

## the good oil

The treatment and finishing of wood with oils, particularly vegetable oils, goes back into the mists of time and satisfies the conception that this 'living' material (i.e. wood) needs 'nourishing' with natural oils.

Of course, wood ceased being a 'living' thing the moment the forester's chainsaw went through it, and the only nourishment that the natural oil provides is to the host of fungi and mould spores that alight upon it.

A significant and varying proportion of wood is comprised of hemicelluloses and sugars. These hygroscopic materials will absorb and release water as the relative humidity fluctuates, causing changes in the dimensions of the wood - leading to the erroneous 'living' tag.

Oils typically have low viscosity and are able to penetrate into porous substrates, which can bring some improved stability and water resistance to the bulk of the substrate - oil tempered hardboard is a good example of how (linseed) oil can improve bulk properties.

Vegetable oils contain more or less unsaturation and the most highly (poly) unsaturated oils have the ability to use atmospheric oxygen as a catalyst to react with themselves and dry (polymerise) into intractable solid materials. This property made them highly desirable as paint and caulk (linseed oil putty) binders. This drying reaction is naturally very slow and somewhat unpredictable.

The fastest drying oil is Tung oil which is derived from the nuts of the China Wood Oil tree. The difficulty of sourcing this product led Western artisans and artists to rely on linseed oil, which is derived from flaxseeds.

As noted above, raw linseed oil is very slow to dry but, by heating it in the presence of certain metal soaps, this property could be dramatically improved. Boiled oil became the 'go to' product for oil-based paints and stains.

One very famous linseed oil based stain was known as the 'Madison Formula' which was developed by the U.S Forest Products Laboratories. It was successfully marketed in NZ under several names, the most famous of which was Goldex NF 11. The product was based on pale boiled linseed oil;

turps; paraffin wax to improve initial appearance and water-shedding properties, and lashings of pentachlorophenol to keep the bugs at bay.

Contrary to popular belief, linseed oil based stains are film forming. Their durability was poor, however, and the film failed by powdering away, which led to easy preparation for re-coating. The fact that they didn't 'flake', as more durable films can do, has probably lead to the 'non film forming' misconception.

Around this time, some entrepreneurs realised that by adding pigments to used sump oil, a fair looking 'timberstain' could be produced. The 'mineral' oils on which they were based are chemically very different in nature to 'vegetable oils'. The major requirement for lubricating oils is that they remain very stable under heat and in the presence of metal contaminants - therefore there must be no tendency to polymerise.

They are truly non-film forming and will penetrate readily into open pores in wood, thereby increasing the water resistant properties of it. Penetration is required as any excess material on the surface (unless it has been modified with wax) will remain liquid and sticky. Wiping off excess is often recommended.

Where the oil is 'visible' to U.V. light, it will degrade quite rapidly and protection of the timber is achieved by the pigment content which is loosely held on the surface. The oil which is 'invisible' to U.V. (either deep in the wood or protected by the surface layer of pigment) will remain liquid and mobile.

This style of product offers benefits in the areas of safety, mould resistance and overcoating and formulations have become refined with the use of more highly specified 'white' paraffin oils.

The ease of overcoating, however, comes with a major caveat - they can only safely be overcoated with similar products; there is a danger of the residual 'free' oils interfering with the curing chemistry of the new coating or causing adhesion and/or blistering problems.

It is therefore important to ensure that the original product specified is well documented to all interested parties so that the subsequent maintenance work can also be properly specified.



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