

Swedish birch - tested to the limit

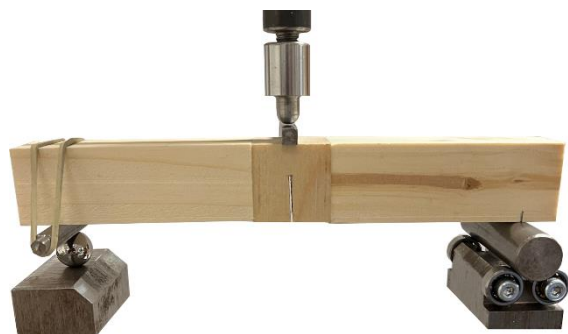
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Raw material from the Swedish forests has been an important resource for the construction industry for many years. Spruce has always been a popular choice because of its great abundant population, but the Swedish forests consist of other species as well - one of which is birch, which potentially can be used for structural purposes! So, how competitive is birch?

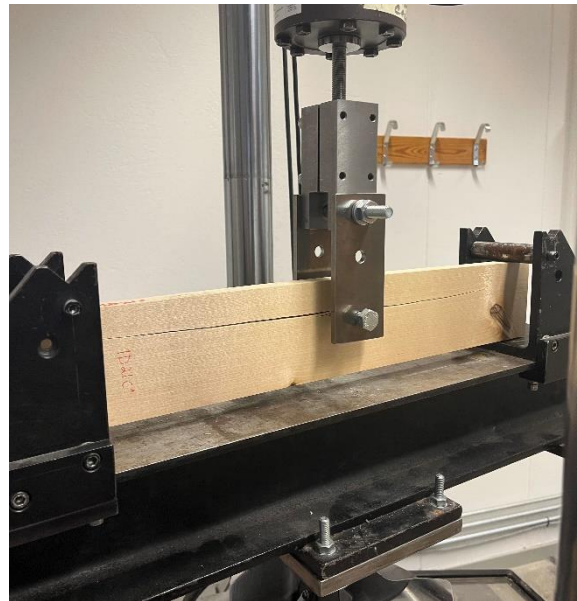
All builders want their beloved woodwork, such as houses, to stand the test of time, the right choice of timber is therefore necessary. Birch makes up 12% of the Swedish forestry and increasing this number might improve a few things like biological diversity, reduce the spread of wood diseases and even hinder forest fires! Sounds amazing, right?

Why are we not building with birch right now? Is it because we don't think that birch is strong enough, or do we simply not know enough about it yet? In fact, the knowledge about birch as a structural timber is less than that of spruce, which is why it needs to be studied. Fracture energy, an essential material property of structural timber, is useful to know since it can be used to predict the splitting capacity perpendicular to the grain of all wood types. It is vital to know the splitting capacity of wood since brittle (sudden) failures can be devastating!

The *Nordtest method* was the method of choice to determine the fracture energy of the birch. In conclusion, the fracture energy of the birch depended on the orientation of the annual growth rings. Also, it was apparent that the fracture energy of birch was dependent on its density. Most importantly, birch had a higher fracture energy than spruce, which is a good sign!



The test setup prescribed in the Nordtest method.



The test setup of the Dowel-type joints.

However, there were some setbacks when the fracture energy was applied to predict the failure modes of dowel-type joints made of birch. It turns out that the formula for calculating the splitting capacity could be faulty, since it suggested a higher capacity than the experiments showed. The used formula, as to when the beam would split, was based upon a standard regulation that all of Europe follows, conveniently called Eurocode 5 (only for wood). The use of spruce is thoroughly explained and developed in Eurocode 5. Birch, and other leaf-bearing trees, are on the other hand seemingly left out. Many more tests must be made so that we can get a better understanding of how birch works. Eventually, we can develop a standard for all leaf-bearing trees!

The bottom line is that birch has a high potential for becoming a potent construction timber, but it must be researched further!