

**Disclaimer**

This sheet is intended for designers, specifiers and other members of construction project teams wishing to reuse this building material or product. It is part of a collection of sheets aimed at bringing together the available information to date that is likely to facilitate the reuse of building materials and products.

This sheet has been produced by Rotor vzw/asbl within the framework of the Interreg FCRBE project - Facilitating the Circulation of Reclaimed Building Elements, supported by the entire project partnership. Sources of information include the experience of reclamation dealers and involved project partners, lessons learned from exemplary projects, available technical documentation, etc.

The sheets have been produced between 2019 and 2021. As the reclamation sector is evolving, some information, notably regarding pricing and availability, may change over the time. When the text refers to European standards, it is up to the project team to refer, if necessary, to their national implementations and local specificities.

It is important to note that the information presented here is not exhaustive or intended to replace the expertise of professionals. Specific questions are always project related and should be treated as such.

The complete collection of sheets (including the introductory sheet) is freely available from different reference websites (a.o. opalis.eu, nweurope.eu/fcrbe, futureuse.co.uk).

Non-exhaustive directories of dealers in reclaimed building materials are available on www.opalis.eu and www.salvoweb.com.

Interreg FCRBE partnership: Bellastock (FR), the Belgian Building Research Institute / BBRI (BE), Brussels Environment (BE), the Scientific and Technical Center of Building / CSTB (FR), Confederation of Construction (BE), Rotor (BE), Salvo (UK) and University of Brighton (UK).

The information contained in this document does not necessarily reflect the position of all the FCRBE project partners nor that of the funding authorities.

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Material Description

Ship's timber (in Dutch: 'scheepsplanken', 'scheepsvloer' or 'scheepshout') is a salvaged material found mainly in Belgium and the Netherlands. It comes from the dismantling of port and maritime structures such as pontoons or barge holds.



Appearance of ship's timber

The wood species concerned is almost exclusively azobé (*Lophira alata*), which is a tropical hardwood that is naturally resistant to moisture and has high mechanical properties.

The boards sold have generally been influenced by time (bad weather, salt water, wear, etc.) and are characterised by a weathered appearance and a coarse texture.

Their dimensions are variable. In general, the boards are 10 to 23 cm wide, 2.5 to 5 cm thick and 80 cm to 5 m long. Slight differences in colour are perceptible between batches, or even within the same batch.

They are widely used for exterior applications such as patio floors, fences, palisades, wooden shelters, outdoor furniture, retaining walls, etc. They are occasionally found in interior use as flooring or panelling.



Outdoor storage © scheepsplanken.be

Material reclamation

Ship's wood planks are available from specialist dealers and can sometimes supplement the offer of new wood dealers.

The involvement of specialised professionals ensures the smooth running of the following operations:

- **Treatment:** boards are generally sold in the raw state or with a light surface treatment (brushing, sanding, sandblasting, high pressure cleaning). In some cases, they can be planed on 3 sides, without affecting the surface patina (upper side).
- **Storage:** the planks are stored horizontally and stacked on pallets, usually outdoors.
- **Transport and delivery:** little or no difficulty. The specific weight of azobé (1050 kg/m³) must be taken into account during handling and transport.



Brushed boards © scheepsplanken.be



Outdoor storage © rawwood.be



Applications and laying

Reclaimed ship wood planks are suitable for a variety of applications, both indoors and outdoors.

Outdoor use

→ **Flooring and decking:** placing salvaged ship wood planks is relatively straightforward and comparable to new wood decks. The planks are generally fixed to a wooden structure (boards and joists) allowing ventilation from below (air space).

→ **Palisades, fences, cladding, outdoor furniture, retaining walls, etc.**

Fixing with stainless steel screws is recommended in order to avoid persistent rust discolouration of the wood. Due to the hardness of the material, it is also advisable to pre-drill it. The installation will be done in accordance with the state of the art and will take into account in particular the following focal points: condition and properties of the underlying structure, moisture of the wood, slenderness coefficient of the planks (width/thickness ratio), method of fixing, etc.

Ship's wood planks have generally withstood many years of use and are generally less prone to deformations (sagging, warping, etc.) than their new wood counterparts.



Untreated boards © rawwood.be

Indoor Use

→ **Flooring and panelling:** for interior applications, it is necessary to dry planks that have been stored outdoors before placing them (up to a moisture content of 8-12%). During drying, the wood tends to contract and the placement of dry planks will ensure better dimensional stability and avoid the appearance of cracks. It is recommended to consult a professional for drying.

Toxicity

Planks from barge holds may have come into contact with toxic mixtures. In the absence of information on this subject, it is best to stick to the 'precautionary principle' for interior applications and furniture.

Ship's wood planks can be sawn, sanded, sandblasted, brushed, oiled, varnished or painted. Please note that azobé is a particularly hard wood which requires suitable tools.

For all uses, in order to facilitate installation, the designer/specifier will take care to use batches with a certain degree of uniformity in terms of the following characteristics. Most professional suppliers are normally able to ensure that delivered batches meet these requirements.

→ **Batch composition:** the batch must consist of planks of the same species of wood (azobé).

→ **Dimensions:** the dimensions of the planks must be uniform, especially in terms of thickness. It is also possible to opt for laying in free lengths, which places fewer demands on the lengths of the boards.

→ **Colour:** relative uniformity, variations in colour are possible within the same batch.

→ **Condition:** Planks must be free from mould. The degree of wear and traces of use can vary greatly from batch to batch.



Dismantling of barge holds
© historischhout.nl

It is up to the designer/specifier to define the degree of imperfection tolerated, with regard to the intended use and any restoration work, by specifying the acceptance or rejection of the defects. For example, cracked planks are unlikely to be suitable for a heavily loaded flooring application.

Most of the reclaimed building materials are sold as is. The conditions of sale may however contain special guarantees specific to the material. Some suppliers are able to indicate the origin of the material and/or provide documentation on the product purchased (for more information, see the introductory sheet).

It is important to purchase a sufficient quantity of panels from the outset. Resellers usually have panels whose format is linked to a specific batch. It is therefore not certain that the desired format will still be available in a subsequent order.



Characteristics and fitness for use

In the particular case of wooden ship planks, there are no standards to determine their specific performance as a construction element. However, experience as well as normative and technical documents relating to wood and new wood-based materials make it possible to highlight the following characteristics and recommendations:

Table 1: Technical characteristics of azobé (*Lophira alata*)

Density [kg/m3]	1050
Monnin / Janka hardness - Sinking resistance *	10,7 / 17000 N (hard)
Stability in use	Low
Natural durability (resistance to wood-eating fungi) **	Class I-II (durable to highly durable)
Durability against xylophagous insects **	(Durable against termites)
Colour (shade)	Reddish-greyish

* There are various methods for determining the hardness of wood, with different test arrangements (Monnin, Janka, Brinnell). The values below, taken from different sources, are given as an indication. They show the transversal sinking resistance at 12% moisture content.

** This classification is only valid for heartwood and not sapwood (peripheral wood). We are taking into consideration here that ship's wood planks are only made of heartwood to meet the technical needs of port and maritime applications.

The performance of wood in use is essentially determined by the following parameters: durability class of the wood (resistance to fungi and insects), water permeability and the presence of humidity in its immediate environment. The harmonised European standard EN 460 thus defines five classes of use of wood and the associated biological risks, and recommends the possible application of an adequate protective treatment according to the use and the class of natural durability of the wood used (see table 2).

In general, azobé planks are recommended for exterior floor applications exposed to bad weather (terraces) without preservative treatment (usage class 3). This tropical hardwood is strong and resistant to compression and moisture, which increases its longevity in use.

Table 2: Classes of use and associated biological risks

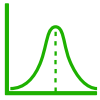
Usage class	General use	Biological risks		Natural durability class of wood				
		Insects	Fungi	I	II	III	IV	V
				Azobé				
1	Indoors, in the dry	Yes	No					
2	Indoors, or under shelter, not exposed to bad weather. Possibility of water condensation	Yes	Low					
3	Outside, above ground, exposed to bad weather	Yes	Yes					
4	Outside in contact with the ground and/or fresh water	Yes	Yes					
5	Immersed in salt water on a regular or permanent basis	Yes	Yes					

Treatment not necessary
Treatment is recommended
Treatment is necessary



Other relevant characteristics to be assessed according to use and context

Characteristics	Comments
Dimensions (length, width, thickness)	These characteristics are closely linked to the degree of sorting of the planks and their origin. A visual or detailed examination of the batch is often sufficient to estimate it.
Geometry (straightness of edges, angularity, flatness of the surface)	These characteristics are closely linked to the degree of sorting of the planks and their origin. A visual or detailed examination of the batch is often sufficient to estimate it.
Surface and edge quality	A visual or detailed examination of the batch is often sufficient to estimate it. The quality of the surface must anticipate the desired degree of finish (rough, sanded, sandblasted, brushed, etc.).
Water absorption	Azobé boards are not very absorbent.
Mechanical performance	The in-depth evaluation of mechanical performance is relevant in case of high static and/or dynamic loads.
Wear	Azobé planks have a higher risk of splitting. Tropical wood splinters usually contain chemicals that increase pain in case of injury. It is therefore recommended to sand them so that they can be used barefoot as a floor covering.
Slippage	The type of finish (sanded, brushed, raw) affects this parameter and influences the appearance of algae in a humid environment. The presence of algae on the panels must be controlled by frequent cleaning and/or suitable preventive treatment.
Reaction to fire	<p>Specific requirements for the reaction to fire of coatings are determined by national regulations. These requirements depend, among other things, on the use of the premises (for example: private or community housing, emergency exits, terraces on flat roofs, etc.), on the height of the building (for the façade cladding) but also on the ability of users to evacuate the premises in the event of fire (senior citizens' residence, hospital, etc.).</p> <p>The reaction to fire of construction products is defined by European standard EN 13-501-1 (Euroclass) and is assessed in particular on the basis of a test carried out under the final application conditions, i.e. taking into account the entire construction system. According to the European classification, solid wood planks (minimum density 400 kg/m³, minimum thickness 12 mm) are classified Dfl-s1 for floor applications and D-s2, d0 for other applications (without an air gap behind the wood panel).</p> <p>It is therefore important for the designer/specifier to meet regulatory requirements in terms of reaction to fire by determining the materials and their method of implementation, with regard to the intended use.</p> <p>Regarding ship's wooden planks, fire retardant treatments improve reaction to fire and reduce their contribution to the conflagration and the spread of fire.</p>
Toxicity	Planks from barge holds may have come into contact with toxic mixtures. In the absence of information on this subject, it is best to stick to the 'precautionary principle' for interior applications.



Assessing the global warming impact of reclaimed wood construction products is complex and difficult to generalise. The analysis is specific to the product concerned, and involves parameters such as the origin of the product, the environmental performance of the new equivalent, the working life, the quantity of biogenic carbon stored in the material, etc. The analysis is also specific to the product itself. For more information, it is advisable to consult the specific paragraph dedicated to this issue in the introductory sheet.

Availability

Salvaged ship wood planks are mainly available in the Netherlands and Belgium. However, their availability depends on the quantities required. As an example:

Frequent	Batch from 0 to 50 m ²
Ocasional	Batch from 50 to 150 m ²
Rare	Batch > 150 m ²

According to some specialist dealers, the supply of salvaged ship wood planks is compromised. They are gradually being replaced by metallic materials, which results in scarcity on the reclaimed market.

Indicative prices (excl. tax)

A non-exhaustive sample of the Western European reclaim market (Belgium, France, UK, and the Netherlands) has allowed us to extract some indicative prices:

→ *Sorted and brushed*: 25 to 45 €/m²

Hazardous substances and precautions

Planks from barge holds may have come into contact with toxic mixtures. In the absence of information on this subject, it is best to stick to the 'precautionary principle' for interior applications.

Find specialised businesses

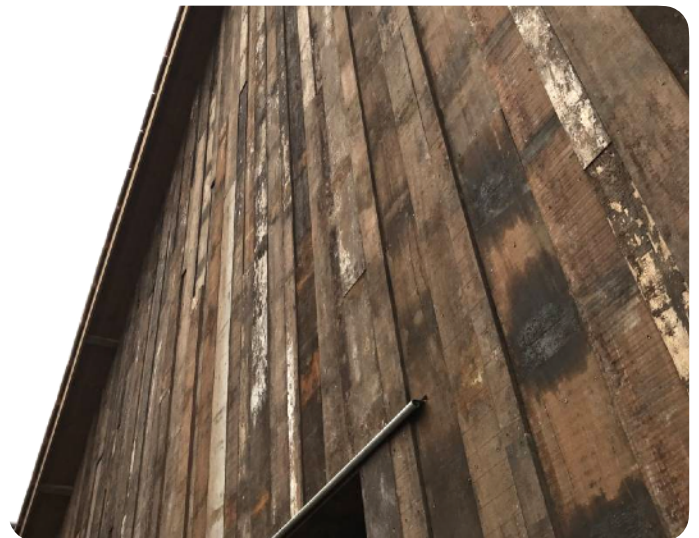


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Terrace application
© robuustbarnwood.nl



Outdoor cladding
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