Project Proposal Short Abstract

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Title: Reduced Variability in the Quality Control of PaperBoard

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Typical variation in strength values for paper and paperboard are of the order of 5 to 8% which requires average values of produced materials to be higher than product spec values to avoid field failures. Meeting products specs with the incipient high variability in testing results comes often at the cost of higher basis weight, chemical additives, etc. Measurement of sound transmission through and along paper samples have been shown to correlate with elastic stiffness and strength values since 1965 and extensively at IPST. Moreover, these measurements have a) a higher sensitivity to process changes than equivalent mechanical tests, b) smaller variability, typically around 3%, c) do not require mounting, cutting, handling or sample preparation for testing d) are now widely commonly available in commercial on-line testing systems. The opportunity abounds to improve quality control in production facilities by replacing traditional mechanical methods with more sensitive, precise, faster ultrasonic measuring techniques. The proposal aims to assert and quantify mechanical quality to ultrasonic measurements e.g., RCT or SCT to measured sonic velocities, firstly through a systematic study using laboratory prepared samples of varying density, refining, bonding etc., and secondly substantiated with a commercial range of fiber-based products. The result will be a series of mechanistic mathematical relationships with specified accuracy to allow faster sonic measurements to replace traditional mechanical testing.