

System layout points to Palletiser choice

CHOOSING BETWEEN ONE TYPE OF PALLETISER AND ANOTHER USUALLY COMES DOWN TO THE OVERALL COST OF THE SCHEME, WHICH VERY MUCH REFLECTS THE CONVEYORS AND LAYOUT REQUIRED, WRITES MARTIN KEAY.

Most machine choices come down to horses for courses – one type of machine should be used for shrinkwrapped packs, while another type of machine is best suited to sacks or drums. But with palletisers the method of operation of the machine is not nearly so critical.

The main types of palletiser – pick-and-place, robot, low level and high level – are all equally suited to handling the main types of transit packs: sacks, crates, cases and shrinkwrapped packs.

So why should you choose one type of palletiser rather than another?

Speed of operation is of course a critical factor and so there is an immediate separation between pick-and-place and robot palletisers that move packs one at a time and low and high level palletisers that load pallets with a layer at a time.

But here too the division is not hard and fast because pick-and-place palletisers can achieve higher speeds by picking up packs two or three or a row at a time and some robot palletisers can match the capacity of some low level and high level machines by moving packs a whole layer at a time.

So how do you choose between them?

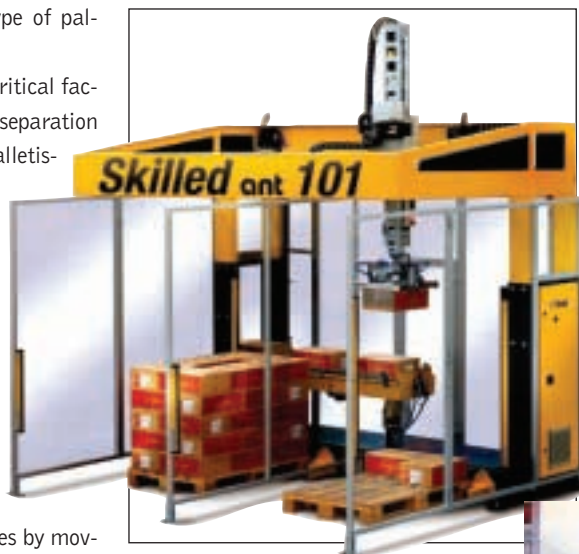
If you ask people why they chose one particular design of palletiser rather than another the answer that comes up time after time is the cost of the overall scheme including all the conveyors and the layout.

The most obvious layout choice is between having a single dedicated palletiser at the end of each line and a smaller number of palletisers handling several lines, usually in a location remote from the production lines.

On the face of it a separate palletiser for each line seems to be an expensive option, but if the only available space for a combined palletising

system is a long way from the production lines, the combined cost of conveyors and palletisers may equal or exceed the cost for individual low speed machines.

The size of footprint of the palletiser can be another key factor. Typically, this is not just a question of the area that the palletiser mechanism occupies but also the arrangement of the empty pallet magazine and filled pallet conveyors around the palletiser that influence the decision to buy one machine rather than another.



Pick-and-place

Pick-and-place palletisers, which support a pack lifting head mounted on an X-Y axis mechanism from an overhead gantry, are usually ideally suited for palletising product from one line. The strength of the gantry support frame typically means that these machines can lift quite high loads compared with simple robot palletisers and when powered by servo drives these machines can also match the precision of the robots.

One example is the Euroimpianti Skilled 101, now available in the UK

from Aetna UK. Said to be particularly easy to programme, it operates within a footprint of just 9sq metres, making it well suited to applications where floor space is at a premium. Its modular design also makes self-installation a practical consideration, says Aetna UK. Speed is 8-10 cases a minute with a 25kg capacity.

A zoned safety system based on light beams and photocells gives continuous operation by allowing a completed pallet to be withdrawn while, in an adjacent zone, the machine is starting to load the next pallet.

Another example is the CP-G Robot from Italian manufacturer Apsol, represented in the UK by Integrapak.

This overhead gantry pick-and-place palletiser, with three independent axes powered by brushless motors is said to have a particularly sturdy framework, allowing it to handle lifts up to 40kg. Multiple grippers, which are able to handle different size items without change parts, can be employed to pick up to four cases per cycle, giving speeds up to 1000 cases an hour. Layer configuration is changed by the operator either by inserting data from the touch screen

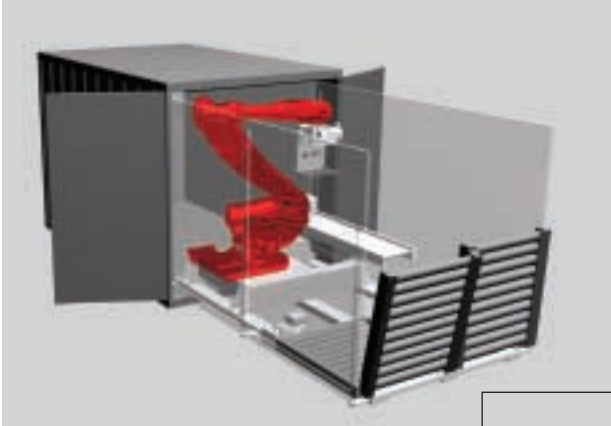


Pick and place palletisers: Top: Euroimpianti Skilled 101 operates in 9sq metres. Above: Apsol CP-G can handle a 40kg payload

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panel or using the integral self-teach system.

In its basic version the CP-G robot loads the pallet while it is on the ground, allowing the machine to work without being fastened to the floor, and so be moved from one production line to another. Optional equipment includes an automatic pallet transport system, layer sheet feeder, and automatic pallet magazine.



The Logimath GRP-40 gantry robotic palletiser supplied in the UK by AMJ Maters is a compact machine with a magazine for 15 pallets and a low-level pallet conveyor for removing the full pallet by pallet truck. Capacity is eight to nine cycles a minute with one or more packs placed on each.

Robot palletisers

Robot palletisers, which use a multi-axis industrial robot to perform the palletising tasks, are unquestionably the biggest area of growth in palletising. Robots that pick up one product at a time can be used in a single cell configuration at the end of one production line, but also lend themselves to use in multiple cells on more elaborate palletising schemes.

Another advantage of robot palletisers is that they are not restricted to moving packs up and down or sideways. For instance, Krones' latest robot palletiser can take empty 20 litre water bottles out of racks on pallets where they are lying horizontally, turn them upright ready for filling and pick them up and place them back in the racks once they are filled.

Krones has used a six-axis robot with a load capability of 350kg, able to operate at 500 cycles an hour, handling eight bottles simultaneously to feed and remove 2000 bottles an hour from the filling line.

The empty 20 litre bottles are fed into the line on the pallet conveyor resting on a metal rack with five levels, each containing two horizontal rows of bottles, one behind the other. Two racks are handled simultaneously.

The robot uses a specially developed gripper head with vacuum suction cups for gripping one row from each of the two racks simultaneously, which makes a total of eight bottles, and places the empty containers on the discharge conveyor belt for filling. A pusher then moves the second row on the rack to the front, and the robot takes these empty containers too.

One of the five racks is now completely empty. Filled bottles are meanwhile waiting to be loaded by the robot which palletises this layer in two lifting movements, each handling eight full 20 litre bottles, a procedure it repeats for the remaining four layers on the metal rack.

Krones is commissioning the



Robot palletisers: Top: Ivanhoe I-Pal is delivered in a container and can be quickly installed. Above: IMA Flexpalletiser operates at 15 cycles a minute

first of these robots for 20 litre bottle palletising this summer at a filling plant in Mexico.

Meanwhile, Ivanhoe, a business unit of CSI, used April's Interpack exhibition to introduce its I-Pal palletising system that can be installed in half a working day, allowing small and medium sized companies to automate pallet loading quickly and economically.

The concept, which is only available on lease, involves a robot with a pick point, a double pallet position as well as the guarding. This robot cell is mounted on a standard steel frame in such a way that it can fit into a 6 metre sea container for shipping to the user and then be effortlessly rolled out, put into place and set up.

One particular feature is the universal gripper-head which can handle cases, open trays, and bundles of cases or boxes with loose lids onto pallets at speeds up to 20 packs a minute. The I-Pal is also said to be the only robot cell in its price group fitted with an automatic pallet-changing system.

Euroimpianti's top-of-range machine, the skilled 504 Robot, is said to provide positional accuracy to $\pm 0.5\text{mm}$ and, with four or five interpolated axis operation and an arm capacity of 120kg, is able to handle 1600 cases an hour, working within a 360deg area. Some 500 systems have now been installed world-wide, says UK representative Aetna UK.

IMA's end of line division offers the Minirobot giving speed up to ten cycles a minute, the Flexpalletiser for speeds up to 15 cycles a minute and a de-palletiser giving up to five cycles a minute.

The ZP1 palletiser from CAM, which occupies a footprint of just 2 x 2 metres, has been specifically designed to sit at the end of a packing line, and can be fitted with a gripper or suction head, single or multi-pick off head to handle shrinkwrapped collations or cases. Speed is up

to 12 placements a minute, or more with the multi-pick off device.

The system has industrial PC based controls, which give memory for up to 1000 products, allowing size changeover within about 5 minutes, says UK representative Campak.

Various options are available, including a

three or ten empty pallet feeder magazine, and automatic layer pad application. There is also the ZA1 integral pallet stretch-wrapping system, which uses a turntable driven hydraulically from the side, eliminating any need for modifications to the factory floor.

Combined case packer/palletisers

For very slow speed lines it will frequently be difficult to justify the cost of either a dedicated palletiser or even conveying the production to a multi-cell palletising system. One solution to this problem is a robot based machine that combines the function of both case-packing and palletising.

IMA has recently announced a new machine of this type, the Cartopallet monobloc case-packing and palletising unit, which is equipped with a six axis robot and can automatically discharge the full pallet and feed the empty pallet without stopping. The horizontal Cartopallet gives speed up to six cases a minute while the

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vertical Cartopallet will run at speeds up to 7.5 cases a minute as standard, up to 15 cases a minute in the HS version.

Low level palletisers

The distinctive feature of low level palletisers is that they form a pallet layer at low level beside the pallet being assembled and then transfer this layer onto the pallet, typically using a stripper plate mechanism.

The advantage of the low level palletiser design is that it is capable of high throughputs and all of the mechanisms are at a low level. But low level palletisers have the disadvantage that their footprint can be quite large and that the options for the layout of pallet conveyors are usually limited.

However Zechetti, represented in the UK by Planet Flowline, has developed a variant on the low level palletiser that overcomes these layout problems while retaining all of the benefits of the low level approach. Zechetti's BB/CF machine features a stripper plate which can not only move up and down to the position of the pallet, but can also rotate 90 or 180deg to the pallet which allows the pallet magazine and pallet conveyors to be positioned in a wide variety of ways.

The latest C-5000i palletiser series from CSi Industries can handle a large variety of pack types from normal cases and open trays to diaper bundles and even shrink-wrapped collations of cans or jars, without a tray.

The combination of servo controlled movements and an industrial PC makes it possible to palletise very fragile

and/or vulnerable packs, explains CSi. "The collation of round cans with a rim on top and bottom will stay in shape and conveying and palletising should not damage the film."

New from GSH is the Verti-Pack FBR-108S low level palletiser, a low cost machine specifically designed to handle crates at the rate of 650-700 an hour.

Depalletisers

Although with pack palletisers the method of operation may not be critical, the same cannot be said of depalletisers and palletisers for light-weight containers such as pet bottles.

Equally, the problems of depalletising are particularly severe where the container has six corners and the machine is required to handle seven different bottle shapes.

This was the problem facing Scotch whisky bottler Chivas Brothers, Newbridge, which has now installed a depalletising machine developed in conjunction with Danish manufacturer Dan-Palletiser.

Chivas Brothers' engineering manager Jonathan Bell says: "As a result of merging two bottling lines together and increasing production speeds we required an automated method of feeding bottles to the line. The seven unique bottle shapes had to be controlled accurately from a full pallet through to single lane of bottles. The new depalletiser from Dan-Palletiser does this job effectively and with a minimum of changeover."



Cans without trays: C-5000 palletiser from CSi handles vulnerable packs

The empty bottles, which are supported during the entire process, are pushed from the 1000 x 1200mm pallets one row at a time.

Italian manufacturer Zecchetti has developed an expertise in palletising and depalletising unstable containers, particularly with pet bottles for which Planet Flowline has installed the fastest lines in the world, operating at over 72,000 bottles an hour. Zecchetti has over 30 installations in the UK alone, operating on pet bottles, glass jars and bottles and a variety of pack styles. The company's pack palletisers can operate at speeds of up to 100 packs a minute depending on pack size and pattern. ■



Depalletising: Dan Palletiser has supplied Chivas with a new system

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For full details of all PPMA members able to supply palletising and depalletising equipment, consult the PPMA machinery finder service, tel: 020 8773 8111, or visit www.ppma.co.uk