THE FLEXIBILITY OF HVI DESIGN ELEMENTS AND ITS INFLUENCE ON FIBER STRENGTH

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Abstract

Excessive flexibility in the fiber strength testing mechanism of the Spinlab 900B HVI system has created controversy for several years. Initially, the HVI specifications required that the strength measurement employ a constant rate of displacement. A tensile testing mechanism which deflects during strength testing will produce a fiber test similar to a constant rate of loading device. To identify major sources of flexing, we removed the mechanism from the instrument and mounted it on a rigid work bench. The mechanism was loaded in tension with dead weights. Deflections were measured with a precision dial indicator. We found that 63% of the deflection under load, was due to flexing of the breaker arms while 9.6% was due to flexing in each of two connecting yokes. The load cell, used to measure tensile force was a source of 17.8% deflection. Ball bearings used to pivot the assembly were found to be a considerable source of free play which will cause randomness in the strength signal.

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