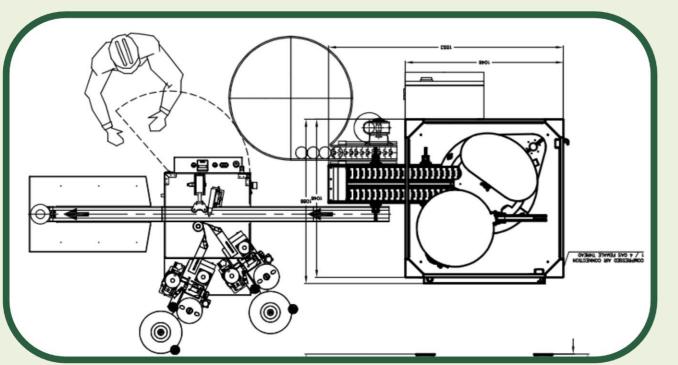
# Design and integration of a pasteurisation and packaging machine into the existing production line

Sam Nuyts and Jorbe Thijs

Bachelor of Electromechanical Engineering Technology

## Situation

Don Corleone Cocktails and More is a company located in Diepenbeek, Belgium. They supply cocktails and mocktails to restaurants, cafés and private clients. Since the company has been growing rapidly in recent years, they want to automate the pasteurisation and packaging process. This process ensures the killing of most micro-organisms in the mocktail, without affecting the taste or texture. It must be implemented in their current production line.



#### **Existing production line**

- Bottles the cocktails and
- mocktails Labels the bottles
- 700 bottles/hour

### **Problem**

The mocktails are now manually pasteurised by placing them in a so called "bath pasteuriser". This machine heats the mocktails following a temperature curve until 80°C. However, this method of pasteurising isn't ideal.

- Causes physical strain (e.g., back issues)
- Very time-consuming
- Increased risk of bottle breakage

#### THE GOAL

- Expanding the existing production line to remove manual labour
- The mocktails will be pasteurised and packaged



Figure 2: Manual pasteuriser [1]



For this project, the Kroonenberg's model was followed. This model consists of several steps, as shown below.

**Function block** 

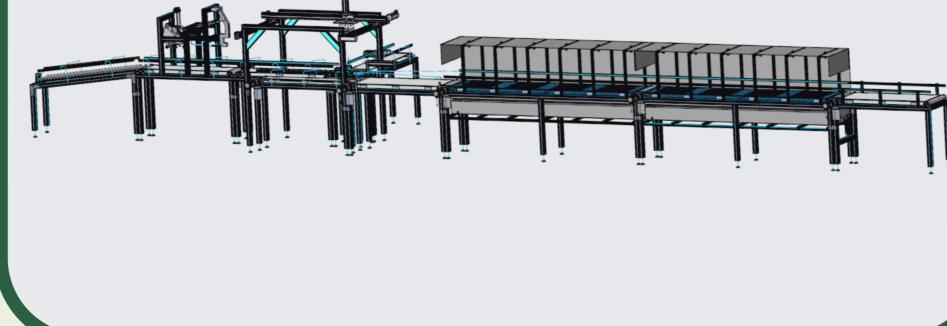
Diagram



In this last step, the boxes get closed and sealed with tape.

Figure 1: Existing production line

- 1. The **first flap** of the box touches a curved component that causes it to close, as shown in figure 7.
- 2. A hammer folds down the **second flap** from the back. This hammer is operated by a piston.
- 3. Next, the longer side flaps are also folded in by a curved aluminium rod.
- 4. The box is sealed by a tape roller.
- 5. The boxes are pushed further by a conveyor belt, causing them to roll down. Allowing an operator to store them on a pallet.



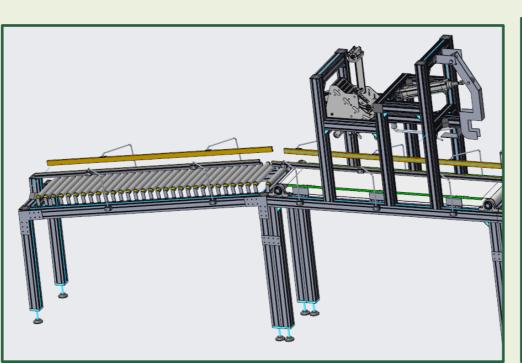


Figure 6: Sealing the boxes

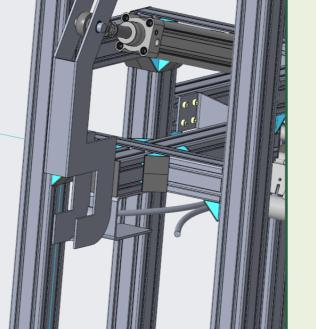


Figure 7: Close-up of the sealing mechanism



Requirements

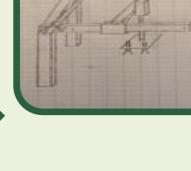
	reference de terre	Doorfin (34) on transportant	metador o presion a transportunar
- factor	<u></u>		- 8
Ормантира	** <u></u>	in sen bed	999
atheaster.	D		000
Ullinder	0_0	C D	- 4
-	COMMON SOURCE	Temportand	Genedica





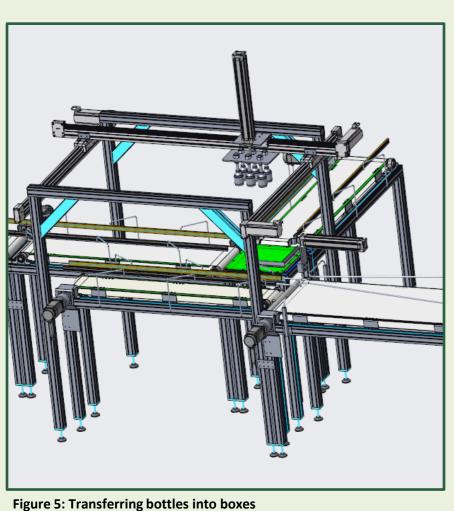












The wide row of bottles, coming from the pasteuriser, is narrowed to a single line, so they can be placed into boxes. This is done using vacuum grippers that lift two sets of three bottles.

In the horizontal plane there are linear guides to ensure a smooth and precise movement. The vertical movement is done by a piston.

Empty boxes are supplied by a conveyor belt, until they are stopped by a mechanical barrier.

When the box is filled, it is pushed forward onto a conveyor belt to go onto the next step.

Hot water is sprayed onto the bottles inside a closed environment in which the bottles pass through at 2.8 mm/s. To ensure that each bottle gets through at this speed, the bottle row must be widened. A cooling and drying stage follows to ensure that the temperature curve is being followed, and the bottles are completely dry. The mocktails are now ready to be placed in a box.

Solutions

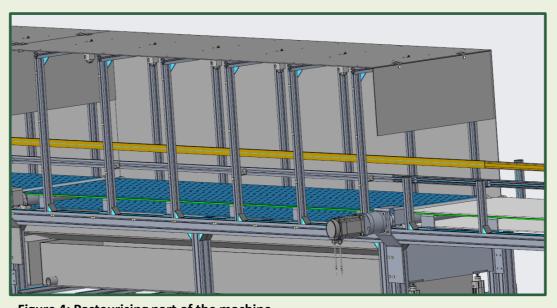
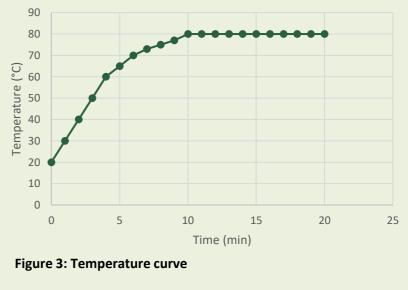
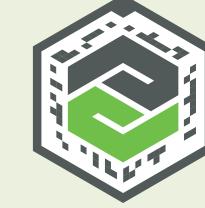


Figure 4: Pasteurising part of the machine



Scan the QR code and download the app to view the complete 3Dmodel of the machine.





Supervisors / Co-supervisors / Advisors:

Prof. Dr. Ing. K. Kellens, Prof. Dr. Ir. M. Daenen, Dr. Ing. J. Bijnens, Prof. Dr. J. Lievens, Ing. D. Speelmans



'Bath Pasteurizer | Batch pasteuriser - NORMIT'. Accessed: May 05, 2025. [Online]. Available: https://en.normit.sk/catalog/food-and-beverages/item/pasteurizer-2



