

**304-146**

**MONITORING HEAT TREATMENTS IN STEELS BY A NON DESTRUCTIVE ULTRASONIC METHOD**

Carvajal, L.P.(1); Arévalo, E.(1); Astudillo, E.(1); Artigas, A.(1);

Universidad de Santiago de Chile(1); Universidad de Santiago de Chile(2); Universidad de Santiago de Chile(3); Universidad de Santiago de Chile(4);

In order to determine if heat treatments can be discerned by non destructive ultrasonic testing, bar samples of 4140 steel were subjected to the classical heat treatments of annealing, normalizing, quenching, and quenching and tempering, and their elastic constants, Young's, shear and specially Poisson's modulus, were monitored by ultrasound. Results show that the microstructural differences associated to the various heat treatments generate differences on the elastic constants that can be effectively discerned by ultrasound (using an ultrasound kit consisting on longitudinal and shear transducers, a pulse generator and a state of the art digital oscilloscope). Special attention is given to Poisson's modulus, since its determination involves the measurement of only times of flight of ultrasonic waves, with no need to measure the distance the waves travel, which is of quite practical importance, since it not only simplifies measurements, but also a fundamental source of error is eliminated. Thus, through this method, the microstructural evolution of a steel part subjected to heat treatments could be monitored by simple ultrasonic testing.