# Automatic bag palletizers: Robotic versus conventional

**Jack Bertram** **Chantland MHS**

As tempting as it is to think that robotics can always improve production speed and economy, here's the surprising truth: Choosing an automatic robotic palletizer over a conventional automatic unit isn't always the best option.This article compares features of both palletizer types and outlines their benefits to help you determine which is best suited to your packaging operation, production rate, and budget.

自动码垛：自动码垛与传统码垛之比较
如果您认为自动码垛必定会提高生产速度和经济，一个令人吃惊的事实是：选择自动码垛而放弃传统码垛并不一定是上策。本文将比较这两种码垛的特点，种类，益处，以协助您去选择最適用于您的包装工序，生产率及预算的码垛机。

**自動袋パレッタイザー：ロボット型ｖｓ従来型**
ロボットが、常に生産スピードと経済の向上に貢献すると思いがちですが、驚くべき事実として、従来の自動ユニットと比べ、自動ロボットパレッタイザーが最適な選択肢とは限りません。この記事では、両方のパレタイザーの特徴を比較し、包装作業、生産効率、予算面でどちらが最適かを見極めるための双方の利点を挙げています。

**Empacadoras automáticas de bolsas: Robóticas frente a convencionales**
Por muy tentador que resulte pensar que la robótica siempre sirve para economizar y mejorar la velocidad de producción la verdad puede sorprendernos: Escoger una empacadora automática robotizada en lugar de una empacadora automática convencional no siempre es la mejor opción. Además de comparar las características de ambos tipos de empacadoras, el artículo siguiente resume sus respectivos beneficios, a fin de que el lector pueda determinar cuál de las máquinas se adecúa más a su operación de empaquetado, nivel de producción y presupuesto.

**Le palettiseur automatique de sacs : un système robotisé ou conventionnel**
On imagine souvent que la robotique peut toujours améliorer la vitesse et l'économie de production, mais la vérité est tout autre : choisir un palettiseur robotisé plutôt qu'un modèle automatique classique n'est pas toujours la meilleure solution. Cet article compare les caractéristiques des deux types de paletisseurs et présente leurs avantages respectifs pour vous aider à choisir le modèle le plus adapté à votre système d'emballage, à votre taux de production, et à votre budget.

**Automatische Beutel- und Sackpalletierer: Robotersysteme im Vergleich mit konventioneller Palletierung**
Obwohl es scheinbar verlockend zu sein scheint, zu glauben, dass Roboter immer die Produktionsgeschwindigkeit und Wirtschaftlichkeit verbessern, wird hier die überraschende Wahrheit gezeigt: die Auswahl eines automatischen Roboter-Pakettiersystems über einem konventionellen automatischen System ist nicht immer die beste Alternative. Dieser Artikel vergleicht die Eigenschaften beider Pakettiersysteme, und zeigt deren Vorteile auf, um ihnen bei der Entscheidung zu helfen, welches System am besten für ihre Verpackungsablauf, Produktionsgeschwindigkeit und Kostenrahmen geeignet ist.

Both conventional and robotic bag palletizers automatically accept filled bags from bagging equipment, arrange the bags into layers, and load the layers onto pallets. Both are controlled by PLCs with a touchscreen operator interface. But conventional and robotic palletizers have different mechanisms for arranging the filled bags in layers and on pallets, and they're suited to different production rates.

The *conventional palletizer* uses a belt conveyor or live roller bed and flow dividers to automatically move filled bags into layers, then stacks the layers to form a pallet load. See a typical example in Figure 1a. Depending on the model, this palletizer can handle high-speed packaging rates from 25 to 40 bags per minute.

The *robotic palletizer*, as shown in Figure 1b, has a robotic arm that lifts bags and places them on a pallet to form and stack layers. The arm can swivel between two or more adjacent stations to begin loading bags on another pallet while a completed pallet load is removed. The arm's *end effector* is typically a hand-like gripper; for some low-speed applications, the end effector is a vacuum lifting device. Typically the robotic palletizer can safely handle up to 20 bags per minute; operating the unit at higher rates can produce unstable pallet loads.

Perhaps because of its futuristic appearance or our increasing fascination with robots, the robotic palletizer has rapidly become the go-to choice for most bag palletizing operations today. However, many users overlook the robotic palletizer's pitfalls while underestimating the benefits a conventional palletizer can provide. Before you select a palletizer, you need to take an objective look at both types. The following information can help.

## Comparing basic features

***Footprint.*** The robotic palletizer's layout typically requires a few more feet in width than a conventional palletizer to allow for the arm's reach, and it requires about the same floor space in length as a low-speed conventional palletizer but a few less feet in length than a high-speed conventional palletizer.

***Versatility.*** Both conventional and robotic palletizers can be programmed from the touchscreen operator interface to handle various bag sizes and stacking patterns. While the robotic palletizer requires no mechanical adjustments, the conventional palletizer occasionally needs mechanical adjustments to handle these variations.

***Capital and operating costs.*** The capital costs for both palletizers are comparable. However, the robotic palletizer's arm requires much less energy to operate than the conveyor-based conventional palletizer because the robotic unit is powered by servo motors and the conventional unit is powered by gear motors.

***Maintenance.*** Both conventional and robotic palletizers use bag- and pallet-handling conveyors — either live roller or belt types — which require relatively simple maintenance, similar to that for most bagging equipment. The conventional palletizer has more moving parts and requires more routine maintenance than the robotic unit. However, if something fails, the repair cost for the robotic unit is typically higher than for the conventional palletizer. Both units can have a phone modem to allow the palletizer manufacturer's service technician to troubleshoot programming problems over a standard phone line, avoiding time-consuming and costly on-site service visits; some models can be equipped with Internet access to provide even faster and more complete remote service support.

Some of this information may seem surprising to you. So what else do you need to know to choose the most economical palletizer for your operation? Let's look at the major benefits of each palletizer.

Figure 1

**Automatic bag palletizer types**

**a.Typical conventional palletizer**

**b.Typical robotic palletizer**

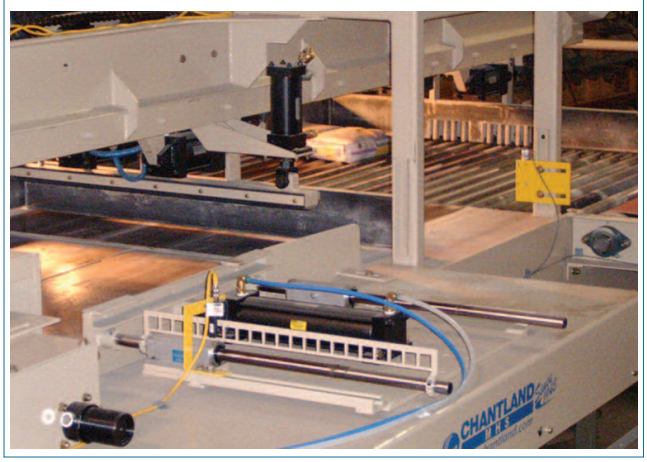

## Conventional palletizer benefits

Besides handling higher production rates, the conventional palletizer's primary benefit is that it produces more stable pallet loads that are squarer and flatter than those produced by the robotic palletizer.

A standard function on many conventional palletizers is *four-sided layer squaring* using some type of layer-pusher assembly, such as that shown in Figure 2. As a layer of filled bags is prepared to be stacked on the pallet, this assembly applies pressure to a back plate and two side plates that extend into the pallet loading area, squaring the layer. The operator can

Figure 2

**Layer squaring on conventional palletizer**



use the touchscreen interface to control how much pressure the plates apply, and some controls allow the pressure settings for different bagged products to be stored for automatic recall.

After the layer is squared and loaded onto the pallet, the palletizer uses a compression mechanism (such as a set of plates or a table) to compress the layer and flatten it. Many palletizers have a current sensor on the lift drive to detect the amount of compression and provide consistent pressure for each layer in the pallet load. As with the layer-squaring pressure, the operator can use the touchscreen interface to adjust this flattening pressure and, in some cases, store the pressure settings for different bagged products.

The resulting pallet loads are stable enough to be safely stacked up to four high in a warehouse, compared with only two high for robotic palletizer loads.

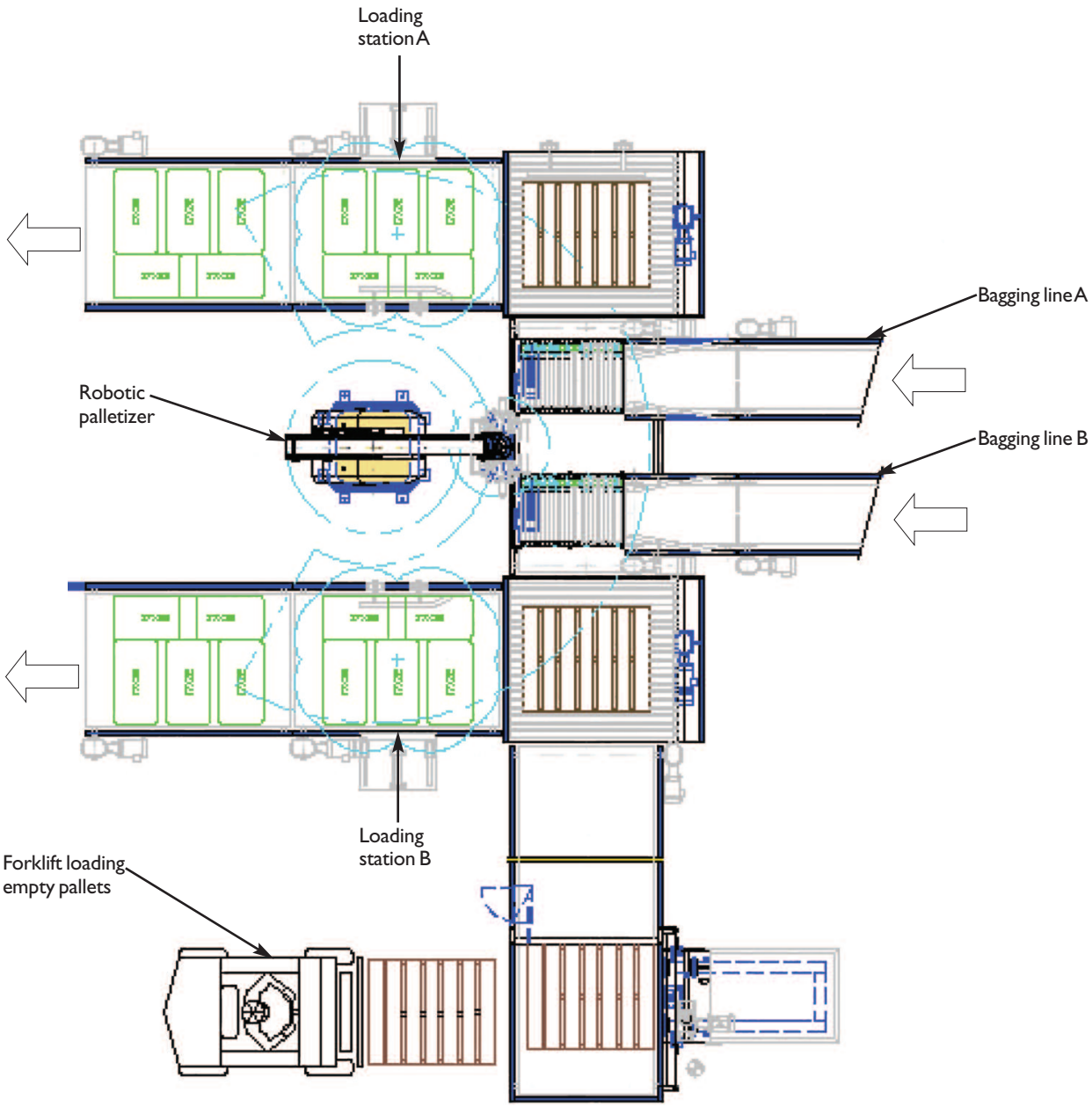
## Robotic palletizer benefits

The robotic palletizer's major benefit is its ability to handle filled bags from multiple lower-speed packaging lines, as shown in Figure 3. This makes it easy to justify the robotic palletizer's cost in applications with two or three lower-speed lines, where the palletizer can typically provide a total production rate of up to 20 bags per minute. *One caveat:* The palletizer must be carefully chosen to ensure that the robotic arm's reach and output capabilities aren't overloaded in such an application.

Another advantage of the robotic palletizer is that it can stack bags on pallets placed directly on the floor by a forklift rather than on a pallet-handling conveyor, as is the case with a conventional palletizer. This eliminates not only the pallet-handling conveyor and the floor space it requires, but the empty-pallet and slipsheet dispensers required by the conven-

Figure 3

**Robotic palletizer handling bags from two lines**



tional conveyor. In a typical robotic palletizer installation for loading pallets on the floor, two stacking stations are located on opposite sides of the robotic arm, and empty-pallet positioning corners are mounted on the floor at each station. The forklift can stack up to four empty pallets between the corners at one station, and photo eyes send a signal to the robotic palletizer to indicate when the forklift is safely clear of the area so the robotic arm can begin stacking bags on the top pallet. When the correct number of bag layers has been stacked on the pallet, the robotic arm automatically shifts to stacking bags at the other station, allowing the forklift to remove the completed pallet load from the first station.

## Making your choice

To choose an automatic bag palletizer that can successfully handle your application while operating economically, work with a manufacturer that offers both conventional and robotic palletizers. Expect to work with the company's experienced applications engineer, who can explain how both types work and discuss their production speeds, layout options and floor space requirements, and other information. The engineer will ask you to complete a technical data sheet to help evaluate your application and budget requirements.

In some cases, your production rate, warehousing requirements, or other needs can make the decision easy. For instance, if you have a high-speed packaging line that yields between 25 and 40 filled bags per minute, a conventional palletizer is going to be the most economical machine for your operation. But if you have two or three lower-speed packaging lines, each operating at 20 or fewer bags per minute, a robotic palletizer is the most economical choice. If your completed pallet loads will be stacked more than two high, a conventional palletizer will be best because it forms the most stable pallet loads. And if your bagged product will settle a lot, you'll need to choose a conventional palletizer that uses compression and flattening to ensure that the pallet loads remain stable.

**PBE*I***

## For further reading

Find more information on bag palletizing in articles listed under "Bagging and packaging" in *Powder and Bulk Engineering/International*'s article index at www.pbeinternational.com. Additional articles and other resources can be found in the Article Index on *Powder and Bulk Engineering*'s website, www.powderbulk.com.

***Jack Bertram, regional sales manager (retired)***
***Contact: Brad Hentzen, regional sales manager***
***Chantland MHS, Humboldt, IA USA***
***+1 918 272 2011***
***bhentzen@chantland.com***
***www.chantland.com***