
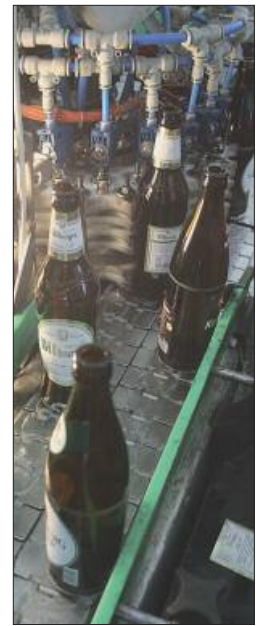


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Take and let go

The change to individual bottles at Bitburger via a mobile sorting plant

The German brewery landscape is characterised through a high number of different brands.

The mixing rate of the returned empties increased steadily through the last years at Bitburger.

The cause lies in the extension of the variety of trading units. Shapes, Colours and in the future maybe also different filling quantities as well as individualising through embossing, account for this complexity.

At the beginning of September 2008 Bitburger launched a new individual bottle. The company Faktor, with its mobile bottle sorting plant, that realises a fluent exchange of trading units, made sure that no shortage in the sorting of the empties took place. Hans Eisenbichler, who developed this mobile bottle sorting plant together with his partner Gábor Farkas, explains the workings of the plant and the backgrounds to this project in the interview. (hof)

BRAUINDUSTRIE: *Certainly, a high variety of trading units and the trend to individual bottles in the brewing and beverages industry is proving advantageous for your company?*

Hans Eisenbichler: Often this trend is seen as a step in the direction one-way. One-way seems at first fanciable, due to more turnovers and less effort; however it shows less margin, more competitive pressure and less customer loyalty. Our company and also our persuasion benefit if the multi-way part in breweries is stabilising or increasing. This can only be achieved with competitive appearance. The brewery is free in its decision regarding shape and equipment with our sorting plant. It simplifies and encourages the increasing direct exchange between breweries and supports to reduce costs. An individual bottle is unique and emphasises the premium character.

BI: *One branch of Faktor is the mobile bottle sorting plant. Which components comprise the plant?*

Eisenbichler: The plant comprises the following components:

- palletiser, unpalletiser for crates
- bottles unpacker
- crates forwarder
- bottles packer
- bottles identification, bottles sorting
- new-glass-clearer

- packer for used bottles on pallets
- peripheral equipment (fork lift truck, compressors, device for packing and shrinkage of the used, sorted out bottles)

BI: *Encapsulate the workings of the single components and their interaction.*

Eisenbichler: Well, the crates arrive unsorted from trade and are, at the palletiser, which is positioned directly at the bottles unpacker, placed on a conveyor. Then the bottles are unpacked from the crates, the empty crates are afterwards transported to the packer, which is standing parallel to the unpacker. In that progress eight crates are emptied per cycle.

In the bottles-running-in the bottles from the return are led to a single belt. The camera identifies, through a proximity switch, exactly the minimal distance of the bottle to the camera, the bottle is documented from the camera. The bottle is compared to the stored bottle models and classified.

Due to the defined number of bottles between camera and star the bottle can be assigned with a bag of the star. At the forced adoption of the bottle in the star, the bottle is rooted to the actual bag via vacuum. When the bottle reaches the assigned exit lane, it is unlocked; the bottle moves to the exit lane.

The unlock in the direction of the exit lane is working with a precision that allows a division of the different bottle models in two or even three parallel running chain belts with each 95 mm width only.

If it's assumed that the bottles are lead away in collocated, rectangular lanes, you can sort up to eight different bottles in a star with a diameter of about 70 cm. (incl. run-in lane and one lane as "rag picker").

BI: *Are more bottles possible?*

Eisenbichler: The number of bottles for sorting is limited by the possibility of removal. A star with 70 cm diameter is able to sort up to eight different bottles. Of course you can cascade two stars or you can dimension the star larger to cover a higher amount of different bottles.

BI: *What is happening to the sorted bottles?*

Eisenbichler: The sorted bottles are transported to the different packing stations, according to customer requirement:

To the big packer, that can equip eight crates simultaneously, whereby missing bottles are added from the new-glass-clearer; to the bottles packer for the sorted out bottles that are "industry packed" or also to the little packer for bottles that are sorted out and are packed in provided crates (e.g. from other breweries).

BI: *The sorting is controlled central through one programme ...*

Eisenbichler: ... that was created initially for the controlling of lifts. It suites perfectly for this purpose, as it is constructed especially for a jerk free start and level control; thus for balanced coordination of the different components.

BI: *Are individual components also convertible, e.g. when higher/lower performances are needed?*

Eisenbichler: At the construction of all components it was made sure, that the plant is applicable mobile on-site, thus easy and quick to assemble and easy to load with a maximal dimension for the single components of 240 cm height and maximal 200 cm width. Each of these components can be laid out for higher or lower performances on customer requirement.



"At the construction of all components it was made sure, that the plant is applicable mobile on-site, thus easy and quick to assemble and easy to load", says Hans Eisenbichler (right) in conversation with Andreas Hofbauer, edition BRAUINDUSTRIE.



The crates arrive unsorted from trade and are, at the palletiser, which is positioned directly at the bottles unpicker, placed on a conveyor. Then the bottles are unpacked from the crates, the empty crates are afterwards transported to the packer, which is standing parallel to the unpicker. Packer and unpicker are designed for about 40,000 bottles/hour.

BI: In order to control the process permanently, you applied a camera.

Eisenbichler: In the age of employee surveillance a tiresome topic that is not adaptable to us. We use the camera only to control the process at sorting and be able to interfere quickly in case of disorders. You can access the camera via internet, through zoom and free movements the happenings can be followed very well, what simplifies the telediagnosis significant.

Together with the also installed online-access to the schedulers,

disorders can be solved but also improvements and demanded adaptations can be realised, no matter where our programmers are. We work on site 24-hour daily on 6 weekdays, a permanent presence of our system programmers is consequently not possible but also not necessary.

BI: Centrepiece of the bottles sorting plant is the new sorting system that can sort about 50,000 bottles per hour, on smallest area and without mechanic moved parts. Please present the mechanics more detailed.

Eisenbichler: The bottles are, per recognition-software, compared and associated with already computerised models. The route to the basic sorting star is defined. In this way a bag in the sorting system can be assigned to the recognised bottle (recognition time: 16 ms)

The position of the sorting star is being controlled constantly; therefore the system knows the position and content of each bag in the sorting star precisely. Every exit is assigned to a definite bottle. When the bottle reaches the assigned exit the bag is unlocked (Unlocking time: 12 ms).

BI: If the bottles are not defined...

Eisenbichler: ...they can be

- with far smaller or bigger diameter (limit is the size of the container)
- with/without or partly removed/off-standing label
- dirty, e.g. from sand/fluid/ice etc.
- filled or partly filled or empty

BI: With this, a mechanic lock is not possible.

Eisenbichler: Exact. A mechanic lock is not possible, as the bottles, depending on the size, are not fixed in the middle of the actual bag and label leftovers etc. arrange on the mechanic lock.

The pressure of the bottle can also differ in the effect to the lock with a velocity of circulation from the star from about 0.7 up to 0.8 m/s depending on the bottle weight and can create a different twist at release.



The sorting plant is consisting of a spinning star that can host a defined amount of bottles and a mechanism within the star that gathers the individual bottles and releases them hyper-accurate at the assigned exit lane.

The lock is made via vacuum that is fixing the bottle always in the centre of the star bag. The vacuum is generated with two nozzles, each involving about 5 bar pressure, which cause compressed air to rush over the bottle to its left and right.

BI: *Is the plant limited to distinct bottle models at all?*

Eisenbichler: No, for example the remarkable shape of the Bitburg-Premium bottle doesn't need a special adaptation. However we don't have experience with bottles over 0.66 litres. At the sorting star the exit is always the "rag picker" that gathers undetected and minor existing bottles. The bag itself was limited to 76 mm in the case under consideration.

BI: *How many bottles-to-be-sorted-out are needed for a mobile bottle sorting plant to be economical?*

Eisenbichler: A mobile sorting plant as with Bitburger is meant for a switch from one bottle model to another. Consequently this campaign is of limited duration, at the beginning dominates one bottle model by the end another; with roughly the same number of external bottles each.

You have to distinguish what requirements are stipulated: "Are sorted out bottles to be 'industry packed'?", "Is new-glass to be added?", or "What is the amount of the bottles to be sorted?" From that results the number of components.

A switch should occupy at least one shift in order to be able to work continuous. You should take a sorting output of about 20,000 crates daily, thus 100,000 crates weekly what is equivalent to approximately 1 to 1.2 m. crates as minimum level.

BI: *What kind of spatial relations are needed for the mobile bottles sorting plant?*

Eisenbichler: Ideal would be a provided hall, a provided tent is also possible. The dimension is depending on the needed components. A complete sorting plant with palletiser and unpalletiser for bottles and a packer for external bottles needs a tent with the dimensions of 15 x 25 meter.

Two independently working plans were installed at Bitburg in a 30 x



A complete sorting plant with palletiser and unpalletiser for bottles and a packer for external bottles needs a tent with the dimensions of 15 x 25 meter

25 meter tent. This increased the framework safety and allowed us to test changes at first on one plant. The sorting stars were applied for the first time at this project.

BI: *The control, maintenance and service staff for the plant is provided from Faktor.*

Eisenbichler: The plant was constructed and manufactured from us including software and control. It is set up, maintained and operated with our own staff.

BI: *Can you tell us something about the costs? On which components are the cost depending?*

Eisenbichler: Ideal is a continual activity of the plant during the project. The costs are depending on the number of bottles to be sorted in a precise timeframe. Depending on the dimensions of the project the components and personnel will be set. We offer a performance per bottle e.g. the packing of used bottles, the packing of new bottles and the sorting price for bottles. We assume that we offer competitive.

BI: *Let's proceed to the practice: At Bitburger you changed from the 0.5 litres bottle park to individual bottles. Adumbrate the demand catalogue on the part of Bitburger.*



Successful business transaction (from left) Michael Artz, assistant of Stefan Brass and operating project leader (was the joint between Bitburg and Faktor); Daniel Schädlich, purchase (responsible for material handling); Stefan Brass, attorney and area manager technique (project responsible) as well as the two Faktor CEO Hans Eisenbichler and Gábor Farkas.

Eisenbichler: The job at Bitburger was to put about 36 million new bottles into crates, pack about 40 million used NRW-bottles and sort about 50 million bottles, within about 5 months. We could convince Bitburger with our indoor solution.

BI: Please describe the particular project stages at Bitburger.

Eisenbichler: The individual bottle was launched at the beginning of September 2008. First talks were held at the end of 2007. There we appointed a structure and submitted a first offer. At that time the offer referred to an Ale-bottle only later Bitburger decided on an individual bottle.

In February 2008 we got a letter of intent. Intensive talks followed regarding the process of the change. The premise was always the securing of the filling resp. the granting of enough single-origin empties, even at peak times like weeks with public holidays etc.

One focus was the fixing of the tent position as well as the definition of the storage place for the individual bottle models. We simulated the required logistics for that. The plant was running from 15th August 2008 until 22nd January 2009. It revealed that the, during the planning predicted, amounts of bottles and calculated time were exactly met.

BI: Amplify the sorting at this project.

Eisenbichler: The task was to sort the returning bottles from the market. Bitburger was filling in NRW-bottles so that the part of NRW-bottles at the beginning was at 80 per cent. NRW-bottles, brown and green Ale-bottles as well as external bottles were sorted out. After about three weeks arrived increasingly new individual bottles in the empties. Consequently it was sorted: NRW-bottles, brown and green Ale-bottles, external bottles as well as individual bottles. The part of external bottles was between 15 and 25 per cent.

BI: The personnel effort?

Eisenbichler: In peak times we had up to 70 employees of Faktor at Bitburg. We had up to 40 men, four to five fork-lift driver, one machine operator and employees for the sorting plant in one shift.

BI: Does your company also offer solutions for a permanent sorting?

Eisenbichler: At the moment (status beginning of May 2009) you can inspect a solution for the sorting of four to eight bottle models at work in Hungary. We assume that this kind of plant will be installed one or two times in Germany up to the drinktec 2009. The sorting differs from the variant used at Bitburg since the main bottle model is not losing rates in favour of a new launched bottle with a permanent sorting, but we have a relative steady mixing rate.

BI: Mr. Eisenbichler, thank you for the discussion.

Components and performance data of the mobile bottle sorting plant

1. Components

- palletiser/unpalletiser: packs each 8 crates (one layer) of the pallet per cycle
- bottles unpacker: packs each 160 unsorted bottles (from 8 crates) per cycle
- crates forwarder: transports each 8 empty crates to the packer
- bottles packer big: packs each 160 sorted and new bottles into crates per cycle
- bottles packer small: packs each 40 to 60 sorted (out) bottles in provided crates
- bottles identification, bottles sorting – the sorting plant is consisting of
 - a single running-in without separation
 - a camera based bottle recognising
 - a spinning star that can host a defined amount of bottles
 - a mechanism within the star that gathers the individual bottles and releases them hyper-accurate at the assigned exit lane
 - exit lanes that lead away the sorted bottles for future use
- new-glass-clearer
- packer for used bottles on pallets (standard glass industry)
- peripheral equipment (fork lift truck, compressors, device for packing and shrinkage of the used, sorted out bottles)

2. Performance data

- bottles packer and unpacker: ca. 40,000 bottles/hour
- palletiser and unpalletiser: ca. 30,000 bottles/hour
- new-class clearer/palletiser bottles: ca. 30,000 bottles/hour
- sorter: ca. 50,000 bottles/hour
- sorting accuracy: higher 99 per cent

Hans Eisenbichler

Age group 1960; finished after his time at the German armed forces a business studies study. In his diploma thesis he dealt with a marketing concept for medium-sized breweries. A four-year training in retail and a one-year career as manager at Hartlauer Deutschland, Austrian market leader in the range of photo and optics ensued. The native upper-Bavarian (Waging am See) held manager at Carl Hirsch (wholesaler for bottles, labelling of crates) from 1992 to 1998. Hereafter he took the step to self-employment what led in March 1999 to the foundation of Faktor GmbH (www.faktor.de). The company belongs to him in equal shares with his partner Gábor Farkas. He remained faithful to the company Carl Hirsch: since May 1999 he acts there as freelancer.

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