

# DESIGNING TO FILL UP THE TRUCK

*An explorative study for reducing the indirect environmental impact of food packaging*

Uli Nicol Hosse Pastor, Division of Packaging Logistics, Department of Design Sciences Faculty of Engineering LTH, Lund University

**Have you ever received a parcel and complained because there was more air than product in the box? This can also happen when food companies deliver their products to the supermarket, just that we do not see it. What can be done about it?**

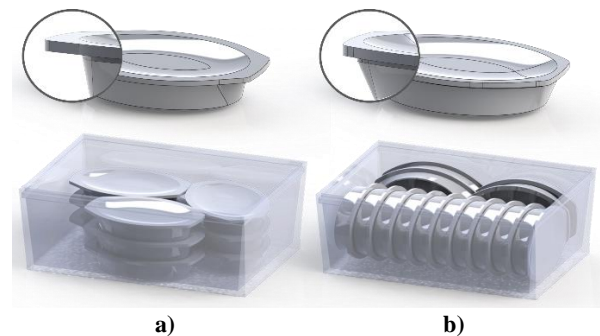
In the road to an eco-friendlier future, packaging companies are looking for ways to reduce their environmental impact. But how can they do it? One of the options, that was explored in the research, was to include transport requirements when designing food packaging. Transport requirements are specially related to the size and shape that the boxes used to transport the food have. Why do we need this? Because, if we consider the shape of the box, we can design a packaging that has a better fit, and we will reduce the amount of annoying air transported. Micvac, a ready meal packaging company, was studied to explore their possibilities of applying this idea.

First things first, we needed to understand the system from suppliers to waste handlers. Not only understand it, but also quantify the carbon footprint related to packaging. The study found that around 88% of the CO<sub>2</sub>e emissions were related to the food, while 5% was for packaging material, 4% waste handling, and 3% transport. It was also found that 81,7% of the emissions cause by transport are emitted when the ready meal trays are transported from the manufacturer to the retailers. Interesting right? Most people think packaging has the highest carbon footprint, not the meal that is contained. Is this another reason to focus on avoiding food waste? Definitely. Should we also try to reduce the impact of packaging? Of course!

Once we understood the system, we explore how are the current trays being designed. Micvac has an interesting production process, in which they seal the meals and then cook them in microwave ovens. Therefore, the packaging was initially designed based on these requirements, along with the needs of the product and customers (the client is always right). But, as they did not consider the crate sizes that are used to transport the product, the volume fill rate of their portfolio varied from 25 to 38%. The fill rate is how full is the box with the product

we want to transport. We want high fill rate because that means low amount of air is being transported. Small increases can mean less CO<sub>2</sub>e emissions and a step closer to fighting climate change.

Small changes can have high impacts. See Figure 1 for example. Reducing the handle size made possible to fit 14 trays instead of 9! This meant an increase of fill rate from 33% to 47%, and a reduction of the carbon footprint per tray transported.



**Figure 1. a) Before and b) After including transport requirements in the tray design.**

There are, of course, challenges in this process. Let us assume 14 trays are delivered to a retail store instead of 9. The consumers will not automatically buy more trays just because they are available, so there is a risk of giving the store more than what they really need, and eventually causing food waste (Which we want to avoid at ALL costs). Therefore, we need to understand how many trays per box the store needs, how often they need it, and combine this additional finding in the packaging design process.

Interesting right? Even though we can make an effort of optimizing the packaging system, the results will always depend on how well we are including the consumers in our analysis.