

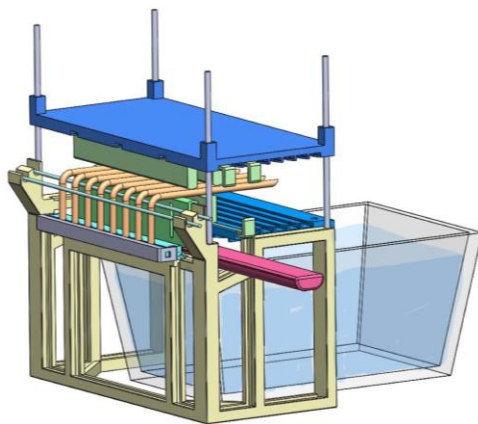
Mimic Drinking from a Straw in a Lab Environment – The MiDrink

To successfully develop straws, relevant and efficient test methods are needed, and the ability to mimic a user's drinking behavior in a lab is key for securing good functionality. Therefore, user observations have been conducted and the stresses that consumers expose straws to have been identified, as a result of this, a tool that can mimic these stresses have been manufactured. This project has been conducted by Ella von Matern and Karoline Teigland at Lund Faculty of Engineering and in collaboration with Tetra Pak.

As an action to prevent and decrease the amount of plastic litter, the European Parliament has decided to ban single-use plastics by July 3rd, 2021. This includes single-use plastic straws and due to this, Tetra Pak must replace their current plastic straws for their liquid portion packages. The aim with the *Mimic Drinking from a Straw in a Lab Environment* project is to aid the development of straws through minimizing the need of panel tests when evaluating the functionality of straws. The outcome was a test set-up that mimics the stresses that straws are exposed to during use in a relevant, repeatable, and efficient way.

The project started with a user observation at two preschools where the team members gave children soft drink packages and observed how they interacted with the straws and what stresses they exposed them to. The team members then compiled the different stresses and evaluated which were of highest importance for the project, and after this they started an iterative development process containing of generation, evaluation, further development and testing of different concept ideas. All this lead up to a final concept which was manufactured and tested.

The conclusion that can be drawn from the user observation is that children expose straws to a wide range of stresses when drinking, and most of the stresses are on the part you put into your mouth. The stresses include drinking, biting, pinching, bending of the part you put into the package, pinching of corrugation, and friction from pushing the straw in and out of the package multiple times. It can be concluded that children normally play with the straws while consuming a drink and that it is common for them to drink, play, and then drink again.



The process resulted in a test set-up called the MiDrink, which mimics the stresses caused by children and will be beneficial during development processes of future straws. MiDrink consists of a stand with plates which tools can be attached to, these tools allow the concept to mimic the different stresses. MiDrink exposes the straws to stresses alike the stresses from piercing the package, drinking, pinching, biting, bending the straw, bending of corrugation, and friction. Since the concept is modular with many different tools, the operator can choose during the procedure if all or only some of these stresses should be used, depending on the test specifications. The execution time for the full procedure is about 60 minutes.

This project was conducted to observe how children drink with the current type of straw and package, the design and material of the package and straw will most likely change over time why new user studies should be conducted when these transformations occur. The future may hold a completely different way of consuming still drinks.