Technical Bulletin Laminated Timber

Appropriate handling of glued laminated timber (Glulam)
Glued laminated timber is a processed construction material which is made of natural timber. Please find below some general rules which help to safeguard the longevity of a timber construction and help to preserve its excellent optical appearance.

Preparation and planning

- If the timber construction is unprotected against weather conditions and it is exposed to heat, rain or alternate wet or dry conditions, this may harm the timber construction. This is why the application of an effective preservative treatment for the structural elements has to be considered during the planning process. For more details please have a look at the brochure "Baulicher Holzschutz", which is available as download in German at www.ifo.infoholz.de.
- As the connection elements effectively increase the strength and stability of a timber construction, they are a very important aspect of the static calculation. In this regard it has to be kept in mind, that timber is a natural building material that changes its volume when it absorbs or emits moisture. It shrinks when losing moisture from the cell walls and swells when absorbing moisture. With regard to the handling of the material the swelling- and shrinkage-properties of timber should always be kept in mind (please see below, "Transport, storage and erection"). For this reason a long time or improper storage on the site may cause problems for the assembling of exact drilled connections.

Transport, storage and erection of glued laminated timber

- It is very important to avoid staining of the glulam members because the cleaning procedure is always very complicated and in most cases a few persisting vestiges of soil remain visible. The best results can be obtained, if the cleaning of the glulam components is done immediately after the staining of the material has been noticed.
- Due to the large dimension of glulam beams in combination with a small sideways stiffness, proper transit, storage and construction methods are very important.
- In order to avoid that the edges of the beams are damaged, heavy-weight lifting straps and edge protectors should always be used for the lifting of the material.
- With regard to the erection of the structural members it is important that the glulam members are adjusted accurately, so that unintentional eccentricities can be prevented. If this is ignored, there may be the risk of extensive additional stressing which has not been considered in the static calculation.
- As far as the assembly is concerned, it has to be kept in mind that any drillings or cuts, that seem to be necessary, may only be implemented after the structural engineer has been consulted in this matter
- In order to avoid that the timber absorbs too much humidity, the roof- and external wall areas have to be closed rapidly after the timber construction has been completed.
- It is strongly recommended that transport packaging is removed promptly, because otherwise perspiration water may accumulate within the wrapping and as a result of this effect mould or blue stain may harm the structural members. As soon as the transport packaging has been removed, the structural members have to be covered appropriately at the construction site, so that they are protected against staining and moisture penetration.
- If trapezoidal roof coverings have been applied, the adjoining beams may be stained by rain water and cylinder lubricant. This effect can be prevented, if the trapezoidal roof coverings are drilled in the middle, so that the rain water and the lubricant cannot come into contact with the beam. In order to avoid the staining of the beams it may also help to insert sealing tapes into the joint.

Implementing

- If a timber building has to be heated, it is important to increase the room temperature only slowly so that a balance between the moisture content within the glulam beams and the atmospheric moisture can be reached. The building owner has to be notified about this on the occasion of the final acceptance of the construction work.
- With regard to the supporting structure of a hall or a timber building the customer has to guarantee normal climatic conditions, e.g. the customer has to ensure that the surrounding temperature is neither too humid nor extremely dry over a longer period. In terms of structural physics it is important that the roof construction has been designed in such a manner that either no harmful condensation can dispose on the roof girders, or that the roof construction can dehumidify immediately.

Maintenance

- It may be the case that shrinkage cracks may appear on the surface of glulam members or alongside the adhesive joints. For structural members without systematic strain on the transverse tensile these shrinkage cracks can be tolerated up to a depth of 1/6 referring to the width of the structural members; for structural members with a regular strain on the transverse tensile, they can be tolerated up to a depth of 1/8 referring to the width of the structural member.
- Before any paint work is renewed or repeated, it has to be clarified with the manufacturer of the glulam beams that the impregnation is compatible with the gluing of the beams.
- If the timber construction is exposed to weather conditions, it may be necessary to renew or repeat the paint work. The best time to do this is during the summer months. Furthermore, it is important that the impregnation can permeate deeply into the timber fibres.

Modifications

- Any modification that may have an effect on the static system or the load bearing capacity of the construction has to be coordinated with the structural engineer in advance. And any further applications that may weaken the cross sections (e.g. drillings) have to be discussed with the structural engineer preliminarily as well. It has to be taken into account that dependent structures shall be applied only in the upper parts of the girders.
- It is of particular importance that any modifications that may have an effect on the basic conditions of the construction, e.g. additional sheathings, intermediate ceilings, planking etc. shall only be implemented after the structural engineer has been consulted in this regard.