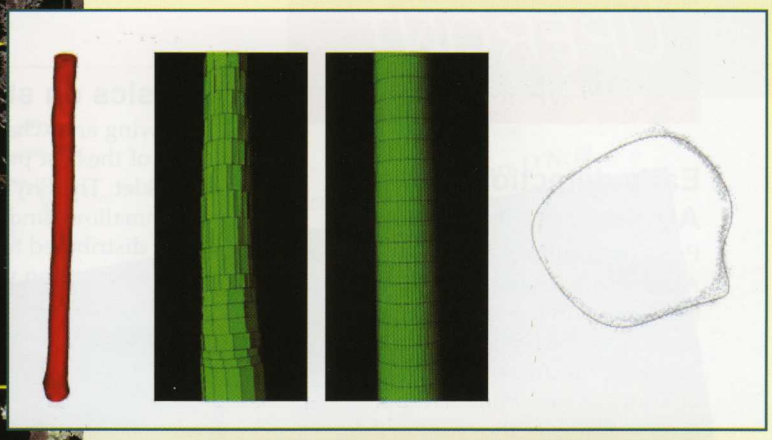

TREES IN 3D

With laser scanning foresters can assess timber value in advance of harvesting and stored data can provide mills with a guide to making more efficient cuts.

Because current methods of predicting timber yield are based on an assumpion of perfect growth, measurements are not as good as foresters would like. In a complex forest environment calculations are hard to make, so foresters needed a better system for assessing growth and pre-harvest value.

TreeMetrics was established in 2005 to solve that problem, and this Irish company has developed an accurate and cost-effective system based on 3D laser technology. During 2005 this system was applied under the TreeScan project, funded by the Council for Forest Research and Development (COFORD). TreeScan involved collaboration between TreeMetrics Ltd., the Institute of Forest Growth (Freiburg University), and the Telecommunications Software Systems Group (Waterford Institute of Technology). Purser Tarleton Russell Ltd also provided timber measurement R&D expertise.

The results were impressive enough for TreeMetrics to be awarded the Schweighhofer innovation in forestry prize for 2005. This award is recognised throughout the European forestry industry as marking a major achievement in innovation.

Having validated the effectiveness of the hardware to operate in forest environments, TreeMetrics has begun developing a range of software tools translating the raw data into information relevant to forest planners, managers and timber buyers. This information can be used to optimise harvesting.

Over the past few years terrestrial laser scanning has become more common in the construction industry where it is now used to capture and store highly accurate 3D measurements.

As the TreeScan project proved, the same capacity to capture and store information can be applied for the measurement of forestry crops. Traditionally, standing trees have been extremely difficult to assess, but laser scanning makes it possible to measure a range of properties, such as dimensions, spatial positioning, texture, and colour.

Measurement involves emission of a laser pulse, which reflects back from the object to the sensor. The angle of laser pulse emission and reflection, and the time between laser pulse emission and return, combine to record a highly accurate X,Y and Z co-ordinate of the point of laser pulse reflection. Also, the intensity of the reflected pulse can be analysed to provide information on an object's reflective index. The most advanced scanners can also capture information on colour intensity.

Improved Forest Measurement

Current pre-harvest forest measurement practice uses generic tables, and at best these just give a rough estimate on possible yield. One of the problems with these measurement is that little or no data relates to the actual taper and quality along the length of individual tree stems. These qualities are of utmost importance in cross-cutting and sawing at the mill.

The TreeMetrics solution provides timber growers and processors with significantly more information about the actual form of individual tree stems in a forest. One major advantage of scanning is that data can be stored for analysis later.

Detailed 3D models of individual stems can be visually assessed for straightness, taper, defects etc. Virtual measurement of stem diameters, at any height above ground level, can be made, allowing for assessment of both volume and length assortments. The cross sectional form of each stem can also be assessed at any height, and this has the potential to act as a guide, optimising cutting patterns in the sawmill.

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