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LISTED HERITAGE



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PAINT
STRUCTURAL ENGINEERING
PANELLING
STEEL WINDOWS
AVOIDING THE PITFALLS OF
OWNING A LISTED BUILDING

The Linseed Oil Paint 'revival' continues...

Kevin Davies

A LEGISLATIVE ANOMOLY?

I have been asked many questions and one in particular poses an interesting anomaly. As Listed Property owners and custodians of our heritage assets we are sometimes in doubt as to what 'work' requires Listed Building and/ or Planning Consent, as well as what is good and bad practice, indifferent or indeed to be avoided. Doing nothing rather than the wrong thing may often be the better choice.

Talk to your Listed Building Officer or Conservation Architect and they should inform you that painting is classified as a 'surface coating' and as such can be and is often changed, maintained, renewed etc without consent being required. So you can do as you like, within reason. Redecoration may require permission if this would 'change the character of the building' and I would not suggest following the 'Candy cane' house owners red and white striped London townhouse colour scheme for your Listed Property – despite winning the appeal decision.

So what is the anomaly? Yes, paint can be only a 'surface coating' but it should also be a lot more. Modern Alkyd (artificial oil) and Acrylic (plastic) paints do sit on the surface, don't penetrate and don't actually offer protection to the wood or substrate itself. What is unfortunately not seen, until too late, is the underlying damage and decay that occurs beneath. Old timber windows and doors are of intrinsic value, as mentioned in Douglas Kent's article on Timber Windows and Door in the May/ June issue, and are in my opinion part of the historic fabric of a building worthy of and therefore requiring protection.

Linseed oil based products where the carrying medium or binder is linseed oil, (raw oil, 'boiled' oil, paint, waxes and putty) offer an alternative 'traditional' approach and are far more than just a 'surface coating'.



FLAX THE HUMBLE LINSEED OIL PLANT

The cultivation of Flax (*Linum usitatissimum*, Linaceae) dates back several thousands of years. Cold pressed oil from this pretty little plant has been used for centuries, you may be familiar with *Lino* and if you enjoy cricket the chances are you have already used a tiny precious bottle of it to protect that special run scoring willow bat. You probably didn't think why, the good folk in your local sports shop had it on their shelves, there was no option, it was and is still the 'best thing' for wood.

Linseed oil was the undisputed paint binder of choice, until.... the Second World War and the need for mass production. The paint industry moved away from 'traditional' linseed oil paint in

favour of chemical, petroleum and solvent based paints. Paint manufacturing became and is still today a high-tech industrial scale process with a correspondingly high carbon footprint and a global supply chain to match. In your typical hardware store, nearly everywhere in the world, you will find a myriad of synthetic products, all easy and ready to use, quick drying and sold as the solution. To some extent it may be for some.

Pause here for a moment. If nothing else the Coronavirus pandemic has given many time to reflect. We have been forced to engage locally, conduct ourselves correctly (virtually or otherwise) and the environment seems to have revisited us all. Global travel has reduced massively, pollution levels have dropped dramatically and we have become more and more aware of the preciousness of all life around us. The fragility of our planet (global warming and the loss of biodiversity) had been the headline news after Brexit, it astonishes me how mother nature still seems capable of rebuilding herself given the chance. The choice of paint and indeed how we choose to restore and maintain our properties plays a small but very important part in this.

AN OVERVIEW OF PAINT TYPES

Alkyd paints (artificial oil paint) – linseed oil is replaced with synthetic alkyd resin oil then dissolved in petrochemical solvent. Polyurethane paints and varnishes contain urethane binders or urethane-modified alkyds. Whilst the alkyd resin oils are often derived from plant products (the fatty acids may come from safflower, sunflower or fish oils) the solvents that evaporate as the paint dries are harmful. Toluene, benzene, acetone, paraffin oil (white spirits) and ethanol contain high levels of volatile organic compounds (VOC's) and exposure to high concentrations has been the cause of ill health among painters for decades. Under the European Union directive 2004/42/EC all manufactured decorative coatings have to comply with reduced VOC limits. For solvent based oil paint for wood this is 300 g/l. There are many who believe that these limits are still too high. Traditional linseed paint will contain less than 18g/l.



Acrylic 'latex' paint (plastic dispersion) – this is a fast drying paint containing pigment suspended in an acrylic polymer emulsion. These paints are often sold as environmentally friendly because the solvent used is water. As the paint dries water evaporates and the acrylic polymers fuse. VOC emissions are low and the painter will suffer no ill-effects. The downside, and it's a big one, is that acrylic polymers are derived from petroleum products, it is plastic! Acrylic paint consists of polymethyl methacrylate (PMMA) suspended in water and you need 2 kg of petroleum to make 1 kg of PMMA. Clever marketing by the paint industry perhaps but since when has using non-renewable fossil fuels become 'eco', 'green' or environmentally friendly?



Linseed oil paint - Linseed oil (or flax seed oil) is referred to as a 'drying oil', meaning the initial material is liquid but after a period of exposure to air it hardens to a tough, solid film. The 'drying' process (there is no evaporation) is the result of an oxidative reaction (or oxidisation) where oxygen attacks the hydrocarbon chain and as a result the oil polymerizes forming long chain-like molecules. As time passes the polymer chains cross-link resulting in a vast polymer network. The result is an aged material that is stable and rigid but remains somewhat elastic. Most applications of linseed oil exploit these drying properties.





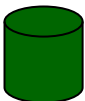

Colour pigments have been ‘suspended’ in linseed oil and used as paint in Europe and England since the 13th century. Pigments are essentially ‘fillers’ that serve to thicken the film, increase the volume of paint and provide colour. As with the linseed oil itself quality is important, pigments affect drying time and durability. Traditional oil paints have lasted centuries and continue to protect exterior timbers, our windows, doors and iron-mongery. Paint failure was unheard of.

Linseed oil molecules are also small, and aided by an expansion in volume of around 10% during drying, it offers excellent penetration into wood pores, both visible and microscopic but



without expanding the wood itself. Linseed oil is also hydrophobic, its molecules are repelled by water. Droplets of water will form on the linseed oil film much like morning dew on grass or on the surface of a leaf. We can begin to appreciate how linseed oil can protect not only our cricket bat but most surfaces exposed to the elements.

Typical paint comparison for exterior application on new timber

Paint Group	Dry matter content	Coverage (m ² /litre)	Surface penetration	Drying time (recoat)	Longevity	Cost (1m ² all coats)	Life (1m ² per year)
Alkyd oil¹ (artificial oil)	± 55% 	≤16 (top coat)	No penetration 	16 hours	±6 years	£10.00	£1.66
Acrylic² (plastic)	± 40% 	≤13.5 (top coat)	No penetration 	4 hours	Up to 6 years	£9.84	£1.64
Linseed oil³	100% 	≤20 (top coat)	Penetration 	24 hours	±15 years	£7.07	£0.47

Notes

1. Quality UK branded paint - one coat primer, two coats undercoat, two coats top coat gloss
 2. Quality UK branded paint - two coats primer/ undercoat, two coats top coat eggshell (micro-porous)
 3. Swedish paint – three coats linseed oil paint, after 6 – 8 years apply one coat boiled linseed oil
- * Alkyd & acrylic paint – failure occurs and application process is repeated after approximately 6 years
 * Linseed paint – oxidation process, apply one additional coat of paint after approximately 15 years

DO'S & DONT'S



Plan – The Society for the Protection of Ancient Buildings (SPAB) publish a calendar of simple checks that you can do to maintain your building, saving you time and money. Inspection and repair of timberwork is listed in the months of June and July. This can be done earlier in fine weather, ideally work is carried out during the warmer months and the timber is protected before the onset of the following winter.

Top tip – It is often unrealistic to do everything required in one season so plan for time, yours and others if required, for the following years as well. It's useful to keep a diary of planned work as well as records of work undertaken.

Do your research – Spend time looking at options and especially the alternatives to synthetic products, these are modern and we have managed well without them for centuries. All products must have Safety Data Sheets, these are sometimes buried in websites and customer support may not always know the answers. Read instructions carefully. Ask questions if in doubt.

Top tip – Avoid chemical paint strippers and other hazardous products. These are controlled by the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) regulations from the EU adopted to improve the protection of human health and the environment from risks that can be posed by chemicals. Look out for the Hazard pictograms and warnings. This includes turpentine which although natural has an extensive hazard summary. There are many naturally occurring nasties that used to be prevalent in paint including arsenic-containing pesticides and of course lead. The latter can be substituted with zinc oxide.



Preparation – It's all in the preparation! If you are working with new wood then your task is more straightforward. If you are restoring woodwork for the best results do try to remove the existing surface coatings, unless of course it is linseed oil paint. Linseed oil will penetrate deep into the wood so any barrier left can inhibit this. It may not always be practical to remove everything, do what you can and get help if needed. The good news is linseed oil paint will 'stick' to pretty much any surface and this includes old paint, wood, plastic, metal and glass. Most importantly ensure the surface is stable, that there is no cracked or peeling paint, and it is clean and dry.

Top tip – Use the right tools and equipment to make the job safe and easy. Avoid the myriad of electric gadgetry that is now prevalent. These are noisy, consume electricity and invariably create dust and mess. Use good quality hand tools



instead. Apply linseed oil wax to encapsulate any hazardous scrapings and consider buying an infrared heater, these soften paint and putty without the burning, smoking and your antique glass won't break either if you are careful.

Enjoy – When you get to the painting, ENJOY. This should be fun. Linseed oil paint is a pleasure to use as it should be a 'one pot system', using the same paint for all coats and it smells lovely. Three coats are normally needed to achieve a semi-glass finish with sufficient pigment and oil to protect from the elements and ultra violet light.

Top tip – You don't need to maintain a 'wet edge' with linseed oil paint, it 'dries' slowly so you can revisit a couple of hours after painting to catch any drips or thick areas of paint not worked properly (letter box openings through doors are my favourite). If applied too thickly the paint will skin and the paint underneath won't dry. Suspend brushes in raw linseed oil between coats, there is no need to clean straight away.

Monitor & maintain – Keep an eye on what you have done. Exterior woodwork needs a clean from time to time (no different to window glass or your car), this will depend on many variables such as orientation, exposure and location. A quick wash with linseed soap and warm water should be all that is required. Any maintenance can be promptly undertaken or put into the plan cycle.

Top tip – Apply raw linseed oil to areas you do not have time to repair now, boiled oil and putty can be mixed into a 'paintable paste' to fill holes and cracks. This will penetrate and protect, buying you time.

We are fortunate then that a combination of traditional European skill, ancient wisdom, modern production techniques and cooperation with farmers, has enabled the development of a new generation of linseed oil paints. These should contain no solvents or poisonous pigments. They will last a very long time and are healthy for the painter and the environment.

As they say in Sweden 'we have to look back if we are to see the future' and we must therefore 'rediscover the ancient wisdom.'

Kevin Davies is a Chartered Architect specialising in works to listed buildings and the supplier of Allback Linseed Oil Paint in the UK.



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