Testing compression strength of wood logs by drilling resistance

Gerda Kalny, Kristijan Rados, and Hans Peter Rauch

University of Natural Resources and Life Sciences, Soil Bioengineering and Landscape Construction, Civil Engineering and Natural Hazards, Vienna, Austria (gerda.kalny@boku.ac.at)

Soil bioengineering is a construction technique using biological components for hydraulic and civil engineering solutions, based on the application of living plants and other auxiliary materials including among others log wood. Considering the reliability of the construction it is important to know about the durability and the degradation process of the wooden logs to estimate and retain the integral performance of a soil bioengineering system. An important performance indicator is the compression strength, but this parameter is not easy to examine by non-destructive methods. The Rinntech Resistograph is an instrument to measure the drilling resistance by a 3 mm wide needle in a wooden log. It is a quasi-non-destructive method as the remaining hole has no weakening effects to the wood. This is an easy procedure but result in values, hard to interpret.

To assign drilling resistance values to specific compression strengths, wooden specimens were tested in an experiment and analysed with the Resistograph. Afterwards compression tests were done at the same specimens. This should allow an easier interpretation of drilling resistance curves in future. For detailed analyses specimens were investigated by means of branch inclusions, cracks and distances between annual rings. Wood specimens are tested perpendicular to the grain.

First results show a correlation between drilling resistance and compression strength by using the mean drilling resistance, average width of the annual rings and the mean range of the minima and maxima values as factors for the drilling resistance. The extended limit of proportionality, the offset yield strength and the maximum strength were taken as parameters for compression strength. Further investigations at a second point in time strengthen these results.