



## THE CONFIGURATION OF TEXTILE FIBRES IN STAPLE YARNS

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### ABSTRACT

*The observation of individual fibres in a mass of fibres becomes possible with the tracer fibre technique. For the microscopic examination of ring-spun yarns containing tracer fibres, the depth of focusing is used as a reference for the fibre location inside the body of the yarns. Three-dimensional configurations of the examined fibres in the yarns are generated by computer graphics. This method will assist researchers who are working in the field of yarn and fabric structural mechanics.*

KEYWORDS: fibre migration, microscopy, tracer fibre technique

### 1. FIBRE MIGRATION

The need for theoretical description and interpretation of the various yarn properties has been met by both the microscopic and macroscopic examinations of yarns.

The observations of individual fibres in the twisted yarn structure became possible by the use of the tracer fibre technique. In applying this technique, a small proportion (that varies among 0.02 to 1.00 % by weight depending on the end product under examination) of black dyed tracer fibres is introduced in the carding stage, with the remaining undyed material. The resultant end-product (sliver, roving or yarn) is then immersed in a liquid medium having the same or substantially the same refractive index as that of the fibres concerned. When the yarn is then examined under a low-power microscope, the uncoloured fibres almost disappear from view leaving the path of each tracer coloured fibre to be clearly discerned (Figure 1). The tracer is seen against the faint background of the yarn

body as a wavy line representing the projection in one plane of a helix. This method was devised by Morton and Yen [1] for the study of staple fibre yarns. Later, Riding [2,3] applied this technique for the study of continuous filament yarns. Description of this method can be found elsewhere [4].

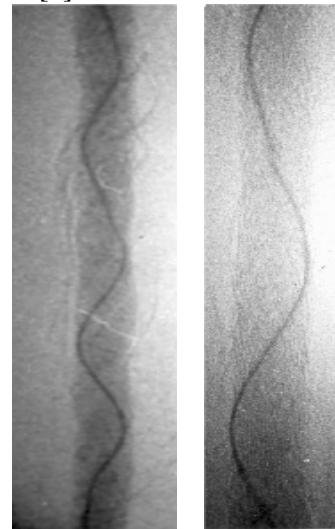


Figure 1: Tracer Fibres in Short Staple Yarns