Top load on top

The need to load reusable transit packaging as well as non-returnable packs is fuelling a trend towards top loading case and tray packers, writes Martin Keay.

A steady trend in case and tray packing machinery towards the use of top loading systems in general, but programmable or 'robot' pick and place devices in particular, has been apparent for some years.

In recent months this trend has become more marked as an increasing number of machinery manufacturers launch new top loading machines. The move to top loading has been prompted by a number of factors, but central amongst them is the demand by many European supermarkets for as many products as possible to be delivered in reusable plastic trays, wire cages or dollies, most of which must be loaded from the top.

However the dilemma facing most manufacturers is that currently only a small proportion of retailers is making these requests, which leaves manufacturers with three options:

1. Pack reusable containers (plastic trays, wire cages, dollies) by hand.

2. Run two quite different types of end packaging machines side by side.

3. Switch all production into a top loading system that can load either reusable containers or non returnable packages as orders demand.

Most manufacturers started with hand packing but, as volumes have increased, so the incentive to invest in machinery to pack reusable containers automatically has been considerable. However, few companies have the space at the end of their production lines to accommodate machinery to pack products in two quite different ways. Consequently, more and more manufacturers are choosing the third option and installing top load systems that can handle all of their production.

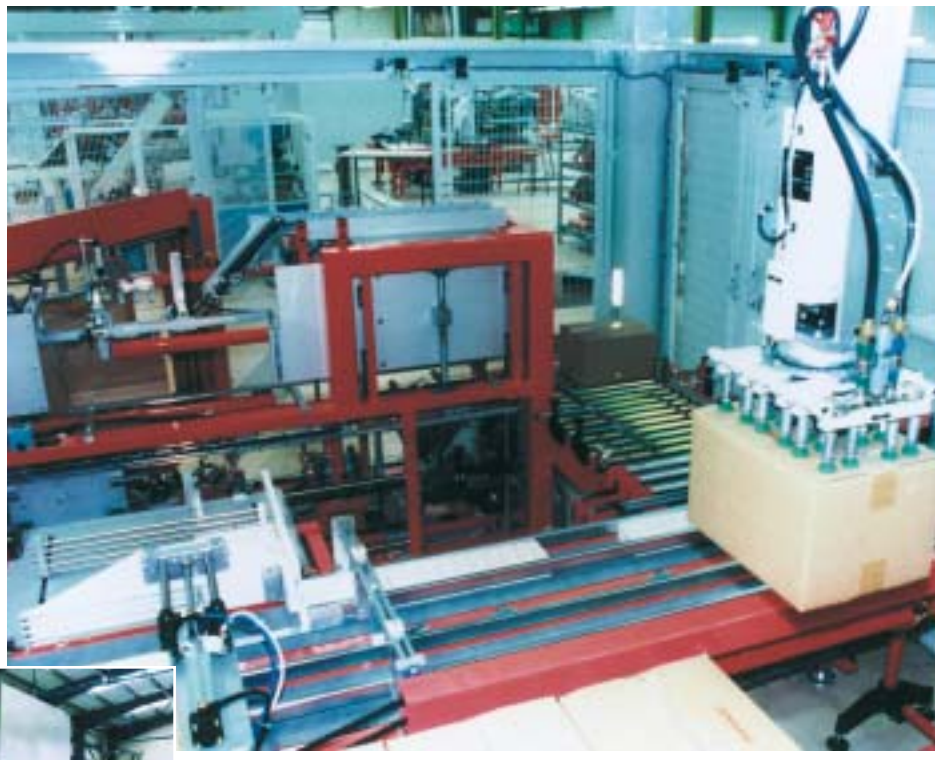
If this has been the market 'pull' prompting the trend, then the technology 'push' that has made things possible is the increasing number of machines now available to automate the packaging of reusable containers.

RTP tray loading: *Automatic line from Rotapak*

For instance, Kensal is now offering the Rotapak range of equipment which has been specifically designed to handle 600 x 400mm RTP (returnable transit packaging) plastic trays. The range of linkable, but standalone machines includes denesters, pick and place packers, tray stackers and tray palletisers, all of which are designed to handle 20 trays a minute. The system can include automatic systems to weigh trays and inspect for damage, rejecting any that fail to meet the quality assurance criteria, while labels can also be printed and placed into pockets on the trays.

Cermex has many years experience in building programmable top loading systems, in particular to handle irregular shaped products, and is supplying an increasing number to fill both plastic crates and corrugated board cases on the same line. Indeed, in a recent installation for Bayer in Germany, Cermex took this a stage further, designing machines to erect, load and tape corrugated board cases as well as erect, load and close collapsible plastic cases.

This meant including units on each machine to erect either type of case – then using robot heads to load and palletise the containers – and



Plastic or corrugated: *Cermex system for Bayer handles cases in both materials*

including units to close the flaps of the plastic cases and band them, as well as tapers to seal the corrugated cases.

"These have got to among the most complicated machines that Cermex has ever made but they did answer all of the customers demands," points out Cermex UK managing director Dick South.

He continues: "There is a demand from customers, more obvious on the Continent at the moment, to have long term flexibility by using machines that can handle plastic cases or crates as well as corrugated. This is seen in several industries including paper products and pharmaceuticals.

"It usually means that rather than buy side or bottom load case packers the trend is to pick-and-place. If the customer wants to change in the future from corrugated to plastic it is quite easy to retain the main pick-and-place packer and just change the case erector and gluer."

In the bottling industry, the concept of a machine that can top load both plastic crates and corrugated board cases is, of course, well established. However the demand for bottles to be supplied in dollies and wire cages as well as non-returnable forms of packaging has stimulated development of a new generation of machines that tend to blur the lines between case packers and palletisers.

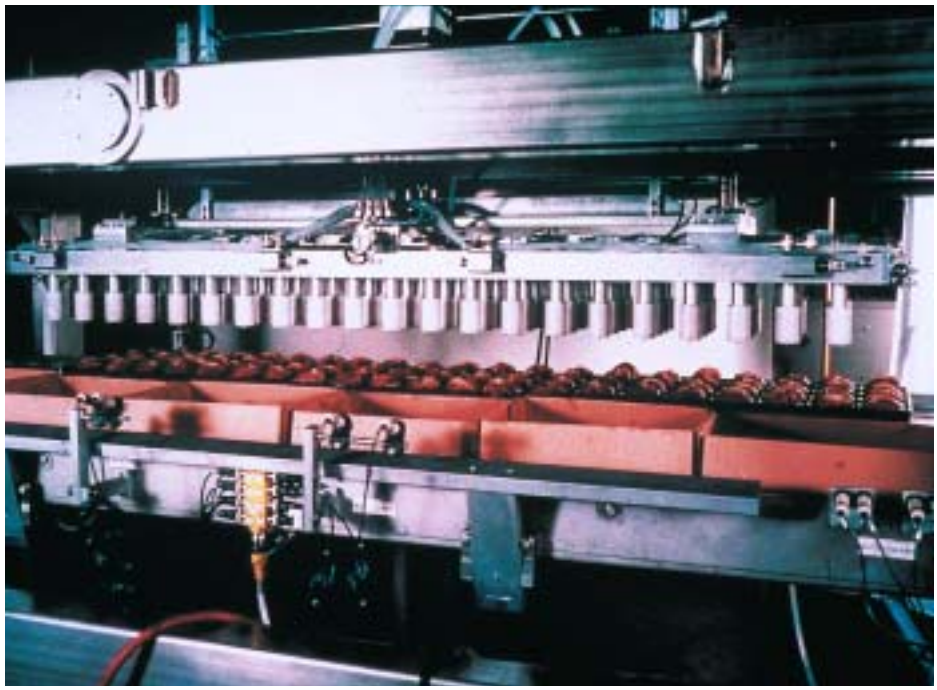
Kettner, part of Krones, is finding an increasing demand for its range of robot crate loaders because, in addition to loading or unloading crates or corrugated board cases, they can also be programmed to load wire cages and dollies. Kettner's Robogrip 2A for instance has a 500kg lift capacity which enables it to top load a layer of bottles at a time onto a full-sized pallet as well as loading conventional crates and 600 x 800mm wire cages.

Difficult packing tasks

In addition there is the Kettner Blitzpac range which is used to pack bottles, jars, cans and multipacks into plastic crates, cases, trays and crates.

Reusable containers are not the only incentive for using top loading techniques. Robot pick and place technology is being used most successfully for some of the most difficult case and tray packing tasks.

Take, for example, the bakery industry. American manufacturer Colborne has developed a pick-and-place machine specifically to handle muffins, pies and pastries, lifting them straight from the baking trays to place them directly into board or plastic trays for delivery.



Bakery pick-and-place: *Colborne system loads delivery trays direct from the baking trays*

The Colborne pick-and-place machine, which is supplied in the UK by Record Pelkman, can operate at up to 20 baking trays a minute and, in addition to handling muffins, pies and pastries, can also be equipped to handle baguettes.

Ishida Europe has developed its own multi-axis pick-and-place robot which, being modular, can be arranged to suit a number of different applications, such as loading flexible or rigid primary packs into trays or cases. Aimed particularly at operations currently carried out by hand, the machine is said to offer a payback in around one year when just one operator is replaced.

Called the Flexible Packaging System, the robot is capable of tasks such as separating single packs from a bulk or flood supply, recognising and if necessary correcting pack orientation, and creating and loading collations into static or moving secondary packaging. It uses suction cups or mechanical grippers and can also be readily integrated with a checkweigher and seal tester.

Maximum input speed is 120 primary packs a minute, with the pick-and-place operation offering a maximum of 40 cycles a minute.

Lower cost method

Meanwhile System Devpak has announced a collating pick-and-place system developed to provide a lower cost method of transferring filled plastic bottles onto trays for shrink wrapping, or to place them in cases. It eliminates the suction cup lifting and individual gripper mechanisms conventionally used on this type of machine type and also, says the company, allows any bottle size or pack configuration to be handled within a small machine footprint.

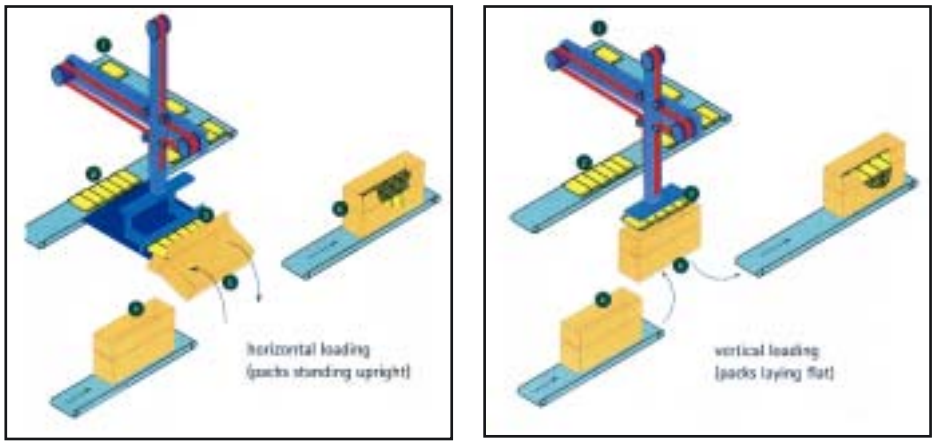
The pick-and-place head is based on two horizontal plates, in close contact, which are cut with corresponding circular holes, large enough to pass over the necks of the collated bottles. Pneumatic actuation moves the plates into slight misalignment, reducing the hole aperture in a scissor action, to a pre-set limit.

Lifted by the cap

When the head is raised, the weight of each bottle bears on the underside of its cap, shoulder or flange, avoiding any compressive stresses on the neck or bottle sides. "This ensures that no clamping force is applied during collation and lifting, thereby reducing the risk of damage and costly downtime as a result of spilled liquids," says System Devpak.

Top load does not, of course, suit all products. While many products can be handled most successfully on top loading systems others cannot, and so top loading can never be the answer to every end-of-line packaging application.

With some products such as flexible bags, stand up pouches and sachets, the approach that often gives the best results is to stack the products at an angle, assemble the complete collation and then push it gently into a pre-erected tray or case. This is the method of operation adopted by Rovema on its Universal Loading and Filling (ULF) module which can handle pillow packs, gussetted bags, block bottom bags, four-side seal



Universal system: : *Rovema ULF system will handle either bags or cartons, upright or on their edge. The principle: 1: Product infeed. 2: Grouping. 3: Loading. 4: Case infeed. 5: Case positioning. 6: Discharge*

Side load for bags: *Cermex system using a vertical racetrack collator*

sachets, blister packs, flow-wraps and cartons.

The ULF uses servo drive motors for all machine functions and is controlled by an industrial PC. Many parameters in the machine can be changed automatically when the machine is set up for a new product, however the loading tool is tailor-made to suit each product and pack size.

In fact the ULF gives the option of loading bags or cartons either flat in stacks, or standing upright in rows to allow final packaging to be easily varied in line with product characteristics or retailer preference. The machine will also load returnable plastic trays, as well as shelf-ready display cases and trays, providing a high level of end-of-line flexibility, Rovema points out.

In both vertical and horizontal loading modes the ULF operates with the same multi-belt infeed arrangement to create a row of bags or cartons, lying flat, ready for loading. The number of packs in the row is variable, depending on their size and the case or tray dimensions.

For the bags or cartons to be arranged standing up, the pre-erected case or tray – entering on its own infeed conveyor – is gripped, lifted, tipped sideways some 70deg from vertical and presented to a tongue plate. This allows the handling tool on the loading arm to sweep the packs off the infeed conveyor and into the container.

Sweep-in process

After one row of product is loaded, the case or tray is lowered by the thickness of one pack, allowing the sweep-in process to be repeated until the case is full. It is then returned to upright and discharged.

When items are to be loaded lying flat within the case, the sweeper tool is exchanged for a set of grippers which lift each row of bags or cartons from the infeed conveyor, placing them into the case or tray, which remains upright throughout. Layer boards can also be loaded into a case, allowing the products to be arranged in two or more tiers.

The smallest machine in the range is the ULF 443, loading cases or trays up to a maximum closed size of 400 x 400 x 300mm tall, while the larger 664 unit will handle cases up to 600 x 600 x 400mm tall.

However, the alternative is to side-load bags or sachets using a vertical race-track collator that allows a single row to be presented in front of the pusher for loading or, for bags, using a lowerator table as well to allow more than one row to be stacked ready for loading.

Easy to unload

"Using a side-loading system means that when the case is loaded and turned upright the product is standing upright and is then easy to unload at its destination," points out Dick South at Cermex, which has built a number of machines to handle flexible packs. "It also means that during transit the case is able to provide the greatest amount of stacking strength."

Indeed, for some products such as cartons, the optimum loading method is to collate them and then load them sideways into a pre-erected case, tray or wraparound case. New machines are arriving regularly on the UK market.

For example, Marden Edwards recently became UK and Ireland distributor for the Spanish-built Prodec range of case packers and, at the PPMA Show in September, demonstrated a Prodec BPF 110 side-load machine for the first time in Britain. This machine was equipped with an elevating stacker to collate multipacks of playing cards, although the modular design adopted by Prodec means that a variety of different product collation systems can be linked to a standard case-handling module. This helps reduce manufacturing cost, while maintaining a flexible design approach.

Modules for side-load machines include lowerator style collators for soft products and vertical racetrack systems to handle large sachets. In addition, Prodec has developed a collation station that creates a double collation, and then divides it for side-loading into two cases, one after the other, so improving speed by some 80 per cent.

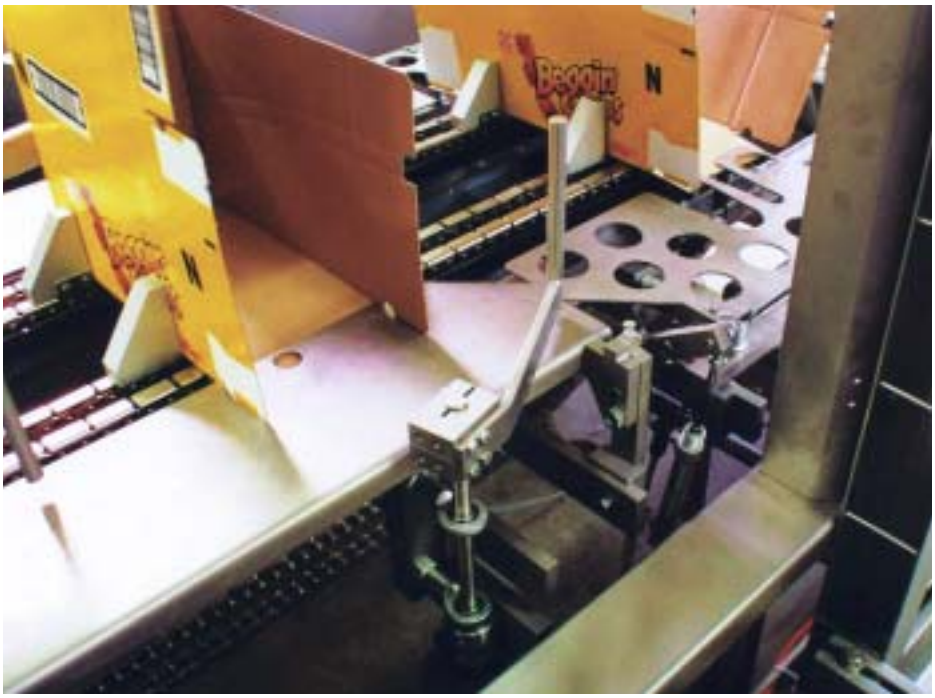
Prodec also builds top load pick-and-place units, including versions to place tapered products such as Doypacks head to tail, and bottom load machines for high speed production on

items such as bottles, cans, pizzas and aerosols. Case size range extends to 600 x 400 x 600mm high which, as Marden Edwards points out, provides a transit pack footprint well suited to 800 x 1200mm pallets.

Italian manufacturer MG2, represented in the UK by Skerman Promac, has recently acquired the MAB range of case packing machines which are being redesigned and uprated with new models also being developed.

The first models to be redesigned are the B88 and B11 side load machines, which retain their mechanical cam operation but now include a new infeed to give more flexibility and easier size changing. The case blank magazine has been made more compact yet is still able to accept larger blanks. In addition, to cope with more intricate display cases, the forming section has also been changed to allow more complicated layers and nesting structures to be accommodated for reduced packing space.

The Racupack Catamaran 1 side-load case packer marketed in the UK by Hansel UK is, as its name suggests, built using two fabricated side frames – the hulls – to provide rigidity and house all main drives, pneumatics and electrical controls in separate compartments. These are joined by inverted channel section bracing, in which all cabling also passes.



Twin hull construction: *Racupack Catamaran provides a range of RSC or wraparound case styles*

Dirt traps avoided

As a result, there are no working components below the machine bed, allowing spillages or packaging debris to fall straight through to the floor with no chains, hollow sections or cabling to act as potential dirt traps.

The Catamaran 1 can be configured to handle RSC cases or wraparound flat blanks, providing a range of case styles including fully closed cases, trays with lids and display trays only.

A balcony construction side-load case-packer in which the blank is carried from the magazine to the erection and loading point by belts, providing a flat, easily cleaned surface, free of the conventional carrier chains and flights, has been introduced by Sussex & Berkshire Machinery. There are no traps to collect dirt, packaging debris or spilt product.

Built in Germany by Oli-Spezialanlagen, the Olimat 2P features a case blank magazine that can be loaded at waist height and uses a pile feeder arrangement to separate blanks from the bottom of the pile and propel them forward into the machine.

At the erection point, the blank is gripped positively by vacuum cups from above and below, and opened in a single movement. The hinged product guides then swing open into the case, holding it square for product to be introduced, and the case is then propelled forward, through the flap closing station. All case-handling components adjust for format changes, avoiding the need for size parts.

The Olimat 2P is available with a variety of collation and case loading systems to handle shrink-wrapped bundles, stand-up bags, blisters, sachets, cartons or bottles, and will work at speeds up to 12 cases a minute.

The PRB Newpocket, a particularly compact end load machine, is now available in the UK from FJ Pistol Machinery and can be supplied to use pre-glued cases or to pack in trays formed from flat blanks. The machine employs a vertical blank magazine which, to save space, sits within the footprint of the main machine. Speed is up to 25 cases a minute.

Choice of case erectors

The choice of case erectors to form open top cases suitable for a top loading system is wide, but new case erectors have recently been launched by OK International, Limpet Tapes and David S Smith.

OK International's new Superformer case erector is able to square up cases automatically, using the side belts that take cases from the point of erection through the bottom flap sealer.

Photocells at the side of the machine sense whether the leading edge of the case is at 90deg to the direction of travel and, if not, adjust the relative speed of the belts to bring the case into square. The machine runs at a speed of 14 cases a minute.

Limpet Tapes' new machine is the low cost F144 case erector giving speeds up to 14 a minute. It will handle a broad size range – 150-350mm wide, 129-500mm high and 200-450mm long – while size change is said to take only 3-4 minutes. A low tape and tape break sensor is standard.

September's PPMA Show saw David S Smith introduce a case erector from the Swedish IBS range for which the company has recently become UK agent. Built in stainless steel it is rated at 10 cases a minute as standard, increasing to 18 a minute with the optional servo drive.

The Wüste range of case, carton and tray erecting machines marketed in the UK by Soudal includes the SK11 model, capable of producing more than 40 different styles of box from flat blanks of corrugated, single-face corrugated and solid board up to 800 x 700mm.

These embrace straight-sided and tapered containers, mailing boxes for books, octagonal trays and lids, stackable trays, hamburger and pizza boxes, and a number of speciality items such as a box with a flip-up access flap on the front panel.

The female forming tool is fully adjustable, leaving the male tool as the only changepart required. Speed is up to 70 boxes a minute.

For smaller boxes, particularly top load cartons, Wüste has now developed its SK3 model as part of an in-line erector-loader-closer, which can be manually or automatically fed, and equipped with a leaflet folder/inserter, within a machine length of 5 metres. "An in-line approach, using flat blanks, reduces storage space and also reduces cost by allowing lower calliper board to be used," points out Soudal.

Continuous motion: *Douglas CMWACP wraparound case packing machine*

The erecting section of the machine can be configured as a single lane unit, or with twin lanes to give speeds up to 120 a minute, or allow a two part pack – carton and separate lid – to be produced on each cycle, at the rate of 70 complete packs a minute. Blanks up to 600 x 600mm can be handled.

Case assembly by robot

Meanwhile robotic technology has been harnessed by Schubert – represented in the UK by System Packaging – for machines to erect and form cases with dividers for holding telephones. The machines, developed for Siemens, erect the case from flat blanks, shape the dividers from flat blanks, and then glue them in place before discharging the completed box for packing by hand.

So if there is a trend towards top loading systems, one might expect that the demand for other machines such as wraparound case packers would be less. However, the demand for wraparound case packers and other similar machines that produce display packs using corrugated board is as strong as ever.

The wraparound case is still one of the most cost effective ways of protecting a product, using the minimum amount of corrugated board and carrying out in one machine all the tasks that for top load case packing require three machines.

Emphasising the continued importance of wraparound case packing, Ocme has launched a new range of servo driven wraparound case packers. The use of servo drive motors in place of conventional mechanical transmission components makes the design of the new machines much simpler and allows them to be size changed considerably more quickly.

There are eleven models in the new Altair range giving outputs from 25 up to 80 cases a minute, with or without division insertion.

Showing confidence in the European market, Barry Wehmiller Europe has recently started manufacturing its Series 400 wraparound case packing machine in the UK. Using servo drives, this four station intermittent motion machine can produce either wraparound cases, wraparound trays or end load RSC cases at speeds up to 20 a minute.

The latest Douglas wraparound case packer, available in the UK from David S Smith, is the CMWACP which has been specifically designed to handle glass bottles at speeds up to 1200 bottles a minute and 50 cases a minute. Cushioned lane guides, assembled in a removable 'cartridge', are used to minimise label damage and bottle breakages. These cartridges are specific to a bottle size, but need only four minutes to be exchanged during a size change.

Servo drives allow the rest of this continuous motion machine to be size changed in under 15 minutes. The CMWACP can be run with blanks made from conventional corrugated board, solid board and the latest full colour postprint E and B flute materials.

The Multipack FRT/FRB wraparound case packer from TMG Marchesini UK is able to handle a variety of products including bottles, cartons and blister cards and create either a tray or lidded case from corrugated or solidboard. Generally, the container is formed first from a flat blank, but with the front or one side left open for the collated contents to be pushed in before the pack is finally sealed.

Speed up to 60 cycles a minute

New from Krones is the Kettner continuous motion Wrapapac wraparound machine able to run at 60 cycles a minute. It can provide both wraparound cases and trays, while a film wrapping station is available to turn the machine into a combined wraparound/shrink packer.

Novopac's range of wraparound case packers, the VF series, can be supplied to erect and load cases or trays. A shrink-wrapping station can be added to provide alternative styles of pack from the same line: wraparound cases for exports and shrink-wrap trays for the home market.

Polypack's TR series of intermittent and continuos motion wraparound tray packers require no changeparts and can be prepared for a new size via hand cranks or servo motors. Design features on the continuous motion machines include a top belt to stabilise cans as they are carried into the wrapping section by the flightbars.

Kliklok Woodman has recently developed a new wraparound case packer which incorporates a high speed collator to handle cartons, allowing the case packer to operate at speed up to 30 cases a minute.

New from Schäfer & Flottman, represented in the UK by Engelmann & Buckham, is the Series 400 range of wraparound case and tray packing machines, in which servo drives are employed to allow a wide variety of different case configurations and styles to be produced. These include full wraparound cases, open top and open side trays, or trays with separate lids. Robotic infeed enables a variety of products to be handled.

Tray packer: *Multipack FRB machine for handling cartons*

While top load systems give the potential for working with reusable containers and wrap-

around machines minimise the use of packaging materials, machines or systems that can produce a two piece pack allow products to be displayed in the best possible way in store, and minimise the labour needed for shelf stacking.

Two piece packs vary in design, but the general principle is for the product to be contained in the bottom part of the pack which is of high quality and printed with graphics that complement the product. The upper piece or lid protects the product during transit and is typically unprinted and made from cheaper material. In store, the top or lid is removed and the bottom part with its quality graphics is placed directly on shelf.

Single machine system

There are several ways to be produce two piece packs. Some use one machine, some use conventional wraparound tray packing machines and a separate lidding machine and others use three different machines: one to erect the base, one machine to load the product and a third machine to apply a lid to the pack.

A single machine approach is the MAF Combimatic wraparound case and tray packer, which has been recently redesigned to offer improved access, a clear view of all operating areas and easier loading of the blanks. Marketed in the UK by Sussex & Berkshire Machinery, the Combimatic is said to use minimum changeparts to provide a choice of wraparound plain trays, lidded trays or full wraparound cases.

Easy opening in store is a key issue, points out Dick South at Cermex. "There are various 'easy open' ideas for cases, be they wraparound or American style. However, the items most in favour are the two piece packs where there is a display tray with a support fitting to strengthen it for transit."

This support item can be a complete lid glued to the tray, or just a simple inverted U board that can be fitted over the product, loaded with the product into the tray and then slid out by the end user. The outer might, of course, have to be secured using tape or shrink-wrap.

"There are many different styles of outer that can be used but it is usually essential that whatever design of outer is decided upon it must be possible to mechanise it," says Dick South.

"From Cermex's point of view this usually means gluing the outer for security but this of course usually means that the outer is cheaper when compared to a self locking design. This is important, since a two piece pack is usually more expensive than a one piece outer."

Spanish manufacturer Prodec also supplies a number of methods available to create display-transit cases, by adding further modules to the basic case-erecting and loading equipment.

For example, a case with a top U-board can be created using a simple additional station to feed the pre-creased board blank down in front of the collation before it is pressed through the guides and into the open top case. Other modules are available to attach high-sided lids to shallow trays while a separate machine, the T4, is available to add wraparound lids to filled cases, attaching the lid by hot melt if required.

However, the one piece case should not be discounted since the latest easy-open styles using rippatape or die cut tear-out facilities allow the outer to be easily and quickly converted to a display or a dispensing unit, without use of knives.

Indeed, some designs of tray are sufficient for the whole process of transit and display. For example, pots of cream or yoghurt travel well in a stacking tray.

This tray can be automatically loaded, then palletised automatically and safely with the stacking lugs. Ultimately it can be loaded directly into the fridge at the supermarket or shop. No extra support is necessary. ■

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