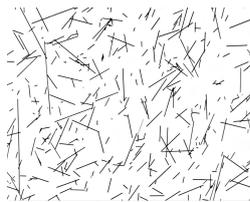
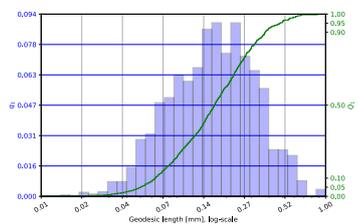
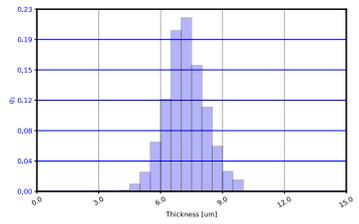
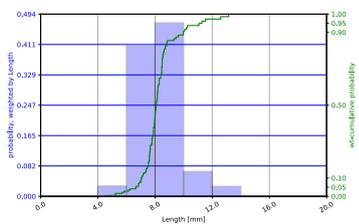
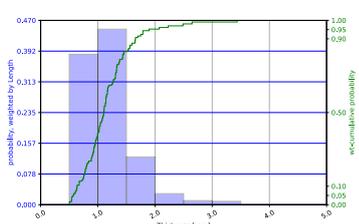
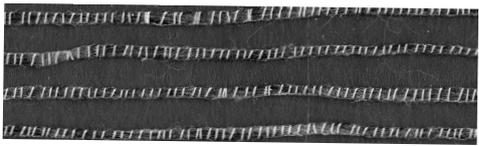
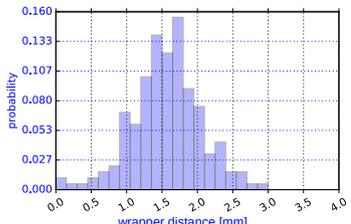
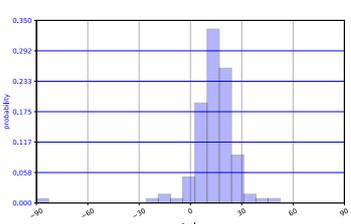


rCF - Geometrical Characterisation

Dr. Hubert Schmid, Isabel Schmid / IST AG - Fiber & Particle Analysis

Abstract	Introduction
<p>The length and other geometrical properties of rCF (recycled carbon fibers) are determinant parameters in the production of composite materials containing rCF. Depending of the recycling procedure the rCF staple fibers (fibers with finite length) are available as roving snippets (fiber collectives) or single fibers.</p> <p>The geometrical characterization of rCF fibers, roving snippets, yarns and nonwovens is done with the measurement system FibreShape. The main focus in this presentation is on the length analysis of the rCF, but the analysis of fiber width, orientation and texture of yarns are also available in FibreShape. The geometrical characterization of fibers provides the information to predict the quality, strength and uniformity of a fiber reinforced composite.</p>	<p>FibreShape provides the user with the safety of a standardized quality measurement. Knowing the properties of a raw material is the first step to create a high-quality product. FibreShape can be used for entrance control of the length and width of rCF as well as to control the fiber length as part of the processing chain.</p>
	Discussion
	<p>The fiber length is a key characteristic important in the production of roving snippets, yarns and nonwovens. When working with short-fiber composites it has to be considered that for the transfer of stress there is relatively little interface per fiber. The so-called "critical length" of carbon fibers is approximately 5 mm. This length is necessary to ensure that the fiber can be stressed to its full strength. Depending on the compound, different rCF lengths are realizable.</p>

rCF fiber: length & width	rCF roving snippets: length & width	rCF-nylon-hybrid yarns: width, orientation & distance
 <p>Single rCF scanned at 3200 dpi, Material provided by the Faserinstitut Bremen</p>  <p>Distribution density (q1) of the geodesic length, weighted by length</p>  <p>Distribution density (q1) of the width, weighted by length</p>	 <p>Roving snippets scanned at 3200 dpi, Material provided by STFI</p>  <p>Distribution density (q1) of the length of roving snippets, weighted by length</p>  <p>Distribution density (q1) of the width, weighted by length</p>	 <p>rCF-nylon-hybrid yarns scanned in reflective light mode at 1200 dpi. Material provided by the DITF</p>  <p>Distances between wrapper filaments</p>  <p>Orientation - Distribution density (q1) of the angles of the wrapper filaments.</p>

Summary	Acknowledgements
<p>Sampling inspection of purity or uniformity or the control of geometric characteristics help to improve later process steps. Knowing the properties of the rCF as raw material or during different process steps allows to detect regularities or irregularities. The advantage of FibreShape is the support of a wide size range and the ability to measure hundreds to thousands of objects with a single batch for statistically significant results.</p>	<p>Thanks to the Faserinstitut Bremen, STFI and DITF for supporting this poster presentation.</p>