the plastic sheet sitting on top type.

PLASTIC SHEETS

The most common and usually cheapest is the plastic sheet, typically a polythene 'builders plastic' which at best is taped or glued together at the joints between sheets. To lay this is quick and if done with care to ensure it is not cut through before the covering, can provide protection and provides a good barrier. The problem is that it is very difficult to ensure there are no holes. I use the analogy: If I put a hose on the top of such a moisture barrier over your fine Persian carpet, would you be happy that it would be adequate protection?

The fact is that small holes are inevitable and if there is ventilation above the plastic sheet, the barrier may be adequate. Typically this situation applies to wooden floors laid over battens on a concrete slab. If there is insufficient 'above barrier ventilation' (i.e. air flow under the floor, but above the barrier) then the barrier acts as a MOISTURE PUMP and causes water to accumulate on top of the surface of the plastic.

HOW? – The plastic sits on the wet concrete and the water vapour pressure, particularly on a warm day, being generated from the whole of the surface area of the concrete causes water vapour to be pushed through even pin hole sized openings [such as are caused by a piece of grit on a boot]. This vapour then condenses when next it cools and there is no mechanism to push it back through the hole. The top of the barrier then acts to accumulate moisture, hence becoming a pump. The wood will absorb the moisture on the underside and still be dried on the surface. The drying on the surface is slightly slowed by the coating but not completely. The wood on top has therefore its underside wet and the top dry which causes differential expansion, cupping and in bad cases blue-stain and fungal attack.

PAINTED ON COATINGS

When a small hole occurs in a 'painted on surface' the area of wet concrete exposed is small and the water vapour from this small area will provide a moisture source for the wood on top, however the concrete area is small and not a lot of moisture is available before the concrete at that point dries. The wood on top will allow some moisture to be transmitted through it and more importantly the proportion of wood to moisture volume is much higher so there is not a big difference between the moisture content of the wood on top to bottom.

It is preferable for a painted on coating to be flexible enough to allow for the cracking that always will occur in concrete as it sets. If possible, both systems should be used to achieve the best moisture protection.