

POSSIBILITIES OF GLUED LAMINATED TIMBER

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The article examines possibilities of glued laminated timber. Its properties are compared with the properties of the other construction materials. The article presents examples of the GLT using in different countries.

KEYWORDS: glued laminated timber, natural wood, strength, mechanical properties, environmental friendly material.

Reinforced concrete, steel and natural wood are the most popular construction materials in the most of countries. But in the second part of the 20th century appeared many new artificial construction materials, such as polymers, composite material and other. One of these rather young materials in glued laminated timber, and it is becoming more and more popular nowadays.

There is a question why people prefer to use glued laminated timber although it is more expensive than natural wood. This article tries to answer this question.

Glued laminated timber, also called Glulam, is a type of structural timber product comprising a number of layers of dimensioned timber bonded together with durable, moisture-resistant structural adhesives.

Glued laminated timber is an engineered timber product manufactured by gluing together smaller pieces of stress graded and seasoned timber. The laminates are typically finger-jointed into continuous lengths, and available in both softwood and hardwood species.



Fig.1 Glued laminated timber wall

The rather high strength and stiffness of laminated timbers enable glulam beams and arches to span large distances without intermediate columns, allowing more design flexibility than with traditional timber construction. The size, length and shape of glulam sections is limited only by manufacturing, transport and handling capabilities, and many manufacturers can produce a variety of shapes and sizes upon request.

Glulam beam can be of any length within 12 meters and let block big bays, planning the room freely. Glulam beams let to erect objects of the increased complexity configurations.

Prior to gluing, the laminates are dressed to exact and uniform thickness. They are clamped together under constant pressure until the glue has cured, and before the members are planned, cut to exact size, and sometimes coated with a water repellent sealant.

Because glulam is made up of many laminates, strength-reducing characteristics are often absent or just confined to one laminate. As a result, the product is stronger than solid timber, and its strength and performance predictions are usually very reliable. The manufacturing process also allows for larger and longer members than would otherwise be possible with traditional solid sawn timber.

Also it is known that many construction materials can cause the allergic reactions, especially among children. But wood is a natural and environmentally friendly product that does not have a negative effect on the human body. Wooden walls accumulate warm air and evenly allocate it withindoors, keeping the optimum balance of humidity. It is possible to heat such room quickly and easily in winter, and there will never be too hot in summer. Therefore glulam houses are ideal both for permanent residence and for the weekend or holiday stay. Wood is completely renewable natural resource.

In addition, glulam beams production requires 50% less energy consumption, than concrete production and 80% less than brick production, therefore air pollution is very low. Glulam house durability is higher, than the durability of a full-log house. Wood compression is a result of gluing the graded lamellas under the pressure. That's why glulam wooden construction of the house is of the correct geometry and the load bearing capacity increases.

Glulam fire resistance is 10 times higher than fire resistance of other wooden housing construction technologies and also metalwork. The metal becomes soft and starts

losing the bearing properties by the inflammation. When fire starts the houses built of a gas concrete or foam concrete blocks collapse. The special fireproof impregnations applying on a wood surface turn it into a flame-resistant material



Fig.2 H.Troon "Riding arena"



Fig.3 Smith and Tracey Architects' Olinda "Tea House" in Melbourne

Below there are two examples of dwelling houses.

Built by H. Troon, the project involved the construction of an 80 meter by 40 meter indoor riding arena, which was fully constructed from structural timber. Sourced from New Zealand, the glulam timber arches have a span of 40 meters (fig. 2).

Smith and Tracey Architects' Olinda Tea House in Melbourne is another example of glulam application (fig. 3). The pavilion-style building with a floating butterfly roof was designed using post and beam glulam components from Laminated Timber Supplies. The main structural timbers included a mix of GL13 'A' grade H-3 treated pine beams, cypress posts 7.5 meters high, and glulam columns spanning over 12 meters long.

In conclusion it is possible to say that glued laminated timber is one of the most perspective and comfortable material for using. In our country we also have to develop this way for building in the future.

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ВОЗМОЖНОСТИ ПРИМЕНЕНИЯ КЛЕЕНОЙ ДРЕВЕСИНЫ

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Одним из самых больших открытий в области древесины стало создание клееной древесины, которая представляет собой материал, обладающий рядом новых свойств и большим количеством преимуществ. Эти преимущества, делающие этот материал весьма привлекательным для строительства различных зданий, рассматриваются в статье.

КЛЮЧЕВЫЕ СЛОВА: клееный брус, натуральное дерево, прочность, механические свойства, экологическая чистый материала.

