

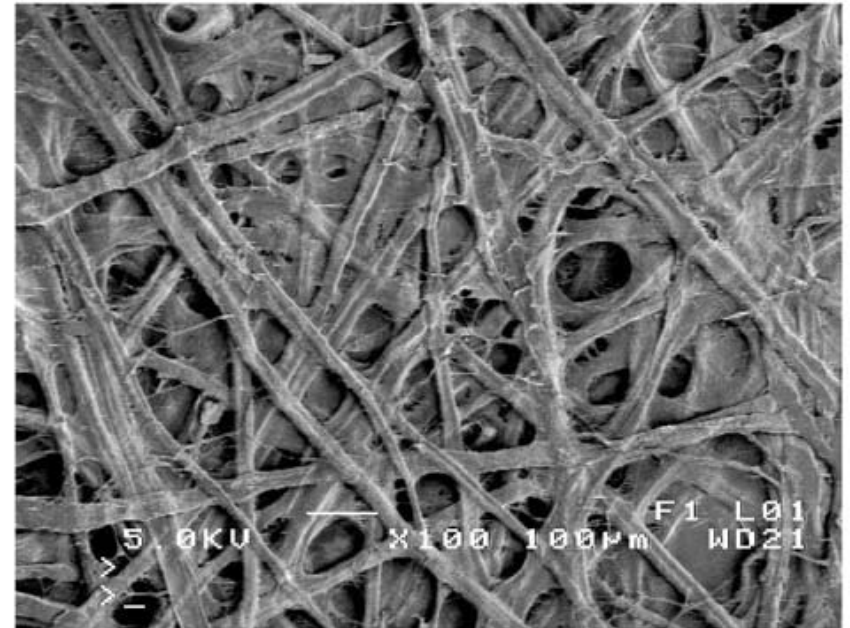


Single Fiber Fragmentation of pulp fibers

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Background

- A pulp fiber in a free span will twist when subjected to strain. The twist depends on the fibril angle in S2 and will result in a high strain to failure.
- Testing of a fiber in a free span result in one data point per fiber – weakest spot.
- A pulp fiber in a paper cannot twist. Strain parameters for a fiber allowed to twist is of limited use in modelling of paper behaviour during strain.
- Fiber fragment can bear load in a paper subjected to strain.

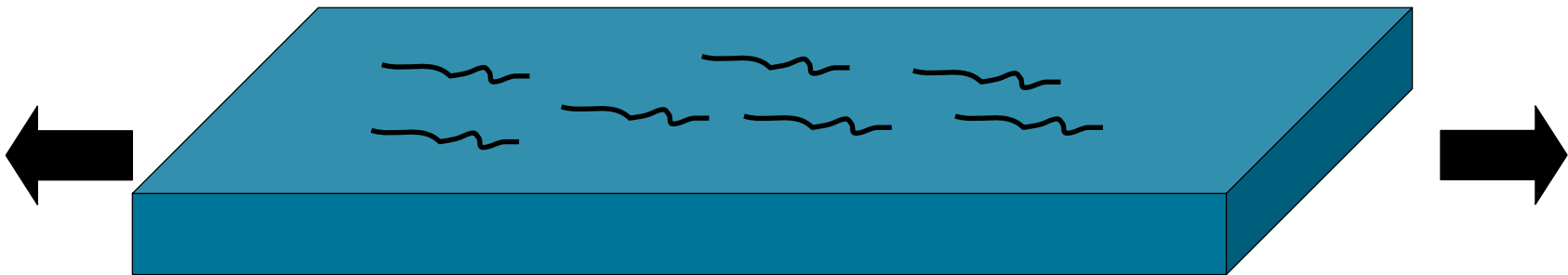


Goal and Purpose

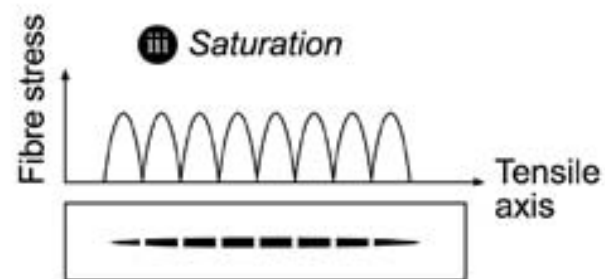
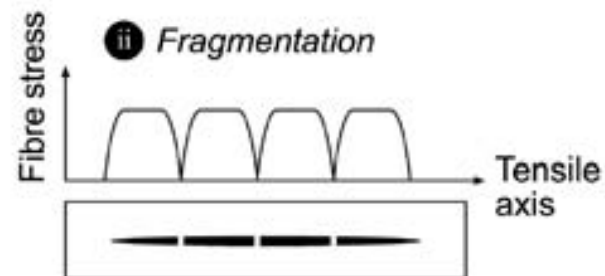
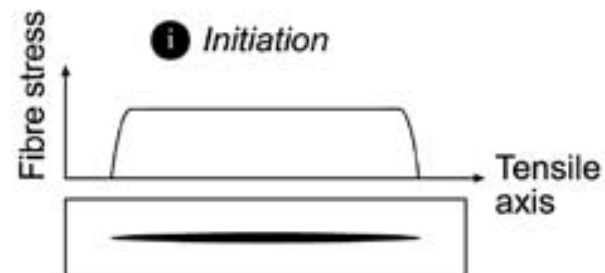
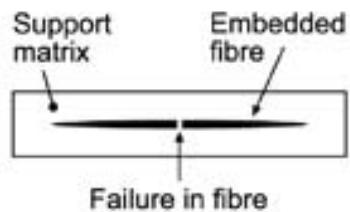
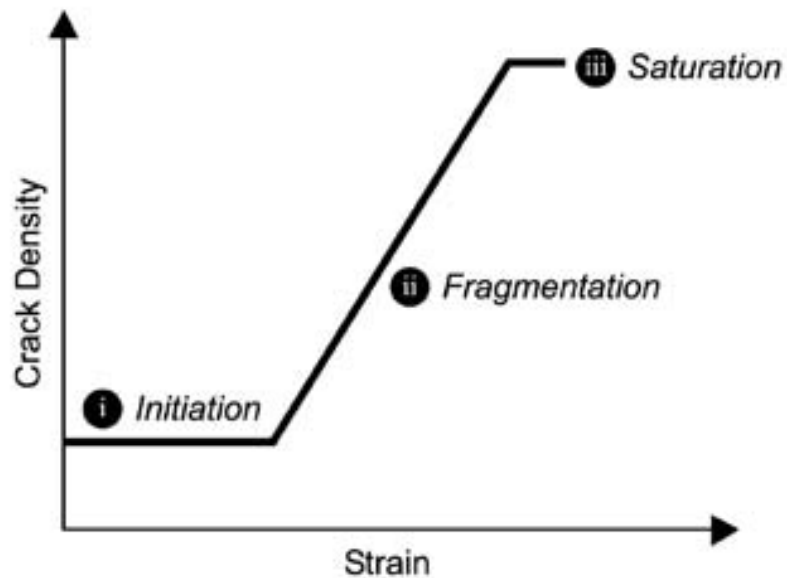
- Goal:
 - Provide material constants for the strain behaviour of a pulp fiber that cannot twist.
 - Single fiber fragmentation gives many data point per fiber. The embedded fiber cannot twist. Weibull statistics can be used to calculate material constants.
 - Develop a experimental procedure for Single Fibre Fragmentation of pulp fibers.
- Purpose:
 - Use material constants for a fibre unable to twist in a micromechanical model of a paper (*Kotik, O. et al*).

Experimental setup

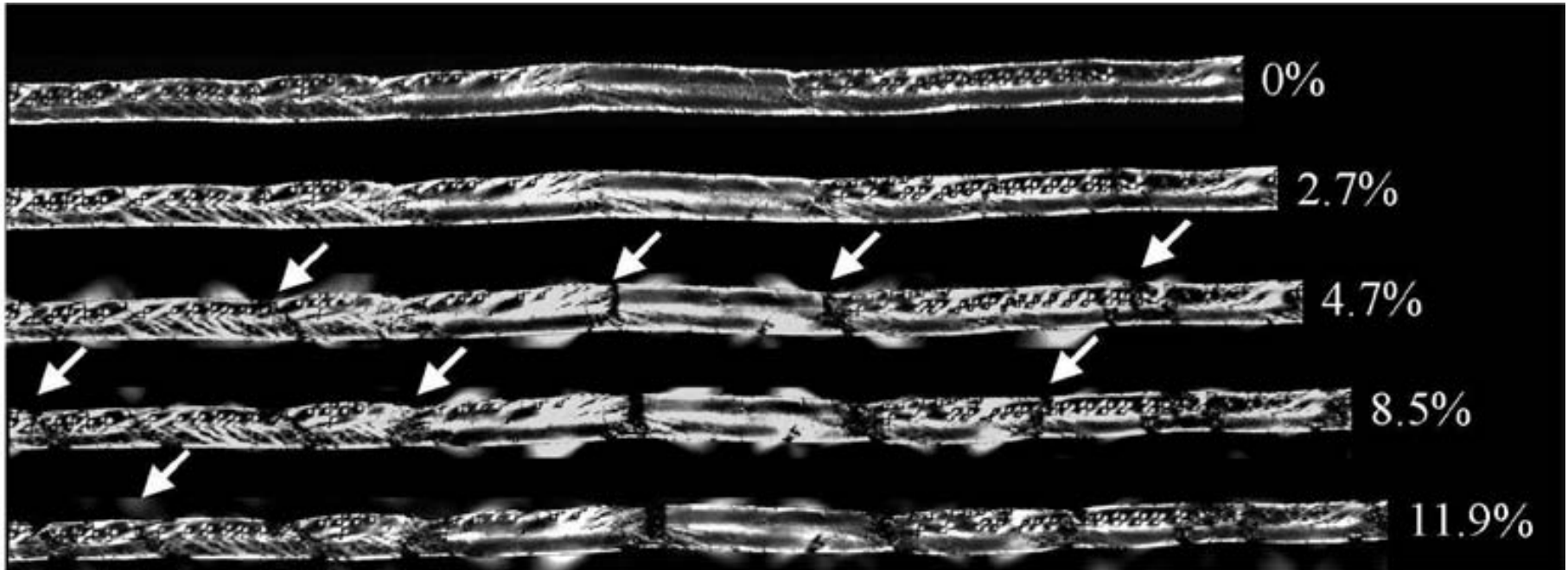
- Polarized light microscope with a CCD-camera.
- Minimat Tensile testing equipment.
- Parallel aligned pulp fibers embedded in polyester resin.
- Tool for analysis of fragmented fibers (will be demonstrated)



Procedure



Analysis was carried out on images of a fiber at several strain levels. This analysis will be demonstrated at poster section.



Part of fiber. Several measured strain levels are omitted in this illustration.