BERGMANN
Machines for
Waste Management

A BERGMANN invention

Concept for Waste Management with the BERGMANN Roto-Compactor

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Introduction

During the last decades the quantity of packages and outer packaging **has risen constantly**. This development can be noticed also when looking at the recyclable fraction cardboard. As a result, the effort and the **costs for the disposal of waste is rising**, too.

The idea and principle of Bergmann company is to compact this recyclable fraction in **a simple way** and **with the lowest possible effort** with regard to handling and maintenance **directly on location where the material occurs**.

Thus, the costs are reduced and the environment is protected.

The customers are no longer only looking for a solution of the problem „reduce waste management costs“, they are **also searching for an implementation concept** for the complete waste handling.

On the following pages we would like to present a complete solution from whose advantages you might benefit.

This concept **is already successfully** realised in a huge supermarket chain.

Situation

For a lot of supermarkets and discounter in the food or clothing industry waste disposal without waste bins or compactors is inconceivable. Only in case of a failure or a breakdown it becomes clear that a reliable solution is needed in order to not have a big problem with bulky and uncompacted waste.
Mostly a typical solution inside the discounter are waste bins and balers. Outside most of the clients use roll-on roll-off compactors or stationary compactors with a roll-on roll-off container. These systems need a lot of space and have a high capacity.

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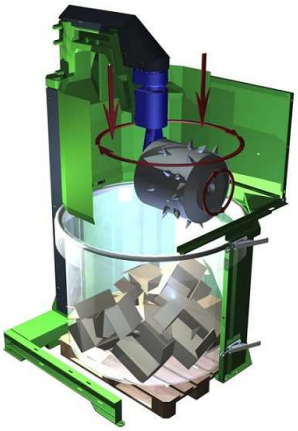
Comparison:

In the following two typical compactor solutions inside a discounter will be compared. These two systems are similar in the result (compaction into a bale) but are completely different in view of the handling:

Roto-Compactor

The Bergmann Roto-Compactor is a compactor with a rotating drum which compacts **waste layer by layer** in a plastic bag. The compaction unit and the drum put pressure onto **the material permanently**. The compaction drum rises together with the waste level until the full signal is reached. The operator can fill in cardboard or the like all the time. **Waiting for the end of the compaction cycle or filling rhythm is is not necessary**! After filling the operator can directly attend to other work again. **Easy handling with minimum effort.**
The Roto-Compactor only needs a small footprint. Thus, it can be installed nearly everywhere.



Function / Handling

The Roto-Compactor **can be filled manually** via chute or cover. The machine can be started via the start button before or after the filling with waste. A rotating compaction drum **catches, tears and compacts the material**. Filling from **different floors** or **from chutes mounted on different sites is possible**. As already explained waiting until the end of the compaction cycle is not necessary. To ensure that no material can dam the Roto-Compactor and that everything will be catched by the compaction drum a automatic lifting system is built-in.

Removal of the bale

Before removing the bale the compaction unit will be lifted via electrohydraulic pressure. Afterwards the doors have to be opened and the bale can be discharged with a hand forklift. Thereafter a new europallet and a new plastic bag can be inserted and the doors can be closed again. The machine is ready for operation then. **This means easy handling in a few steps**. The result of a baler is approx. 200-400 kg/bale (depending on the Roto-Compactor type).

Baler

Often balers will be used in areas with small space and a lot of cardboard. Their principle is a vertical cylinder with a pressplate which goes up und down and thereby compacting the material. The result is a big bale which will be wrapped with metal wire afterwards.

Function / Handling

The filling process of the baler takes places by opening the door of the compactor, fill in the cardboard, close the door and start the compaction. The cylinder drives down, compacts and goes up again! This process repeats until the final bale is ready. The **operator has to wait during every compaction cycle** until he can throw in new material. That means if the operaotor has a lot of material that should be compacted he needs **a lot of time**. If the filling level of the baler rises there is less space in the compaction chamber. That means only less material can be filled in then because the material which is already in the chamber expands. Consequently shortly before the fullsignal only a few cardbaoard can be filled in the machine.

Removal of the bale

When the operator wants to remove the bale he has to wrap the bale with a metal wire firstly (either manually or automaticall). Afterwards the bale can be taken out and transported by means of a europallet. The result of a baler is approx. 200-400 kg/bale (depending on the type of baler).

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Sample calculation:

Based on the principle of the Roto-Compactor this compaction technology has an **enormous savings potential** in time saving for the handling of waste compared to a baler. In the following a sample calculation based on studies and time measurements of **an independed consultant** (see annex for more details) is presented:

Roto-Compactor

Situation:
Discounter with approx. 3,0 to material / week
Bale weight Roto-Compactor: approx. 400 kg

Compaction of cardboard with Roto-Compactor:
Operating costs per ton: **approx. 30,- € / to**

Calculation:

Roto-Compactor:
3,0 to / week equivalent to 156 to / year
Costs: 156 to x 30,- € / ton = **4.680,- € / year**

* see annex regarding the calculation`s basis

Baler

Situation:
Discounter with approx. 3,0 to material / week
Bale weight baler: approx. 400 kg

Compaction of cardboard with baler:
Operating costs per ton: **approx. 120,- € / to**

Calculation:

Baler:
3,0 to / week equivalent to 156 to / year
Costs: 156 to x 120,- € / to = **18.720 € / year**

* see annex regarding the calculation`s basis

Calculation:

Baler 18.720,- € / year **minus** Roto-Compactor 4.680,- €/ y ear

Saving: 14.040,- € / year

Functioning of the compaction-drum

Roto-Compactor fillable right and left side

Front filling of a
Roto-Compactor

Roto-Compactor PS 1000-E bale removal

Bale of a Roto-Compactor
PS 1400-E approx. 400kg

Concept thoughts

discounter

&

central warehouse

channel baler

Bale > 800 kg

Use existing logistics

Use existing logistics

For the transport of the bales one can use **the existing logistic.**
This means the trucks which supply the single discounter **can also be used for the transport of the produced bales from the discounter** back to the central warehouse.
The bales are clean and easy to transport on palettes. In **this way the most economic workload** of the resources is guarateed.

Considering the savings of costs with the Roto-Compacor for only one discounter the savings potentail for a complete supermarket chain **is enormous**. Converted this potential would be a **useful invest in a channel baler** for the production of highly compacted bales (approx. 800 kg) in a central warehouse. These bales could be sold directly in the market.

Another solution **is a service company that produces 800 kg bales on behalf of the discounter**.

central warehouse
for approx. 50-75 discounter

truck

&

Roto-Compactor bale

truck

&

food / non-food

supermarket

Annex:

Data baler`s handling from an operator:

- 0,4 kg cardboard can be handled in average per hand movement, resulting due to the the problem, if the level of the baler is rising the handling of cardboard is more difficult (less material can be thrown into the machine)
- 7 seconds / hand movement because the material has to be inserted in the filling opening and has to be folded sometimes
- 17,00 € / h calculated average costs for the employee, including holiday, thickness, etc.
- on average approx. 6 kg can be compacted per compacting cycle to produce a complete bale; due to the fact that in the beginning it is possible to fill in a lot of cardboard which changes with the rising bale level
- a baler needs approx. 46 seconds for a complete compaction cycle with closing th door, compacting, opening the door, etc.
- 10 minutes time exposure for wrapping the baler with metal wire and threading in the new wire
- on average 400 kg per produced bale

Colour green = handling Colour blue = handling compaction cycle Colour orange = bale handling

Calculation:

(1 to / 0,4 kg per hand movement to empty the transport boxes and fill in the baler x 1000 kg x 7 seconds per hand movement / 60 seconds / 60 minutes x 17 EUR per hour) + (1 to / 6 kg per compaction cycle x 1000 kg x 46 seconds / 60 seconds / 60 minutes x 17 EUR per hour) + (1 to / 400 kg per hand movement bale wrapping and transshipping x 1000 kg x 10 minutes per hand movement / 60 minutes x 17 EUR per hour) + (1 to / 400 kg per hand movement bale on truck x 1000 kg x 1 minuts per loading bale / 60 minutes x 17 EUR per hour)

Result: 118,84 € / to costs for handling baler

Data Roto-Compactor `s handling from an operator:

- 1,0 kg cardboard can be handled in average per hand movement, due to the permanent filling, the big filling openeing and the filling possibility from above in case of the Roto-Compactor
- 6,5 seconds / hand movement due to the filling of the machine from above (without filling hole or chute)
- 17,00 € / h calculated average costs for the employee, including holiday, thickness, etc.
- 2 minutes for removing the bale and installing a new palett and a new plastic bag
- on average a bale of approx. 400 kg will be produced

Colour green = handling Colour blue = handling compaction cycle Colour orange = bale handling

Calculation:

(1 to / 1 kg per hand movement to empty the transport boxes and fill in the Roto-Compactor x 1000 kg x 6,5 seconds per hand movement / 60 seconds / 60 minutes x 17 EUR per hour) + HANDLING COMPACTION CYCE NOT NECESSARY + (1 to / 400 kg per hand mevement bale transshipping x 1000 kg x 2 minutes per hand movement / 60 minutes x 17 EUR per hour)+ (1 to / 400 kg per hand movement bale on truck x 1000 kg x 1 minute per loading bale / 60 minutes x 17 EUR per hour)

Result: 30,69 € / to costs for handling Roto-Compactor

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