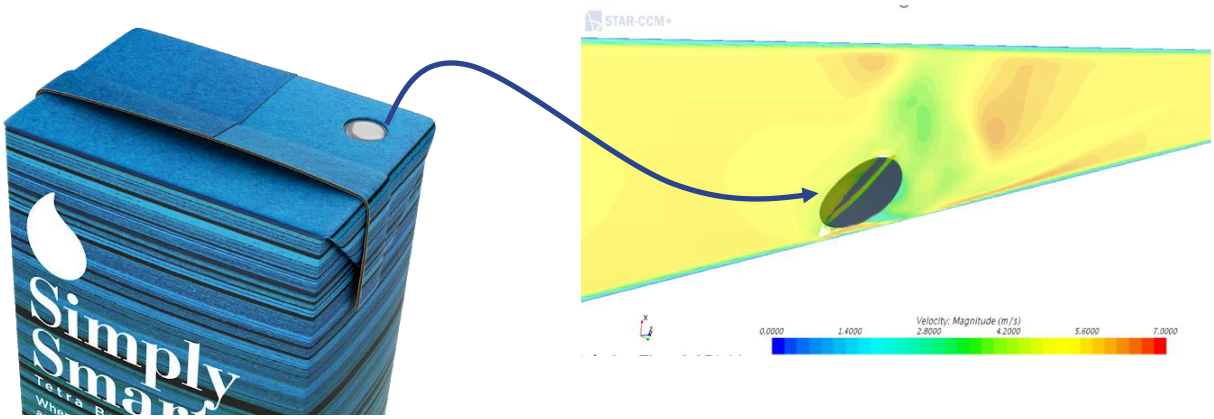
Modelling the transport and interaction of “confetti”



Paperboard are being cut with a set of knives and dies mounted on rollers during packaging material production. This complete process is called Pre-Laminated Hole (PLH) due to this cut hole is later laminated with polymer layers in the converting process. Afterwards the PLH, also called “confetti”, consisting of a piece of paperboard, is extracted and transported out from the roller into an exhaust system. The behaviour and transport of the “confetti” depend on its shape and its interaction with the surrounding, i.e., the air flow, the exhaust geometry and other “confetti” which are transported simultaneously in the system.

Virtual modelling is used to increase the understanding of how these different parameters influence the extraction. The model consists of **Fluid-structure interaction (FSI)** simulations combining **Computational Fluid Dynamics (CFD)** to describe the air flow and **Finite Element Method (FEM)** to predict the deformation and non-linear behaviour of the “confetti”. This master thesis project is focused on developing and enhancing the current FSI model to include the interactions between several “confetti” in a complex geometry. Virtual testing in STAR-CCM+ and Abaqus™ will be performed and compared to available experimental data. The focus is to predict locations in the exhaust system where the “confetti” are slowed down which lead to lower performance. Moreover, the exhaust system can be optimized with such a new detailed modelling method. For more information, please feel free to contact us.

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