Problem
Ball Packaging Europe delivers their cars to mainly large enterprises like Bavaria Brand Management. The cars that Ball Packaging Europe delivers to their customers are stucked on a pallet.

The sheets between the layers of cars will be re-used. Customers of Ball Packaging Europe retrieve those plastic or cardboard sheets back from the pallet. Customers send these sheets back to Ball Packaging Europe because of the deposit on these sheets or contracts agreements.

When pallets with plastic or cardboard sheets go back to Ball Packaging Europe, employees have to check each sheet for imperfections (tears, bends and flaps) and separate the imperfect area from the area that can be re-used. The sheets that are too dirty will be 'shaked' off. The handling and sorting of the sheets is a continuous repetitive process done by hand and naked eyes. This process requires making the same motion during the entire shift in order to check the separator sheets.

Not every employee grades a sheet the same way, especially not later in their shift. An employee might rejet a sheet while another employee might approve the same sheet. The same goes for brushing; some employees might grade the sheets drier than others.

Customers of Ball Packaging Europe complain about the quality of the separator sheets. Cargo Service Europe wants to make an in-house handling and sorting procedure (with necessary equipment) in order to help employees at Ball Packaging Europe with the separation of separator sheets. This equipment would help the users (employees of Ball Packaging Europe) to grade, clean and sort the separator sheets all in the same quality level. This equipment would also improve the current ergonomic situation for the end-users, because it is designed with the end-user in mind.

The handling and sorting equipment Cargo Service Europe wants to make will be branded and made under a new name: Corugan, Industrial Packaging Solutions.

The Handling and Sorting of Separator Sheets
Ergonomic improvements in the (soda-) can industry

Solution
The solution for this problem is a modular system. This modular system enables the end user to work on an ergonomic matter because he is able to adjust the height of the ‘Boven-Transport-Modul’, or BTM for short. Besides the BTM he is able to adjust the height of his pallet with separator sheets.

The system consists of various similar modules which together form the handling and sorting equipment. In the standard configuration the separator sheet is placed on top of the BTM. The sheet travels through the ‘Corugan-Brushing-Modul’ and gets brushed on both sides in order to get the dirt off. After the BTM, the sheet gets picked up by the ‘Onder-Transport-Modul’ (OTM). On the OTM, the sheet is scanned on the bottom side. Next step is another BTM, here the sheet is scanned on the top side. At this point it is known in what state the separator is. The distinction is made between an A-sheet, B-sheet and reject separator sheet. When a sheet is an A-sheet, storing it in inert conditions, it will be pushed out by the first ‘Corugan-Sorting-Modul’ (CSM). When it is graded a B-surface, the second CSM will push the sheet off and reject will be pushed off by the third CSM.

All conveyors are vacuum conveyors. A vacuum is created within the conveyor belt. Using perfectly lined up holes in the vacuum lid as in the conveyor belts make it possible for the separator sheets to stick to the conveyor belt.

- BTM: ‘Boven-Transport-Modul’. This vacuum conveyor has a standard height of 1050mm but can be adjusted to the end-user’s wishes.
- CSM: ‘Corugan-Sorting-Modul’. With 4 pneumatic actuators it ejects sheets from the vacuum conveyor.
- OTM: ‘Onder-Transport-Modul’ is usually placed after a BTM. In this configuration a sheet can be controlled or cleaned on both sides.
- CSM: ‘Corugan-Brushing-Modul’. It has 22 brush heads are made of brushes. These brushes, together with pressurized air and suction makes sure the separator sheets are ‘dry-cleaned’.

Ergonomic improvements

Working height
The working height for the employee is improved. The employee is now able to adjust the height of the pallet as well as the conveyor. This makes sure the employee is able to adjust the working height to his wishes.

Not so heavy
The employee does not have to flip the separator sheets anymore. Initially, the employee had to flip the separator sheet in order to scan both sides with the newest side. With the handling and sorting equipment the employee does not have to do flip the sheets anymore which will make it less heavy.

Room for feet
The employees initially did not have much room to place their feet and therefore their stature was not anthropometrically sufficient. Employees would tend to bend a bit. With the handling and sorting equipment they have more room and are able to stand directly next to the conveyor without bending over.

Faster
The work is done faster. Employees will be able to process the sheets three times faster. Because it is faster, it will not have less effect on the back and hands of the employee.

More accurate
The separator sheets are scanned better and more accurate with the handling and sorting equipment in relation to the naked eye. Working with the handling and sorting equipment would make sure the separator sheets are consistent of quality at a higher pace.

Ability to work from left to right and vice versa
The employees is able to stand on both sides of the handling and sorting equipment. Initially, the employee was only able to work from left-to-right. With the handling and sorting equipment the employee is able to stand on both sides of the conveyor.

Test setup
For the first version of the handling and sorting equipment, the scanning system is considered the most important part. The scanning system has the highest priority and therefore a part of the scanning and sorting equipment is built, with five vacuum conveyor. It is possible to test numerous things and attach a scanning system. The scanning system is connected to Edwin Wissen, a company specialised in high speed scanning systems.

Jan Thissen
Designing New Handling and Sorting Equipment
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Integrated Product Design

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