

## RESSOBOIS – WOODEN BOXSPRING

### Problem – Challenge

*Sleep is one of the essential part of our existence. Nowadays our sleep is disturbed by many factors like noise, indoor air quality, light and electrosmog. Customers's demand is increasingly oriented to the use of fully natural materials in order to replace metal and plastics in bed systems. Elite SA and the Institute for materials and wood technology of the BFH have been together studying the possibilities to replace flexible metallic parts in bed by wooden elements. This represents several technical challenges: the element should have an adaptable stiffness to give comfort to the different body parts; they should have small dimensions and should resist to approximately 30'000 loads and climate cycles. The complex analysis of the wood behaviour in terms of hygromechanics, relaxation, creep, fatigue and viscoelasticity in this specific case had to be first clarified. 3-dimensional woodworking solutions had to be developed in order to find a suitable cutting pattern giving wood more flexibility.*

### Solution

*The project has demanded an extended work in prototyping and mechanical characterisation wooden springs. Several wood species were investigated as they offer different solutions in terms of viscoelasticity and resistance. Climate cycles have been measured in different point of a bed in normal use. Thanks to this data it was possible to simulate numerically the sollicitation of several night cycles. A testing set-up was also developed in order to validate the numerical models with experimental values. Finally the team developed a wooden box spring system where laths are 3-D machined in order to produce an in-line series of wooden rectangular springs. This offers a progressive load carrying and increases the comfort. The system is manufactured out of spruce (Picea abies) without any specific treatment. First Wooden Boxspring systems are already successfully commercialized by Elite SA.*



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