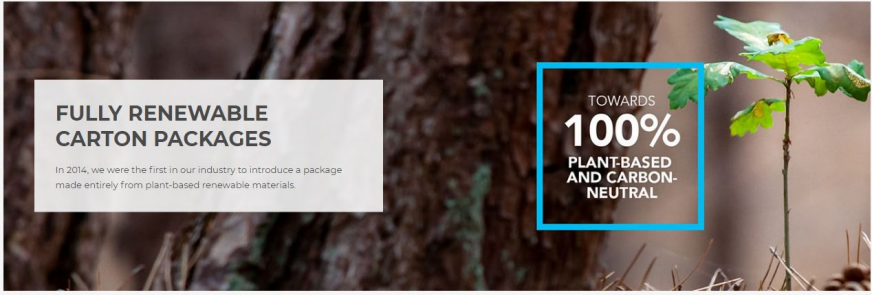

Tetra Pak®
PROTECTS WHAT'S GOOD

Strain rate characterization of Packaging Materials

More than half of the world's consumers are looking for packaging that is recyclable, better for climate and with a low impact on the environment. With such high demand, the time is now to look into developing the 'package of the future' – one that supports a low-carbon circular economy without compromising food safety. What does the future sustainable package look like? Or more importantly, what is it made from? Tetra Pak aim to push the figure of renewable material from wood fibre in carton packages towards 100%. One example of a more environmentally friendly packaging solution is for instance to produce Paper Straws.

Plant and wood-based fibres of cellulose materials are sensitive to moisture, temperature and strain rate which influence the mechanical performance significantly. Manufacturing of packages in filling machine and paper straws are relatively fast, which indicate that the material is exerted to high strain rates. Hence experimental material characterization for strain rate dependencies is necessary to build knowledge and understanding of the importance of this material property and how to accurately include this material property dependency in virtual models. Therefore, the focus in this work is to perform mechanical tests of strips of individual layers of packaging materials to quantify the strain rate effects in different packaging materials. To increase the understanding and to optimize material structures and material behaviour and its changes over different processes, computer simulations are made.

Scope:

- Literature survey on strain-rate material responses
- Methodology development and calibration procedure for experimental measurements
- Perform experimental tests on different material layers and the complete packaging material

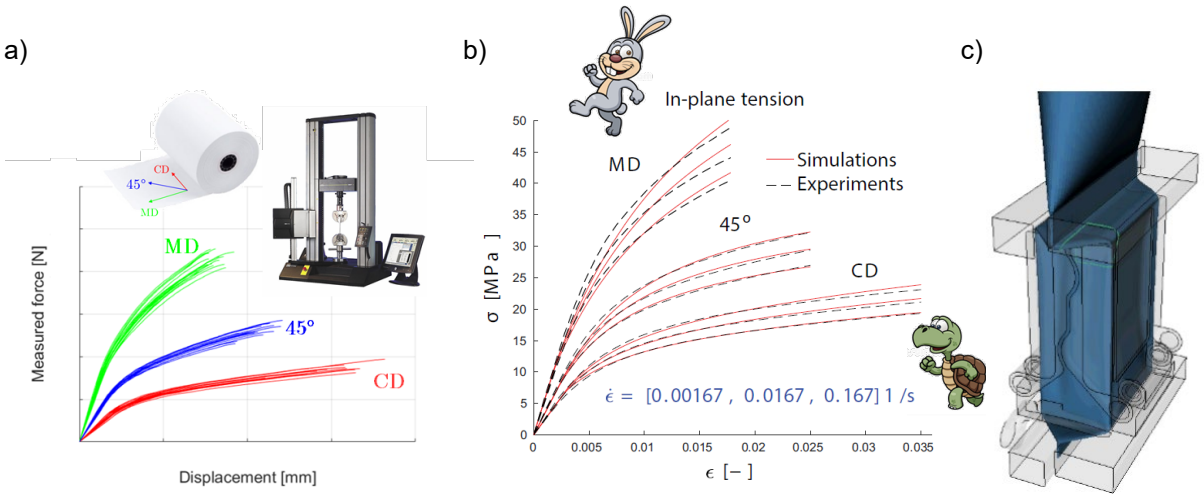

Figure 1. a) Mechanical material response of paperboard in the three different material directions MD, CD and 45 degrees. b) Different strain rates during in-plane tension tests of paperboard (*Robertsson et al., A rate-dependent continuum model for rapid converting of paperboard, Applied Mathematical Modelling, Volume 99, November 2021, Pages 497-513*) and c) Computer simulation model of package filling machine simulation of package forming.

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ABOUT TETRA PAK®

Tetra Pak is the world's leading food processing and packaging solutions company. Working closely with our customers and suppliers, we provide safe, innovative and environmentally sound products that each day meet the needs of hundreds of millions of people in more than 170 countries around the world. With almost 22,000 employees based in over 85 countries, we believe in responsible industry leadership and a sustainable approach to business. Our motto, "PROTECTS WHAT'S GOOD™," reflects our vision to make food safe and available, everywhere.

More information about Tetra Pak is available at www.tetrapak.com

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