

**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.

Unless explicitly stated otherwise, the content of these sheets is credited in the Creative Commons Attribution NonCommercial – Share Alike format (CCBY-NC-SA).



Unless explicitly stated, the images used in this document belong to © Rotor vzw/asbl or © Opalis. Any other image has been the subject of a systematic request for authorisation from their authors or rightful owners. When this request has not been answered, we assumed that there were no objections to the use of the image. If you feel that this interpretation is unreasonable, please let us know.

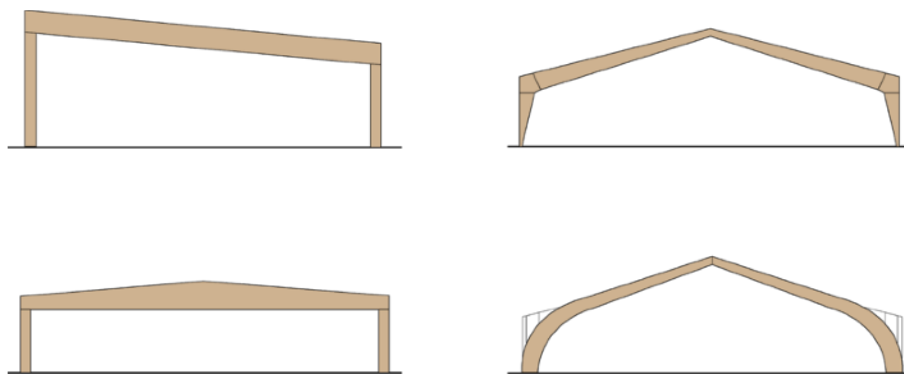


Material description

Glued laminated timber (Glulam) elements are produced by superimposing and laminating layers of planed wood timber. This technique, known for hundreds of years, has experienced strong growth during the 20th century. Glulam has become a structural element appreciated for its mechanical performance, its lightness, its ability to cross long spans (limited in practice by transport constraints) and the diversity of geometric shapes that it allows.

The timber used for manufacturing is obtained by jointing wooden parts free from structural defects (knots, etc.). They are arranged so that their grain is parallel to the main direction of the element produced. The timber layers are assembled by gluing and pressing into the desired shape (straight or curved). The elements thus produced are then planed and machined in order to facilitate the placement and assembly of the connecting elements. Many finishing treatments are available, depending on the specific requirements of the intended use (appearance, fire resistance, protection against biological agents, etc.).

The manufacturers of new glulam give a reference lifespan estimated at 100 years, but it is not uncommon for buildings constructed with a glulam structure to be demolished much sooner. In theory, structural elements in glulam carefully dismantled during these demolitions could therefore be reclaimed, also for structural purposes. In practice, this approach remains rare, although a few pioneering projects illustrate the possibility of doing so and perhaps herald the devel-



Examples of shape variability of glued laminated timber structural elements

opment of a promising sector for the future. Currently, the elements in glulam are most often reclaimed for non-structural purposes, for the realisation of furniture or in interior architecture for example.

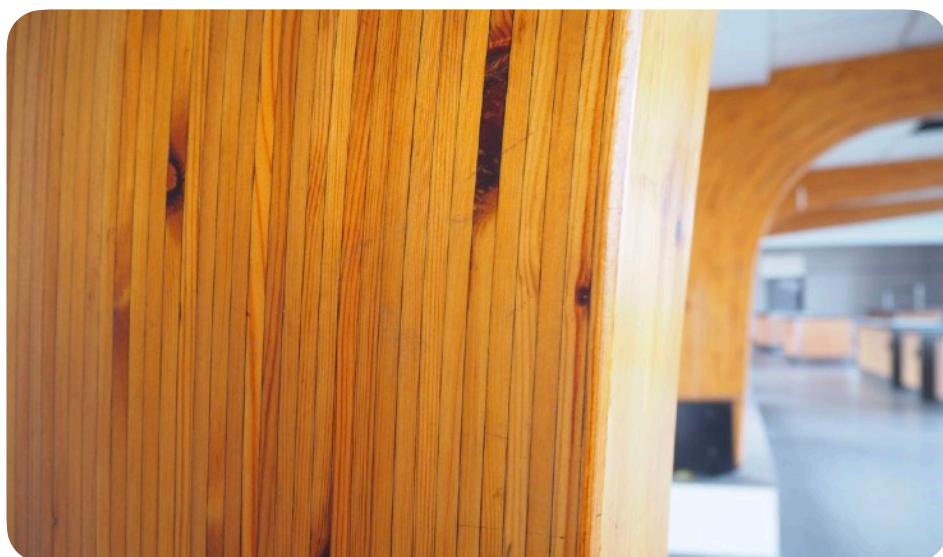
Structural glued laminated timber should not be confused with CLT timber (*Cross Laminated Timber*, the layers of which have the particularity of being crossed at 90° in order to increase the rigidity and stability of the panel in all directions.) or LVL (*Laminated Veneer Lumber* which is more like a very thick plywood). They also differ from glued laminated timber intended for furniture or carpentry.

Glulam beams generally differ according to the following criteria:

→ **Wood species.** Most of the time coniferous (e.g. spruce, fir, Scots pine, Douglas, larch), more rarely deciduous (e.g. poplar, beech or oak). The composition of a glued laminated wood element can be uniform (all the sheets are of the same wood species) or variegated (assembly of several species with different mechanical characteristics).

→ **Formats and dimensions.** The beams can be straight or curved, with constant or variable inertia, with straight or chamfered edges. The dimensions, number and arrangement of the sheets are variable and influence the mechanical performance and possible shapes.

→ **Appearance.** Depending on the natural colour of the wood, its degree of exposure to weather conditions, finishing or preservation treatments, etc. Reclaimed beams may bear marks left by previous uses: presence of fittings or holes in fittings, discolouration in the assemblies, etc.





Material reclamation

Currently, reclaimed glulam comes mainly from the dismantling of framing elements, floor beams or poles generally dating from the second half of the 20th century.

The reclamation of structural elements in glulam requires good coordination as well as a certain level of expertise. It is preferable to be accompanied by professionals (structural engineers, control offices, demolishers, contractors, etc.) who will be able to guarantee the stability of the building via an adequate removal methodology, to ensure the feasibility and the profitability of a removal, and estimate the quality and quantity of elements in glulam in good condition in order to assess the interest of the batch.

Like solid wood, glulam elements can deteriorate when subjected to excessive moisture. The pathologies generally result from the presence of fungi which cause rotting of the wood or the presence of xylophagous insects. Shrinkage of the wood and the detachment of the sheets, due to significant variations in humidity, also lead to the formation of cracks into which excess water can penetrate. This is why an unprotected or poorly designed structure will potentially be more damaged. The horizontal parts of the beams and the assembly areas are the main areas at risk.

→ *Preliminary studies.* These aim to assess the general quality of the various elements. They can combine several approaches:

- *Visual inspection.* This makes it possible to check the characteristics of the wood (species, methods of joining the sheets, etc.) and to identify the presence of possible pathologies:

- cracks, not damaging or through
- detachments
- abnormal deformations
- discolourations
- presence of insects, fungi or areas of rot
- condition of fittings and mechanical assemblies
- condition of the protective layer (varnish, stain)

It will also be necessary to study what type (s) of stress the structure had to face during its use: exposure to polluting substances, operating overloads, accidents, etc. The analysis of the types of assembly also makes it possible to consider the most suitable removal method.

- *Basic tests:*

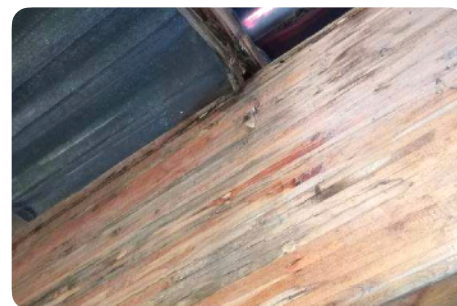
- 'Hardness' test using a resistograph. It allows the detection of superficial areas of rot.
- 'Screwdriver' test. Consists in causing a localised splinter using a blunt object. In healthy wood, the breakage occurs along the fibres while rotten wood tends to break in small pieces or in the middle of the fibres.
- 'Mallet' test. Consists in gently striking the wood to detect the presence of empty or rotten areas (emitting a hollow sound).
- Humidity measurement using a moisture meter.

- *Complementary studies.* Depending on the new, targeted uses, other studies may be carried out:

- Building history, based on the original documentation (executive plans, assembly method, calculation notes, original declaration of performance, technical documentation, etc.) and research on the conditions of use (maintenance of long-term occupants, identification of events such as fires, water infiltration, flooding, etc.).
- Geometric profile, based on a survey of the frame or framework by a surveyor to mark the dimensions of the elements and their connections.



Humidity measurement © SGI



Visual assessment of risk areas © SGI



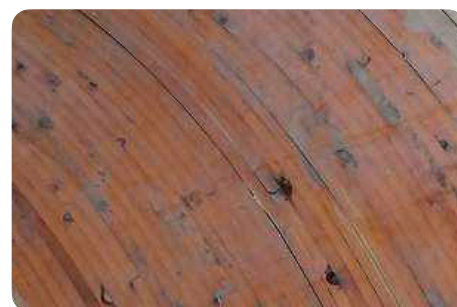
Characterisation of cracks © SGI



Deterioration due to prolonged exposure to humidity © SGI



Characterisation of assemblies © SGI



Delaminating cracks © SGI



→ **Removal.**

- For a new structural use of the elements, care should be taken in preventing removal from causing torsional forces or deformation of the elements. To do this, the elements are first separated before being carefully extracted. The careful removal of structural elements requires good coordination and adequate technical means (cutting equipment, lifting equipment, etc.) to ensure the safety of workers and the integrity of the reclaimed elements. When lifting by crane, wide straps should be used and the edges of the glulam elements protected with steel angles or a similar system in order to avoid marking the elements.
- The removal method using a grapple clamp, frequently encountered on demolition sites, risks causing damage and deformation which limits or even compromises the reclamation of components for structural purposes. However, parts removed in this way can still be used for less demanding applications.

Once dismantled, the elements are preferably grouped, numbered and correctly identified in order to guarantee the uniformity and traceability of each part of the batch.

→ **Storage.** The elements are stored on the edge or flat, and in such a way as to be protected against external influences such as sun, rain, variations in humidity, contact with the ground, vegetation, etc. A waterproof tarpaulin can cover the glued laminated elements to protect them. In case of prolonged storage, the packaging should be opened to prevent or drain off condensation. The elements are placed on clean wooden transverse supports and thick enough to ensure good ventilation. A sufficient number of not impregnated wood spacer blocks of similar thickness are used when layering flat. Particular attention should be paid to the flatness of the elements in the event of long-term storage.

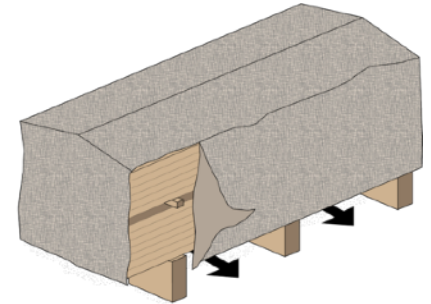
→ **Transport.** Depending on the length of the elements and the traffic rules in force, specific authorisations and resources may be necessary. Depending on the intended application and the initial length of the parts, it may be preferable to resize the elements on site for ease of transport. Ideally, the elements are protected to limit the risk of damage (mechanical damage, humidity, uv-rays, etc.). The use of wide and correctly positioned straps is recommended.

→ **Operations.** Depending on their condition and intended use, reclaimed glulam structural elements may go through several operations before being put back into use. Some suppliers automatically carry out some of these operations. However, sometimes the wood is salvaged or sold in its original condition. It is then up to the buyer to anticipate these stages. It may be interesting to involve producers of glulam elements in this process. These can contribute to the restoration of the elements.

- **Removal of metallic elements.** Nails, screws and other metal parts are removed using suitable tools. This laborious process is essential if woodworking is planned later, at the risk of damaging the machines. Using a metal detector makes it easier to locate metal objects.

- **Superficial cleaning.** By means of a soft or metal brush, by sanding or sandblasting according to requirements. Mechanical sanding makes it possible to remove the remains of paint or varnish for example.

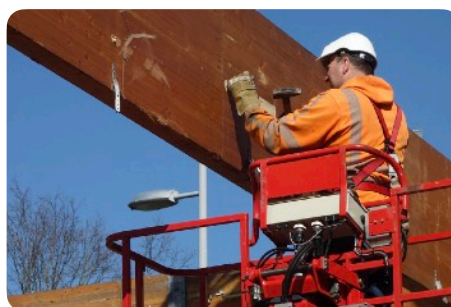
- **Drying.** According to the hygrometric state of the wood. The elements are generally dried naturally in a shed, taking the necessary storage arrangements (spacing between the elements, no contact with the ground, wedges, etc.). Artificial drying can be carried out in certain cases in order to reduce the humidity level.



Covered storage scheme



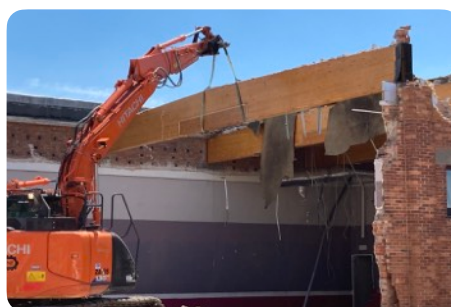
Storage of reclaimed glulam beams



Preparing for removal



Removal of glulam beams



Removal of glulam beams



Transport of glulam beams



- **Preservation treatment.** In order to optimise the durability of wood outdoors or improve its service class, several types of preventive treatments are possible, for example by soaking, sprinkling, staining, in autoclave, etc. They are supervised through standards and recommendations for use. The large dimensions of the glulam elements may limit certain types of treatment. Professional advice is recommended, especially if the wood has already undergone this type of treatment before or if a topcoat is already present. Generally speaking, no surface treatment provides lasting protection against rot. In the absence of information on the original wood preservation treatments, it is not possible to consider reusing the elements in an unprotected outdoor space.

- **Sawing and cutting.** Glulam parts can be cut into smaller sections or re-cut to size. The beam thicknesses can also be cut using a portable saw or sawmill to obtain thinner elements, suitable for the realisation of furniture projects for example.

- **Planing.** The parts can be planed on one or two sides to obtain flat and constant sections and to correct the flatness defects resulting from a preliminary sawing.

- **Machining.** If necessary, new locations for the assemblies (connectors, fittings, etc.) can be machined. Numerically controlled machines offer a useful degree of precision in this case.

- **Repairs.** Filling cracks and small holes using wood filler or epoxy type resins (old assembly holes for example). Mechanical repairs are possible (addition of parts and reinforcements).

- **Finishes.** Depending on the intended uses, the wood can be left as is or receive a finishing coat (varnish, waxes, oils, stains, paint, etc.). Certain finishing treatments can improve performance linked to fire risks. Preferably, healthy finishing treatments that are not harmful to the environment should be used.



Removal of metal parts



Metal detector inspection



Splitter glued laminated timber (sawn lengthwise)



Planing



Planing



Processing a recycled Glulam for a table.
© Crossroads Lumber, 2015.
(<https://www.youtube.com/watch?v=YmB2cAdFDAQ>)

**Applications and installation**

In principle, reclaimed glulam elements offer many possibilities for re-use.

In practice, several scenarios can arise:

- depending on the new application targeted:
 - Structural
 - Non-structural
- depending on the starting point of the design work:
 - From a still standing structure
 - From a batch of elements already dismantled and offered for sale by professional suppliers

The most demanding case is of course that of a structural application. This is governed by the standards of use, to which it is advisable to refer to (for example EN 1995: Eurocode 5 for the design and calculation of timber structures, EN 14080, etc.). According to the regulations in force, it is also necessary to take into account seismic, thermal and acoustic requirements, protection against termites, fire resistance, etc. To do this, it is recommended to involve specialist engineers as early as possible in the design process.

In the case of a structure still in place, they can recommend, supervise and interpret the preliminary analyses: visual inspection, preliminary tests, additional studies, etc. (see § *Material reclamation*). Based on this information, additional tests may be required (identification of species, condition of adhesives, flexural strength performance, etc.). In most cases, they are able to propose design approaches adapted to the level of information available:

→ conservative assumptions during the calculation of the structures' load conditions. For example, by adapting the edges or uncertainties as to the quality of the wood, by simulating a modelling based on the lowest mechanical class, etc.

→ compensation measures based on the current conditions of use of the framework. For example, by offering reinforcements where the bending is greatest, by shortening the centre distance between the uprights, by providing for lighter loads, by oversizing the elements (by doubling the posts, for example), etc.

The case of non-structural applications also requires a balance between the properties of the original material and the intended use.

Certain properties of the elements are detailed by professional suppliers who, in addition to reconditioning services, are generally able to provide information on the dimensions of the elements (thicknesses, length, width), their weight, species or even condition of the elements (presence of holes, cracks, metallic elements, etc.). It can also be useful to go on-site to see the quality of the batch.

Depending on the intended use, the specifier is required to specify his expectations regarding the following characteristics:

→ **Types and dimensions.** Leaving some latitude on dimensions, species, wood colour and all non-essential characteristics makes it easier to find a batch on the reclamation market.

→ **Condition.** Depending on the requirements of the intended application, the specifier can specify his expectations on the following aspects:

- Checking the good resistance of the adhesives (through specific tests or by visual inspection). If these are no longer viable, the elements may delaminate.
- The degree of imperfection tolerated, with regard to the intended use, by specifying the acceptance or rejection of these defects (for example, non-penetrating cracks < 30 cm etc.). This principle can be described in visual form to facilitate the examination of the glulam elements.
- Acceptable presence of holes and drill holes. If the project cannot accept them, a simple filling of cracks and small holes can be done using wood filler or epoxy-type resins. For structural use, other renovation methods exist by treating the deficient material by injection, mending or reconstitution, by replacing a damaged part with an artificial joint or by adding reinforcements.

→ **Quantity.** For non-structural use, and to increase the chances of meeting the offer available on the reclaimed market, the specifier can choose to split the batch with different species, colours and batches.

Most of the reclaimed building materials are sold as is on the reclamation market. 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).



Presence of holes, cracks and damage on the reclaimed elements

Portail du BOIS LAMELLÉ

The laminated timber portal (<http://www.glulam.org>) published by the Union des Industriels Constructeurs Bois (UICB) brings together a great deal of information on glued laminated timber for construction and its uses (In French).



Characteristics and fitness for use

Reclamation of glulam elements for structural purposes generally requires knowing with sufficient precision the following specs, related to the type of wood: dimensional characteristics, moisture content, mechanical resistance, natural or imparted durability of the wood, use class, bond strength, reaction to fire and emission of dangerous substances. These requirements, defined in the harmonized standard EN 14080, can be assessed by accredited professionals. Although detailed for new materials, they make it possible to consider the particular case of elements in reclaimed glulam. Some of these characteristics are also relevant for non-structural uses.

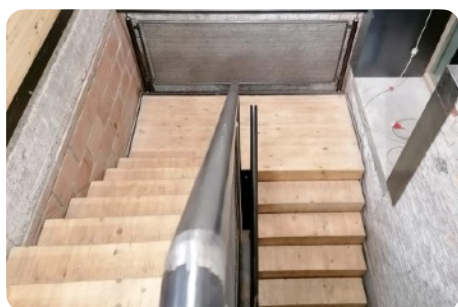
Characteristics	Comments
Dimensional stability	Closely linked to the type of wood, the drying and storage conditions, the degree of sorting of the elements and the uniformity of the batch. The actual dimensions of glulam elements are influenced by swelling and shrinkage due to variations in moisture content. A visual or detailed examination can be sufficient to estimate the dimensional characteristics of the elements.
Humidity level	Controlling the humidity of the glulam is a guarantee of dimensional and mechanical stability. Depending on their function and their location in the construction, the elements must be installed at a balanced humidity level (for example: 15% max. for structural members) and with regard to the assigned class of service. Reference should be made to the installation standards. The moisture content of the wood depends mainly on the drying and storage conditions of the reclaimed wood. It is measured using a moisture meter.
Useful life	<p>The natural durability of glued laminated timber elements is measured against their resistance to fungal attack. It is identical to that of the wood species from which they are made and makes it possible to verify their compatibility with the assigned service class. It is possible to increase the natural durability by means of preservation or finishing treatments adapted to the species and the intended use. In this case, we can talk of 'conferred' durability. The use of preservatives is governed by standards and recommendations for use. It should be ensured that the treatment facilities are adapted to the size - sometimes considerable - of the glulam elements concerned.</p> <p>In general, the best way to protect wood is to ensure, during design, that decomposition cannot occur: by choosing a suitable species, by protecting the elements, by ensuring that they can dry quickly, or even by considering a specific treatment.</p>
Use class	<p>The use class of the wood determines the appropriate uses (see table). 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 standards EN 350-2 and EN 335). For example, roofing timber which does not come into contact with the ground, which is not exposed to bad weather and which is temporarily moistened must belong to use class 2. This classification is relevant for structural and non-structural uses.</p> <p>The application of preservation treatments on the surface of glulams does not allow going beyond use class 2. Usage classes 3 and 4 can only be obtained by treating the separate sheets, that is to say before gluing. Use class 5 does not apply to glulams.</p> <p>As part of the dimensioning of timber structures, the elements are assigned to a service class (EN 1995) directly influenced by the use class of the timber.</p>

Use class	General use	Biological risks		Natural durability class of wood				
		Insects	Fungi	I	II	III	IV	V
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 required
Recommended treatment
Treatment needed



Characteristics	Comments
<p>Bonding durability</p>	<p>In the context of the reclamation of glulam elements, the strength of the adhesive joints mainly concerns the butt joints within the sheets (most of the time with multiple finger joints) and the adhesive joints between the sheets. It can be checked through delamination tests or shear tests on samples. Determining this performance makes it possible to verify that variations in the humidity of the wood do not lead to delamination, that is to say an opening of the joints, for a determined service class.</p> <p>A rapid test (but not standardized) provides a first indication on the matter. It consists in applying a compressive force to a hollowed out part of a sample using a joint clamp to cause tensile stresses perpendicular to the grain of the wood (detachment stresses of the glue joint). If the rupture takes place within the fibres of the wood and not in the bonding, the rupture is said to be cohesive, which indicates satisfactory bonding.</p> <div data-bbox="438 633 1410 851" style="text-align: center;"> <ol style="list-style-type: none"> 1. Clamp (compression force) 2. Glued laminated timber 3. Recessed part 4. Gluing plane between the lamellas 5. Cohesive failure within the wood fibres </div> <p>In general, a visual inspection of the elements provides a first glimpse of the condition of the glued joints. The results of this inspection can also be interpreted with regard to the service class of the element in its original use (for example, beams which would have been initially installed in service class 3, with strong variations in humidity, and which do not show traces of delamination, are likely to be suitable for reuse in service class 1, with slight variations in humidity. The reverse is absolutely inadvisable.</p> <p>Similarly, the type of glue used determines the service class in which the element can be installed. In the absence of precise information on the type of glue, it is therefore advisable to aim for a less demanding service class. The most commonly used adhesives for structural laminated timber parts are of three types: Melamine-Urea-Formalin (MUF), Polyurethane (PU) and Resorcinol-Phenol-Formalin (RPF). This third type, two-component synthetic, has been gradually abandoned in favour of the other two. Casein adhesives, solvent-free and environmentally friendly, used in the early 20th century were also abandoned as they no longer meet the current requirements.</p>
<p>Mechanical resistance</p>	<p>In industry, the mechanical resistance of new glulam elements is determined based on the mechanical resistance of the sheets used in their manufacture. To do so, each batch of sheets is characterized by a normative classification (visual or mechanical), which makes it possible to define a resistance class for glued laminated timber elements (e.g.: GL24, GL28, GL32, etc.). The various mechanical performances of the elements can therefore be calculated directly on the basis of this classification (flexural, tensile, compressive, shear strengths and modulus of elasticity) as well as on the basis of other material characteristics (species, density, resistance, rigidity, resistance of joints, dimensions and combination of sheets, etc.).</p> <p>In the case of reclaimed wooden elements, a visual and detailed classification of the timber by a competent and approved body is possible, which makes it possible, by means of conservative assumptions, to determine the mechanical performance of each glued laminated timber element.. Destructive tests on full-size beams are also possible. They require having enough elements within a batch to sacrifice one or the other). This information makes it possible to make the material suitable for its future use.</p>



Conversion into stair treads, Brussels (BE) © Zinneke



Conversion into guard railing, Brussels (BE) © Zinneke

Find specialised businesses



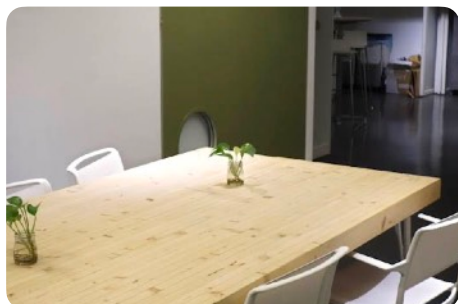
salvoweb.com

opalis.eu



Characteristics	Comments
Fire resistance	When calculating the fire resistance of wooden structures (EN 1995 standard: Eurocode 5), the burning rate is evaluated using the geometric characteristics (dimensions of the elements, section, combination of sheets) and the properties of the material (species of wood, resistance, rigidity, characteristic density).
Reaction to fire	<p>Specific requirements for the reaction to fire 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.). It is therefore important for the 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>According to a European resolution (Resolution 2005/610/EC), the reaction to fire class D-s2, d0 is assigned without additional testing to all glued laminated timber conforming to standard EN 14080, whose minimum average density is 380 kg/m³ (measured according to a reference humidity of 12%) and the minimum overall thickness is 40 mm.</p> <p>The influence of a preservative treatment against biological attack or any other finishing treatment must also be taken into account. If necessary, the reaction to fire performance of glued laminated timber elements shall be tested and declared according to EN 13501-1.</p>
Dangerous substances	<p>Many types of glues have been used in the production of glued laminated timber components. In the absence of precise information, it is relatively difficult to determine their harmfulness and their impact on indoor air quality. Certain adhesives such as modified melamine resin and phenol-resorcinol resin may, for example, contain formaldehyde. However, it should be noted that the formaldehyde content in these glues is very low, and that the concentrations of volatile organic compounds (VOCs) in the ambient air will be well below the limit values imposed by the regulations for wood-based panels. If necessary, tests can be carried out to assess the release of formaldehyde. However, it is generally accepted that the emissivity of some formaldehyde-containing materials decreases over time.. The risk associated with the reclamation of glued laminated timber elements indoors can therefore be considered low.</p> <p>Glulam elements may also have been treated with toxic products or have been in contact with hazardous substances during their use. Most of the time, even if it is possible to visually detect the presence or absence of preservative and finishing treatments, it is generally more complicated to determine the exact nature of the substances present. Laboratory tests make it possible to identify and assess the dangerousness of any contaminants present. The toxicity of some of these contaminants may have dropped drastically after several years of service. In the absence of information on this subject, it is best to stick to the precautionary principle or likely to interact with people, for interior applications.</p> <p>Since glulam structures exhibit excellent behaviour in aggressive environments, they are frequently used in sheds intended for the storage of substances such as salts, acids, hydrocarbons, etc. Information relating to this use may therefore be useful in limiting the risks of toxicity associated with their new application.</p>

(1) Indoor Air Pollution: An Evaluation of Three Agents – Formaldehyde, Exposure to Environmental Hazard, University of Minnesota, PubH 5103, fall semester 2003.



Transformation into pieces of furniture. Offices in the Martyrs Square building, Brussels (BE). © Rotor



Transformations into pieces of furniture. Espace 16 Arts, Atelier d'architecture Alain Richard, Brussels (BE). © aa-ar

For more information on the subject, you can consult the following document written by INRS (in French) which covers the main timber treatment products (constituents, dangers, uses, preventive measures):
<https://www.inrs.fr/media.html?refINRS=ED%20981>



In 2015, the Dutch company Bruil Beton & Mix allowed the integration of reclaimed glued laminated timber beams into the design of their new building. The spruce beams, taken from the old building, were individually inspected by the SHR inspection office, carefully dismantled and repaired by the company Heko Spanten (manufacturer of new elements). After drying, the beams were individually assessed to mark any damage and deterioration due to decay. Delamination tests were carried out on each part to check the state of the glue. The mechanical resistance class was determined visually (GL24h). All of these parameters were then used for structural calculations and sizing of the new building. The restoration of the beams consisted of a surface cleaning with water, a shortening in length, and a machining for the new assembly parts. A total of 13 beams measuring 16.100 × 890 × 133 mm were reclaimed.

(<https://naturalcapital.futureproof.community/uploads/71dbb80a7b0136dff3f57725f4b11762.pdf>) in HOUTWERELD, N° 11 (May 2015).



Availability

Glulam elements are not very common products in the reclamation market. However, some suppliers supplement their regular offer with batches of elements in glulam.

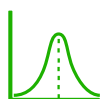
Indicative prices (Excl. tax)

Random sampling of the reclamation market in Western Europe (Belgium, France, Great Britain and the Netherlands) made it possible to extract some indicative prices. These vary depending on the models, condition and quantities needed. Some observed prices:

→ Glulam beam: 200 - 450 €/m³

Similarly, the Dutch company De Groot Vroomshop, which also manufactures new beams, contributed to the reclamation of 80 tonnes of arched beams, around 40 years old, from the demolition of an old ice rink (NL).

© De Groot Vroomshop
<https://degrootvroomshop.nl/gelijmde-hout-constructies/hergebruik-houten-spanten/>

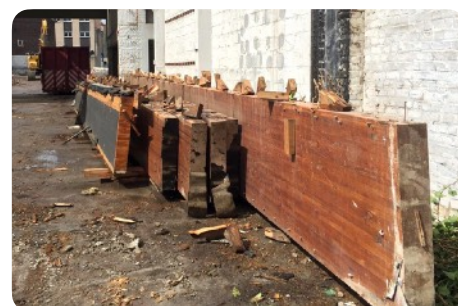


Assessing the impact of reclaimed timber construction products on global warming is complex and difficult to generalise.

The general principle is that construction timber can confine biogenic carbon. Reclamation is therefore a way of preserving these carbon stocks and preventing it from being released into the atmosphere (which would be the case if the wood was incinerated, for example). The overall environmental assessment of a reclaimed wooden element must, however, also take into account aspects such as the origin of the product and the distance travelled, the use of preservation treatment, etc. For more information, it is advisable to consult the specific paragraph devoted to this question in the introductory sheet.



Before reuse



Dismantling



Installation



After reuse

On-site reclamation. Standaertsite, Ledeborg Gent (BE), 2018. © AE / Carton123 / murmuur.
<https://opalis.eu/fr/projets/poutres-en-lamelle-colle-reutilisees-sur-le-site-standaert>