

## ***Part 1 - Summary Details***

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*Please use your TAB key to complete Parts 1 & 2.*

**CRDC Project Number:** **CMSE1310**

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**Project Title: Scoping study of the influence of fibre length properties  
on the HVI fibre strength measurement.**

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**Project Commencement Date:** 1/7/12      **Project Completion Date:** 30/9/13

**CRDC Program:** Program 1: Value Chain

## ***Part 2 – Contact Details***

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## ***Part 2 – Final Report Executive Summary***

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Provide a one page Summary of your research that is not commercial in confidence, and that can be published on the World Wide Web. Explain the main outcomes of the research and provide contact details for more information. It is important that the Executive Summary highlights concisely the key outputs from the project and, when they are adopted, what this will mean to the cotton industry.

The cotton industry relies on HVI™ measurements of cotton fibre quality for commercial trading. The current scoping study has confirmed the influence of cotton fibre length on the HVI Strength measurement i.e. cottons with longer fibre length characteristics appear to be artificially stronger in the HVI test than similar shorter cottons.

The methodology for this study utilised one cotton parent cut to produce a range of samples with different fibre length characteristics. Detailed single fibre testing confirmed that fibre strength and elongation values for the samples prepared at different lengths were the same i.e. the sample preparation technique of cutting the cotton sliver did not introduce any other unexpected damage of the cotton. The HVI measured strength values did vary between samples exhibiting a clear dependence on fibre length. Combining these two observations, it was concluded that the observed variation in the HVI strength values must be an artefact of the instrument test method.

The source of this error has been identified. The natural variation in the individual lengths of fibres with a cotton samples is such that in the HVI test some of the fibres will not fully span the distance between the two sets of breaking jaws. Thus the instrument will always have a tendency to slightly underestimate the breaking strength of the beard. Existing protocols to account of this through the current general calibration processes has been shown to be inadequate as the effect is dependent on the specific fibre length properties of individual cottons.

A first principle approach for correcting for this error was developed based on a detailed examination of both the internal operation of the HVI Strength Module and knowledge of the shape of the fibre length distribution. This resulted in the identification of a simple correction factor. Application of this correction factor removed the effect of fibre length on the corrected strength values.

This study also identified that the HVI Fibre Elongation values also contain a significant bias due to fibre length.



Adoption of the outcomes of this work will allow a more accurate determination of fibre strength and elongation which are important fibre quality parameters.