Wood Protection

Figure 1: Pallets for a raised bed with linseed oil coating

Key Data

- Location: Outdoor
- Scope: For all "green" building elements made of wood

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Content

Introduction

Wood is a "living" natural product – and therefore also perishable. Fungi and insects can "gnaw" at wood and gradually destroy it. This happens particularly quickly in warm, humid conditions. Sunlight (UV radiation) also attacks wood – however, this only causes the surface to turn gray ("silver") and does not destroy it; on the contrary, the surface then becomes more resistant to fungi and insects.

This perishability of wood is a great pity, because it usually takes a lot of work and money to build the "Green Elements," and they bring joy to the school community every day. – How fortunate, then, that wood can be protected!

Note: The environmental factors mentioned above have varying degrees of impact in different regions of Europe – it should therefore always be assessed on-site to what extent wood protection is relevant and which measures are most suitable.

Constructive wood protection

This section deals with construction techniques. Many of these are already covered in our building instructions – and will therefore only be briefly summarized here.

- **Choose durable wood!**
  Oak, larch, or Douglas fir are considered particularly durable. However, they are often also more expensive than other, less durable types of wood.
  There are also very weather-resistant tropical woods, such as teak. We explicitly do NOT recommend these – because we don't want to contribute to the destruction of rainforests on other continents for the sake of Green Cool Schools in Europe.
- **Distance from the ground** – so don't place wooden parts directly on the ground – and certainly don't bury them in the ground!
  A wooden bench, for example, is better placed where there is a hard surface – such as stones or concrete. Of course, not in a depression!
  If anchoring in the ground is necessary, then metal sleeves should be used, which are driven into the ground or set in concrete. The wooden part is then screwed to the metal slightly above ground level – thus protecting it from rising damp.
- **Avoid prolonged contact with potting soil!**
  When planting greenery on wooden structures, the potting soil should be kept away from the wood, for example, in containers or with pond liner or dimpled membrane.
- **Avoid horizontal surfaces and valleys!**
  It looks very neat when everything is perfectly vertical or horizontal. However, rainwater (and snow) tends to pool longer on perfectly horizontal surfaces. Therefore, it is better to install all parts exposed to the weather at a slight angle lengthwise or crosswise – this allows water to run off quickly.
  Valleys can occur, for example, when wooden structures are braced diagonally. Water can linger here for a particularly long time. However, valleys can also be designed with an angle.
- **Cover wooden parts!**
  Wooden parts that are particularly exposed to the weather can each be given their own small "roof" in the form of metal strips. This must be installed in such a way that the water drips off downwards.

Wood protection through painting / impregnation

The goal here is to make the individual wooden parts more durable. There are several ways to do this. You can buy suitable substances in liquid form and apply them, for example, with a brush, or the wood can be immersed in a container of wood preservative by the manufacturer.

Here are three examples:

- **Wood preservatives**
  These are substances that are toxic to wood-destroying fungi or insects.
  We do NOT recommend these wood preservatives, as we do not want to expose either the people on school grounds or the animal inhabitants to toxins.
- **Varnishes**
  Varnishes form a thin, hard, often glossy, and water-resistant layer. As long as this varnish layer is intact, the wood underneath remains dry – and offers no food or habitat for fungi or insects. They can also be used to create colorful surfaces. However, if the varnish layer gets scratched or cracked, water can penetrate – the protective effect is lost, and it no longer looks as attractive.
- **Impregnation / Stains based on linseed oil**
  The raw material, linseed oil, is non-toxic – some people even eat it, for example, with boiled potatoes and quark. From this oil, you can make coatings such as varnish, linseed oil, or stains. These should not be eaten! When applied with a brush, they penetrate the outer layer of the wood. They fill the pores in the wood and harden through polymerization (a process that can be explained in chemistry class). Linseed oil and water are opposites; they do not mix, and when the pores in the wood are filled with linseed oil products, water cannot penetrate.
  Linseed oil can also be used to create colored finishes: To do this, mix the linseed oil coating with colored powder (pigment) to create a stain, which is also applied with a brush. This stain also protects the wood from graying because it (partially) blocks sunlight.

Instructions for impregnation with linseed oil products

Note: These instructions are based on experiences, products, and product names from Germany. If you wish to implement this in another country, you should visit a hardware store or (better yet!) a natural building materials supplier, seek advice there, and follow the instructions on the purchased products.

For this work, you will primarily need linseed oil products (varnish or stain), thinner (turpentine substitute from a hardware store or balsa turpentine oil or orange-peel oil from a natural building materials supplier), and brushes.

The best wood protection is achieved when all cut, dry wooden parts are treated before assembly. This is the only way to ensure that all wooden surfaces are impregnated. The wooden parts must be placed/stored in a well-ventilated area to dry.

It is a complex process overall, but it offers the chance to significantly extend the lifespan of the wooden structure. For example, a raised bed made from old pallets has a maximum lifespan of 5 years without wood preservative; this can be doubled with linseed oil impregnation (these are rough estimates!). Structures made from good quality timber last longer.

Special oils, also linseed oil-based, are available for garden furniture and seating surfaces. Information about these can be obtained from the manufacturers or specialist retailers.

Step 1: Prime with linseed oil

This step is only necessary for highly absorbent wood. This includes many softwoods or reclaimed wood such as used pallets.

Linseed oil is made by mixing linseed oil varnish and thinner in a 1:1 ratio. Apply one coat to the wood. The linseed oil is quickly absorbed and dries completely by the next day.

Steps 2 & 3: Apply wood stain

Hardware stores offer various products labelled "wood stain." This instruction refers exclusively to linseed oil-based products. They are ready to use and are applied thinly with a brush.

The stain should be dry after 15-20 minutes. If any areas are still wet, carefully dab them with a cloth – otherwise, these areas may remain permanently sticky.

Apply a second coat of wood stain the next day.

Variation: Colored Wood Stain

If you want to color the wood or avoid the "silvering" effect, you can make and apply a colored wood stain yourself. To do this, stir 10-15% lightfast pigment into the first coat of wood stain – and otherwise proceed as described above. Suitable pigments are available at natural building supply stores.

The color effect of the pigments should be tested beforehand on a small sample of the wood. Generally, the pigments can also be mixed.

Safety and other instructions

- All substances mentioned here have a very strong odor. Therefore, work should be carried out outdoors or in well-ventilated rooms.
- Once linseed oil products have dried, they are no longer soluble. Therefore, meticulous cleanliness is essential in every respect:
  - Protect skin and clothing, or wear old clothes
  - Cover surfaces/tables, etc.
  - Wipe up any drops or splashes immediately
  - Position paint pots so they cannot be accidentally knocked over
  - Tightly close paint pots with a suitable lid after use
  - Clean brushes thoroughly with one of the thinners mentioned above immediately after use, then dry them with rags or newspaper and store them in a well-ventilated area.
- The products mentioned here and their fumes are highly flammable. Therefore, thorough ventilation is essential, and smoking or the use of open flames in the workplace is prohibited.
- Due to the risk of fire, heavily saturated rags should be disposed of in a sealed metal bucket or a wastebasket outside the building.

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