

ACOUSTICS2008/2963
Ultrasonic quantitative strength assessment of artificially aged and archaeological wood samples

Ari Salmi^a, Kari Steffen^b, Joona Eskelinen^a and Edward Hæggström^c

^aUniv. of Helsinki / Dept. of Physical Sciences, POB 64 (Gustaf Hällströmin katu 2), 00014 Helsinki, Finland

^bP.O.B 56 University of Helsinki, 00014 Helsinki, Finland

^cElectronics Research Unit, University of Helsinki, P.O.Box 64 (Gustaf Hällströmin katu 2), FIN-00014 Helsinki, Finland

A large fraction of discovered archaeological artefacts are wooden. Since materials grow brittle and their stiffness decreases over time, it is vital for archaeologists to have methods that assess the strength of the object prior to moving it. We present preliminary shear and elastic modulus data measured using 100 kHz longitudinal and shear ultrasonic tone burst through-transmission. Artificially aged wooden samples and archaeological samples of known age were used to validate the aging procedure by comparison of the shear and elastic modulus. We also measured the modulae of water-logged samples obtained from the ship wreck *Vrouw Maria* sunken in the Finnish archipelago in 1771, and compared to samples artificially aged to similar age. Scanning electron microscopy (SEM) was used to compare the structure of artificially and naturally aged samples. The results presented may be used to create an artefact model for strength assessment, and to give guidelines of strength vs. age for archaeologists to support their logistics decisions.