From imagining to imaging

Description

Timber towers with a green perspective

Architect Michael Green predicts a green revolution in building materials. At the 2016 Marcus Wallenberg Prize symposium he claimed that it is possible to construct 102-storey skyscrapers of mass timber panels.

From imagining to imaging was the theme of the 2016 Marcus Wallenberg Symposium in Stockholm, Sweden 10 October 2016. An audience of representatives from both forestry and the wood industry listened to speakers with different perspectives.

Sustainable buildings
Michael Green, CEO, MGA Michael Green architecture, Vancouver, Canada, pointed out how engineered wood is becoming an alternative to realize safe and tall urban buildings.
â?? New technologies are evolving very quickly, he said.
Wood was the main material in a virtual redesign of the Empire State Building carried out by Michael Green and the Finnish forestry company MetsÃ¤ Wood. According to their project it would be possible to copy this 102-storey building in masstimber products.
Today 56 percent of the biological footprint in Vancouver comes from building, mostly in steel and concrete. Michael Green would like to use wood constructions in buildings to reduce the amount of emitted greenhouse gases.
A switch to wood requires a change of education of architects, engineers and social planners. Michael Green has started the Timber Online Education, TOE, to meet the need.
â?? It will hopefully become a new tool used globally to teach this new way of building with wood in a larger scale, he says.

Federico Giudiceandrea, CEO, Microtec, Bressanone, Italy.

A sawmillerâ??s dream
The symposium started however by introducing the recipients of the 2016 Marcus Wallenberg Prize. Professor Carl-Johan Johansson, senior advisor of the Prize Selection Committee, revealed the story about how Federico Giudiceandrea, CEO, Microtec, Bressanone, Italy, in 2007 was building a prototype of a CT-scanner for sawmills and had a problem with a blurring picture. He googled and found professor Alexander Katsevich, University of Central Florida, USA, who had constructed an algorithm for high speed CT-scanning. They met and started working together. The day before the symposium they received the 2016 Marcus Wallenberg Prize for the development of the highspeed x-ray based online scanning machine.
â?? The CT-scanner can control the sawing pattern, which enables a better control of the property of

the sawn wood, said Carl-Johan Johansson.

Professor Alexander Katsevich, University of Central Florida, USA.

In his talk Alexander Katsevich presented the theory behind the algorithm, which was implemented in the logscanner.
Federico Giudiceandrea explained how a full 3D reconstruction of the wood before sawing will detect defects and enable an optimum cutting angle selection, which can give up to 8 percent higher output from each log.
â?? It has always been the dream of sawmillers to know what is inside the log before sawing, he said.
Professor Johan Oja, LuleÃ¥ University of Technology/Norra Timber, KÃ¥ge, Sweden, also mentioned the potential for value addition offered by the integration of the new technology in saw lines.
â?? With a CT scanner you change the strategy to find the right log. It is a way to reach a higher profitability in the industry, Johan Oja said.

Knowledge replacing guessing
Peter Lister, PFL Consulting Ltd., Vancouver, Canada, compared the lumber manufacturing with the cutting of beef.
â?? We want more steaks and less hamburgers, Peter Lister said.
A butcher knows where to find the best parts in cattle, but sawmillers have until recently been ignorant of the interior of each separate log.
â?? Historically we have guessed how to cut it, Peter Lister said.
He described different techniques of laser scanners and x-ray log scanners from the early 1980s until the invention of the 3D x-ray computed tomography developed by Federico Giudiceandrea and Alexander Katsevich.
â?? It allows us to look inside the log and figure out where the knots are, where the rot is and where the different features are that could reduce the value, he said.

CT-scanner for research
Dr Franka BrÃ¼chert, Forstliche Versuchs- und Forschungsanstalt Baden-WÃ¼rttemberg, Freiburg, Germany, uses CT as a tool for research. A stem database with 25 different species of complete trees has been set up with the help of the new technology.
â?? We can learn how trees grow by scanning them. There is a huge variation of characteristics within the same species and the very same tree, Franka BrÃ¼chert said.
The database also offers data on harvesting and logistics, scaling and grading.
â?? CT scanning is crucial for evaluating the log volume. The log is delivered in bark but paid without bark, Franka BrÃ¼chert said.
Forest pathology is another big issue. Franka BrÃ¼chert mentioned the possibility of building up a database of plant pathogens, to study for example invasive insects.
â?? The CT scanner can find the eggs and the larvÃ¦ of the longhorn beetles, to help us track down the individuals, said Franka BrÃ¼chert.

Dr Franka BrÃ¼chert, Forstliche Versuchs- und Forschungsanstalt Baden-WÃ¼rttemberg, Freiburg, Germany.