

## Demystifying linseed paint

Linseed paint is enjoying a renaissance, with new appreciation of its green credentials and of its naturally protective properties for wood, metal, gypsum and glass.

Over the last 30 years, the UK paint market has become focused on highly technical preparations while neglecting the benefits of simpler and arguably better alternatives which deliver high-protection and high eco-credentials with low maintenance.

In countries like Sweden where many houses are made entirely of wood, the performance of surface coverings has become a critical issue as there is an epidemic of paint failure. Modern paint suppliers are attempting to address this with high-performance materials, which can unknowingly exacerbate problems and actually be the cause of rot and decay.

Oil-based paints have been used in Europe since the 12th century for decorative purposes. They are still commonly found in modern applications in finishing and protection of timber in buildings, and exposed metal structures such as ships and bridges. Their hard-wearing properties and luminous colours make them a perfect choice for both interior and exterior use on wood and metal.

Unlike modern manufactured paints, linseed oil paint does not build up on wooden surfaces, so it allows any moisture present in the wood to escape easily, enabling breathing and natural drying. This eliminates any chance of paint failure through paint flaking and peeling. Indeed, linseed paint is one of the very best preservers of wood. This can be seen in many buildings that are hundreds of years old, both in Europe and the United States. In the 1800s and early 1900s painted surfaces survived intact much longer than they do today.

After the second world war, the paint manufacturing industry moved away from traditional, natural products like linseed oil in favour of more technologically advanced materials. It began heavily promoting petrochemical, solvent-based paints. These were very inexpensive to manufacture but did not hold up well, making repainting necessary every few years: a perfect product for the paint industry, but not for the customer.

When the newly introduced petroleum paint products began to be marketed in the 1950s, rationales for the new paints were primarily:

- Drying times were claimed to be shorter, with it being recommended to leave at least 24 hours between coats. This is true, although this seems to be worth the time invested for a decorative surface that is going to last many decades.
- Bright new colours. Actually, bright colours are also achievable in linseed paint and linseed paint colours are significantly longer lasting. Linseed paint can last 50 to 100 years with minimal maintenance. Wiping the painted surface with a cloth with cold-pressed, raw or boiled linseed oil suffices.
- New high-gloss surface. A high gloss can be achieved with linseed paint by adding more coats. The more coats, the



glossier the finish. It is true that an extremely high gloss can be achieved only by the addition of certain agents. By the end of the 1980s, linseed oil paints had almost disappeared from the market. At the same time it was being reported that relatively new wooden windows, doors and facades were rotting after only a few years and house owners were having to replace them.

Petrochemical (or solvent-based) paint is now being replaced with acrylic paints as this eliminates environmentally harmful solvents (VOCs). Acrylic paint on the exterior of a house, especially an old house, without an

*Making linseed paint: the roller grinds the pigments into the oil.*

*The pier at Malmö, protected by linseed paint*



*Hallarbergs Country House: pine timber houses can last many centuries when painted with linseed paints.*

interior vapour barrier, will suffer extensively. The paint traps moisture on the inside of the walls, rotting the wood from the inside as the paint starts failing. In the UK, the belief is still that more coats of paint protect the timber better. The opposite is true: water will always find a way in, but the more coats on the surface of the timber, the more the water becomes trapped. The surface tension of linseed oil is lower than that of water, so linseed oil paints will penetrate the timber far deeper than water will. Linseed oil protects the timber from the inside out.

Modern acrylic paints do not breathe enough and only form a surface coating. Wood replacement products, ranging from hardy-planks (clapboard exterior siding made from a cement compound) to vinyl siding do not resolve the maintenance nightmare. They simply shift it to a new material that still has to be maintained.

Acrylic paints are thermo-responsive, being soft when hot and brittle when cold. Behaving differently in hot and cold weather means that if warm weather is suddenly followed by cold rain, the expansion and contraction of the paint is too great, potentially causing severe problems with paint adhesion, leading to the paint cracking and allowing water to penetrate and cause damage.

Mildecides and fungicides were prevalent and popular until their environmental hazards were seen to outweigh their benefits. New formulations which retard the growth of the mildew and fungi are now being used. However, volatile organic solvents in oil paint and thinners have been categorised as environmentally hazardous.

Historically, lead was often added to linseed paint. One comment I heard a couple of times during the IHBC annual school was that linseed oil paints only work when lead is added. It is true that lead forms a great accompaniment to linseed oil paint, but of course we now realise that the use of lead is undesirable for health reasons. Fortunately, there is another alternative. The addition of zinc white provides almost the same benefits but without the harmful side effects of lead. Zinc white, mixed in the right dose and in the right way with other pigments, provides superb protection

against mould-growth. However, if the dose is wrong or the pigments are mixed with the oil incorrectly, linseed oil can become sticky and the colour may be unstable.

The best results are obtained by applying linseed oil paint as a whole system to untreated substrates. This allows the oil to penetrate the surface and protect the timber from within. Linseed oil paint can also be painted over existing paints. Chemically, linseed oil has a very small molecular structure; so small, in fact, that it can adhere to other painted substrates. However, it is important to recognise that the final coat is only as durable as the base coat it sits on.

With the awareness of the dangers of petroleum products to the environment, the paint industry is entering a new era. The use of binding materials made from alkyd oil instead of natural boiled linseed oil means that the use of synthetic resins, such as acrylics and epoxies, has become prevalent in paint manufacture. Acrylic resin emulsions in latex paints, with water thinners, have also become common. Most water-based paints also use these petroleum-based emulsions.

Legislation has been drafted to eliminate petroleum-based oil paint from the market completely and to ban solvents in paint. Now might be the time to redress the balance and return to a completely renewable, natural product, which has an almost unlimited lifespan and where the maintenance is only every eight years or so, with nothing more than the application of some more linseed oil.

Although the UK flax-pressing industry vanished back in the early 1960s, there has been a resurgence from the heartland of linseed paint production – southern Sweden. Since the 1980s, the Swedish open-air museum Kulturen ([www.kulturen.com](http://www.kulturen.com)) in Skåne, working with specialist manufacturer Ottosson Färg, has conducted extensive research into the use of linseed paint on century-old buildings. Their work has shown that linseed paint still offers the most durable, long-lasting protection for timber, minimising environmental impact and enhancing the natural beauty of timber.

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