Popular Abstract

All over the world, on a daily basis, billions of people need food delivered to them safely. This commonly happens with the use of paperboard packages. For obvious reasons, these packages need to stay intact during intended use. With such high stakes, the question is, how can one ensure the durability of paperboard packages?

One solution is to use computer simulations to predict how paperboard behaves when you load it in different ways. You test different variations of paperboard to see which variation is most durable. As you can probably guess, more complex simulations will likely yield more accurate predictions. One way to increase the simulation complexity is to account for the microscopic structure of paperboard. Doing this in the past, you would have to wait for weeks or months for the simulation to complete. This is not feasible on an industrial scale. Today though, thanks to clever computation algorithms, one can perform these simulations in minutes. This approach - paperboard microstructure built into the simulation, combined with existing clever computation algorithms - has been tested in this thesis work. Overall, the work has been successful. The simulations performed can predict how paperboard responds when stretched along one axis. Further, a framework has been constructed, upon which future simulations can be based.

This promising work shows the possibilities to more accurately predict paperboard durability, and therefore ensure a safe delivery of food to billions of people all over the world.