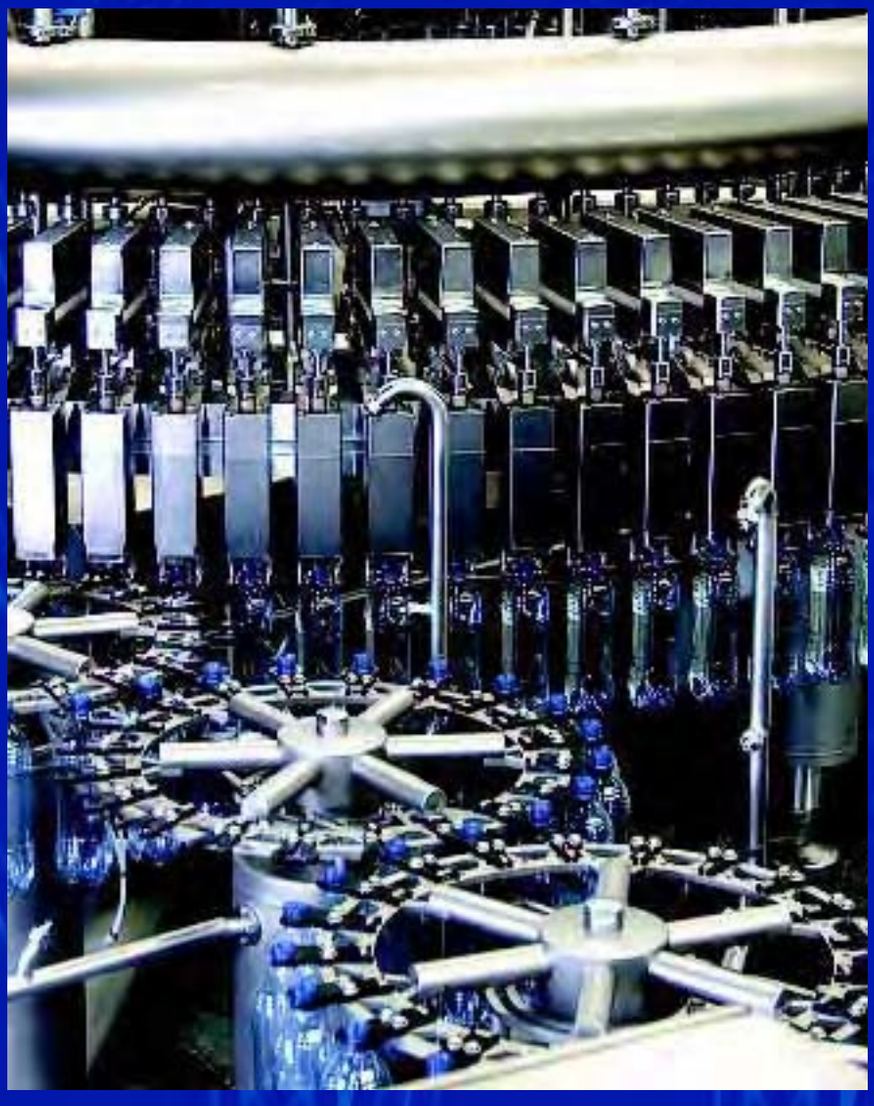
Issue 1, Volume XVII. January/February 2006

PPMA Machinery UPDATE

The only 'machinery only' journal for processing and packaging

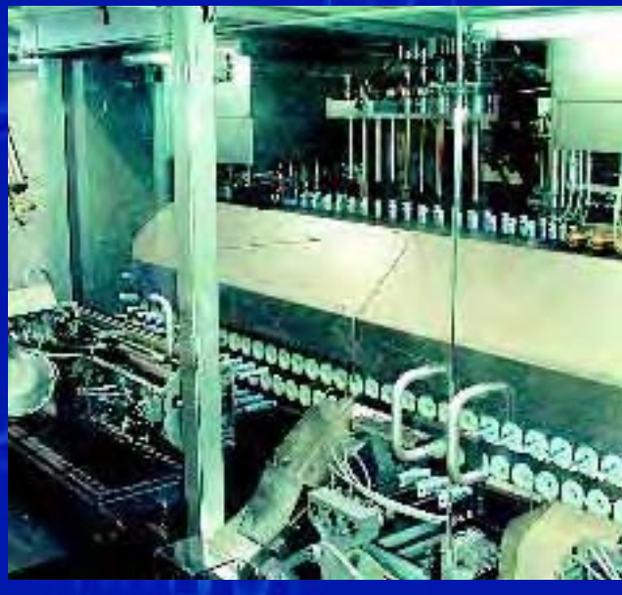


BOTTLING REPORT

New ground in filler design

ROBOTICS

Moving upstream



TUBE-FILLING

Raising the speed limit

MACHINERY UPDATE – ISSUE 1, VOLUME XVII. JANUARY/FEBRUARY 2006

BOTTLING REPORT • TUBE-FILLING • ROBOTICS

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ISSUE 1, VOLUME XVII. JANUARY/FEBRUARY 2006

Machinery UPDATE

THE JOURNAL OF THE PPMA

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PPMA

FEATURES

REGULAR FEATURES

CLASSIFIED

BUYERS' GUIDES

Training at heart

From the very beginning, nearly 20 years ago, the PPMA has always put training and safety at the heart of its technical contribution to the design and use of processing and packaging machinery. It's long been our view that here, for supplier and user alike, there lies a particularly important area of common values.

It's something in which the Association takes a special pride and indeed, in this issue of *Machinery Update*, you will find our new seminar programme for 2006, which sets out to address many of the issues that mark 2006 as a critical year, certainly as far as machinery legislation is concerned.

The continuous involvement of the PPMA in technical and regulatory matters – through its member companies and headquarters staff – means that a substantial pool of in-depth knowledge has been created and is now maintained regularly for the benefit of the entire industry.

In fact, that pool of knowledge goes well beyond the portals of the PPMA itself and reflects also the strong links the Association now enjoys with research and academic establishments throughout the UK and the constructive relationships we have built up and sustained with both UK and EU regulators.

In the beginning there were courses just for PPMA members, the machinery suppliers, but these were soon joined by courses and seminars for users of machinery, who need equally to understand and react to technical progress and changes in the laws that govern their business.

Over the past few years it has become increasingly apparent that the training needs of both machinery suppliers and users are merging significantly, and that is why the PPMA has for the first time brought together many of its various education activities into this single training and seminar programme for the year ahead.

In matters such as machine safety there is clear common interest, as suppliers seek to provide equipment that is safe in operation and users, who shoulder the ultimate responsibility, improve their understanding of the regulations in which that responsibility is expressed.

There is also the question of modifications to machinery by the user and quite possibly the CE marking procedure to be repeated, together with a new technical construction file and hazard analysis.

In technical matters the emphasis moves more towards the machinery user, but covering substantial common ground with suppliers in applying robotics to advantage and using the latest in-place cleaning techniques to protect both brand and company reputation.

Indeed, this CIP course features substantial input from research associations with which the PPMA works regularly, underlining again the resources on which the Association is able nowadays to call.

Our seminar on machinery for shelf-ready packaging is particularly topical, with demand from supermarkets prompting most fmcg manufacturers not only to re-assess their transit packaging, but also the end-of-line machinery they employ.

There is common ground again in the business section, looking at definitions of performance and contractual obligations, and mastering the arts of presentation.

I hope you find this year's PPMA seminar programme of interest (see next page for details). We look forward to welcoming you.

Chris Buxton

Chief Executive, PPMA

PPMA TRAINING COURSES

Training courses to address machinery issues of 2006

A new series of training courses covering many of the latest developments in processing and packaging technology as well as critical upcoming regulations that affect the use of machinery has been announced by the PPMA for 2006.

The programme gets under way on 1 February with an update on machinery legislation, particularly new rules that come into effect during 2006. This will be followed through the year by courses on risk assessment, health and safety legislation for maintenance engineers, designing safe equipment and PUWER – the Provision and Use of Work Equipment Regulations.

A complete course programme brochure is included in this issue of *Machinery Update*. Further copies are available from the PPMA.

The technology series for 2006 will include the use of robots, new approaches to containment in pharmaceutical processing equipment, high efficiency clean-in-place and machinery to provide shelf-ready display packaging.

"The year 2006 will be a particularly busy and indeed critical 12 months in terms of new regulations," explains PPMA technical consultant Martin Keay. "And the first of our courses aims to deal with the new rules."

This will include implementation of significant amendments to the Machinery, Low Voltage and Electromagnetic Compatibility Directives and the start of the Waste Electrical and Electronic Equipment Regulations (WEEE) and the associated Restriction of Hazardous Substances (RoHS) legislation.

Also new for 2006 is the start of the Physical Agents (Noise) Regulations which, amongst other things will lower the action threshold from 85dB(A) to 80dB(A) and will inevitably affect both machinery users and suppliers.

This year employers who have designated potentially explosive atmosphere zones under the Dangerous Substances and Explosive Atmospheres regulations (DSEAR) will have to decide if existing equipment is suitable or has to be replaced with new equipment that complies with the Atex Directive.

Four further courses concerned with regulations – sponsored by Pilz – are to take place in 2006:

Machinery risk assessment (March): What is "a suitable and sufficient risk assessment" that will satisfy the Health and Safety Executive? Companies are expected to carry out machinery risk assessments, not only when new equipment is designed, but also for existing plant that is in daily use and particularly before machinery is modified.

Health and safety legislation for maintenance engineers (May): Most maintenance and service engineers are well aware of the hazards associated with the work they do, but are much less sure about the wide range of legislation that regulates their work.

This knowledge gap can leave both engineers and their employers vulnerable, particularly since engineers are frequently the only people in a company with the technical training to judge if equipment does or does not comply with legislation.

Designing safe machinery (June): This course is intended for both machine manufacturers and machine users, who create assemblies of machines or modify machinery, and will provide delegates with a thorough understanding of the Machinery Directive (Supply of Machinery (Safety) Regulations 1992) and the European standards that support this legislation.

Provision and Use of Work Equipment Regulations (October): This course will help anyone who is responsible for the purchase, use, maintenance or modification of work equipment to gain a thorough understanding of their responsibilities under this legislation and what it does and does not cover.

Also during the year are the four technology courses looking at important developments in processing and packaging machinery. These are sponsored by Elau.

Machinery for shelf-ready packaging (April): Demand from supermarkets for products to be provided in shelf-ready packs is prompting most fmcg manufacturers not only to re-evaluate their transit packaging, but also their end-of-line equipment.

This course will describe the main types of shelf-ready packaging alternatives and the different types of machines available to produce them. The course will also consider the factors that need to be taken into account when selecting a machinery system.

High efficiency in-place cleaning (June): Dr Mike Bird from the University of Bath will be presenting the findings from his research into improving the effectiveness of in-place cleaning by altering the chemicals used for cleaning and the temperatures and flow rates of the cleaning media.

Andy Timperley from Campden and Chorleywood Research Association will be describing the research work done by CCRA to measure the cleanability of process equipment.

Pharmaceutical processing equipment (October): The course will examine how recent changes in the design of processing equipment have provided improved standards of containment for pharmaceutical products. This includes one pot processors, granulators and tablet presses.

Future uses of robots in our industry (November): Can we expect to see more and more types of packaging machinery replaced by multi-purpose industrial robots, or is the current trend of incorporating robot mechanisms into packaging machinery the way ahead?

Dr Ken Young of the University of Warwick will explain both the advantages and disadvantages of current robots and forecast how the technology will develop and influence the design of packaging machines. Don Braggins from the Industrial Vision Association will explain what can be achieved using the latest vision systems.

A further series of four business-orientated courses will deal with perfomance claims, strategic planning for small business, press relations and creating effective presentations.

For full details of PPMA 2006 training courses and seminars contact John Cowdrey at the PPMA, tel: 020 8773 8111, e-mail: john.cowdrey @ppma.co.uk

THE PPMA BOARD

Barry Tucker retires after 11 years service on PPMA Board

Barry Tucker

Barry Tucker, chairman of Aetna UK, has retired from the PPMA board after 11 years of service.

He joined the Board in 1994 and the following year became director responsible for exhibitions. In 2001 he led the successful negotiations with Reed Exhibitions which led to the new partnership that now runs the PPMA Shows and the new Total Processing & Packaging Show, bringing together PPMA, Pakex, Interphex and Eurochem every third year.

Barry Tucker was also PPMA Vice President in 2000, President for 2001-02 and Vice President again for 2003. In 2004 he was presented with a PPMA Lifetime Achievement Award (Machinery Supplier) recognising his outstanding contribution to the industry.

Also retiring from the PPMA Board is Ivan Reeve, sales director of Europack, who was responsible for technical and training matters.

The PPMA Board, headed up by President Mike Randall, chairman of Lock Inspection Systems, now consists of the following (with their specific responsibilities):

John Clayton, managing director, Newman Labelling Systems (technical and training); Karen Cobbett, sales director, Integrapak (publishing); Jeremy Marden, technical director, Marden Edwards (exports); Ian Pruchniewicz, chairman, Burnley Packaging Machinery (Government and external relations); Mike Warren, UK regional sales manager, Niro Pharma Systems (processing sector); Chris Williams, sales and marketing director, Selo-Bollans (finance) and Alan Yates, chairman and CEO, Endoline Machinery (membership).

Joining the board this year is Peter Binns, managing director of Heuft UK.

PEOPLE

New md takes over at Overprint Packaging

Guy Anderson has become managing director of coding and marking machinery manufacturer Overprint Packaging, in succession to his father Patrick who has retired from the family business after 30 years. Guy Anderson has been sales director for the past ten years.

Peter Stuart (right) has joined Propack Automation as UK sales manager following experience in flexible packaging machinery gained with Rovema, Aquarius and Ishida. The appointment follows Propack's acquisition of three agencies for Spanish manufacturers: Enflex (cartoners and sachet machines), Synchropack (flow-wrappers) and Inever (stick-packing machines).

Automatic sorting and inspection equipment manufacturer Radix Systems has appointed **John O'Shea** as sales director. He was previously with Engelmann & Buckham.

Luke Garnham has become strategic planning manager at Herbert Industrial. He was previously the company's services support manager.

SMITHS DETECTION

Checkweighing by X-ray at new inspection centre

Twin function: *Eagle Combo X-ray machine*

An X-ray inspection machine equipped with software that simultaneously provides checkweighing to average weights legislation was among equipment on demonstration in early November when Smiths Detection, a recent arrival on the UK X-ray machine market, opened its new product inspection centre at Grimsby.

World-wide the company now has an installed base of over 500 X-ray machines employed in food inspection.

Smiths Detection says it chose Grimsby for its location at the heart of one of the fastest growing food industry areas in Europe, but will also serve the rest of the UK and Ireland, including potential users in chemicals, cosmetics, pharmaceuticals and toiletries.

The Eagle Combo machine is one of ten models from the US built Smiths Heimann Eagle range that Smiths expects to have on permanent display, giving the 4000sq ft product inspection centre what is believed to be the largest collection of X-ray inspection systems available under one roof for customer demonstration and trials.

With its checkweighing capability, the Eagle Combo is said to offer a particularly attractive cost-performance ratio compared with metal detection. "For around £19,000 a customer can have a single machine that offers three quality control functions," points out Terry Woolford, manager of Smiths Detection's product inspection division in the UK and Ireland.

"The machine combines the traditional benefits of X-ray contaminant detection – high sensitivity to metals, particularly stainless and the capability to detect stone, bone and glass - as well as package inspection – monitoring product count, presence, geometry, position, breakage and so forth – and also average weights checkweighing at high speed."

Checkweighing by X-ray offers a number of advantages over traditional checkweighers, using the X-ray machine's capability of detecting volume and density to calculate mass. This can be carried out on selected parts of the image to establish a fill level or overcome the need for tare weighing of glass containers to compensate for variations in their weight. There is also potential for higher and more consistent accuracy.

Monitoring garlic bread: *Weight is within tolerance, there are no contaminants, but two of the 16 butter portions are missing*

Conventional checkweighers use a gravimetric technique in which the products pass over a section of conveyor, mounted on load cells. As weight is a function of gravity, which is an acceleration, the accuracy of the checkweigher is affected by changes in the velocity of the product, which in turn means that the accuracy of a conventional checkweigher will be reduced at elevated throughputs.

The Eagle Combo is capable of inspecting at speeds up to 120 metres a minute, typically handling 600 food trays a minute, and is unaffected by changes in throughput.

A test routine, with correct weight product passed through the machine some 20 times, establishes that repeatable accuracy is within the required limits with set points automatically updated if necessary by the software. A similar check, using contaminated product, is made for sensitivity to contaminants.

X-ray monitoring of complete traded units, as a final check before cases or shrinkwrapped collations are despatched, is another way of achieving high throughput, with the minimum amount of machinery.

Also shown at Grimsby was the Eagle Case, a large aperture X-ray machine capable of processing cases up to 450mm x 540mm in cross section at speeds up to 30 metres a minute. This means that several thousand individual packs, such as food trays, can be inspected every minute for metal and other contaminants, carrying out the function of maybe ten or more metal detectors.

Should a case be rejected, the operator is able to use the recorded image to identify fairly closely the location of the contaminated pack or packs.

Further specialist X-ray machines from Smiths include the Eagle Tall, for vertical containers such as stand-up bags, tubes and cartons, and the Eagle Tall-G.

This is aimed at high speed inspection of glass jars, with particular emphasis on detection of glass contaminants, and is designed to allow particularly effective coverage of the bottom of a jar, which is often a weak point in X-ray systems, says Smiths Detection.

There is also the Quad View which uses four viewing points to eliminate all blind spots along a container's base, particularly when glass-in-glass detection is required.

Like other Eagle systems, these machines are able to detect missing or misplaced items, closure presence and weight.

In the past few months Smiths Detection says it has received several significant orders for its Eagle X-ray machines, including one from Geest for equipment to monitor 60,000 packs of garlic bread supplied each week to Tesco. In particular, the machines will be able to establish that no garlic butter is missing between slices.

T: 01923 294400
E: terry.woolford@smithsdetection.com

DIARY DATES

sponsored by

NEC, Birmingham, UK, February 15 & 16, 2006

14-18 February: Ipack-Ima. New Fiera Milano. Details: www.ipack-ima.com

15-16 February: Machine Building and Automation and Pneumotion exhibitions. NEC Birmingham. Details: www.machinebuilding.co.uk and www.pneumotion.co.uk

15-16 February: Machine Vision exhibition. NEC Birmingham. Details: info@trident-exhibitions.co.uk

15-16 February: MDT 2006, Medical Device Technology conference and exhibition. NEC Birmingham. Details: www.mdtevents. com

7-10 March: Sino-Pack packaging machinery and materials show. Guangzhou. Details: www.2456.com/sino-pack

19-22 March: Food & Bake Exhibition. NEC Birmingham. Details: www.centre-exhibitions.co.uk

19-22 March: Foodex Meatex exhibition. NEC Birmingham. Details: www.william-reed.co.uk

19-22 March: Food and drink trade expo. NEC Birmingham. Details: www.william-reed.co.uk

27-31 March: Hispack packaging exhibition. Barcelona. Details: www.hispack.com

4-7 April: Anuga FoodTec exhibition. Cologne. Details: www.anugafoodtec.de

4-11 April: IPEX printing and publishing exhibition. NEC Birmingham. Details: www.iir-exhibitions.com

25-28 April: Food Asia exhibition. Singapore. Details: www.food-asia.com

15-19 May: Achema pharmaceutical processing and packaging show. Frankfurt. Details: www.achema.de

14-17 June: ProPak Asia. Bangkok. Details: www.propakasia.com

11-13 July: Propak China. Shanghai. Details: www.propakchina.com

26-28 September: The PPMA Show 2006. NEC Birmingham. Details: www.ppmashow.com

26-28 September: Fachpack packaging and labelling exhibition. Nuremberg. Details: www.fachpack.de

24-27 October: Scanpac packaging machinery and materials exhibition. Gotenborg. Details: www.scanpack.se

29 October-2 November: Pack Expo exhibition. Chicago. Details: www.packexpo.com

NEC, Birmingham, UK, February 15 & 16, 2006

www.tridentexhibitions.co.uk

LOCK INSPECTION SYSTEMS

Checkweighing and metal detection for bakery lines

New production lines at expanding Welsh baker, Brace's Bakery, Newport, have been equipped with two dough weighers and four Weighchek combination metal detector/checkweighers from Lock Inspection, complementing existing Lock MET 30+ metal detectors.

''As Brace's has undergone significant expansion over recent years, the procurement of dough

Combination: *Weighchek checkweigher and metal detector*

weighers was viewed as a necessity for product control, monitoring waste material and ultimately controlling unit costs,'' points out Lock Inspection.

Working with the bakery, Lock developed dough weighers with Intralox modular belting, which prevents sticking and avoids vibration interference from the dough moulder. The dough weighers also feature a lift and drop flap reject device and a 'bin full' sensor. They each work at speeds up to 60 dough pieces a minute.

The Weighchek combination systems, installed at the end of the production lines, each consist of a MET30+ metal detector head and a checkweigher.

T: 0161 624 0333
E: marketing@lockinspection.co.uk

PFM PACKAGING MACHINERY

Flow-wrapper lifts output of high-integrity drinks packs

Drinks vending specialist Brupac, Crewe, has installed a PFM Tornado LD high integrity seal flow-wrapper to meet rapidly increasing demand for in-cup drinks of coffee and other beverages.

These are supplied as packs of 25 interlocking plastic cups – each filled with the ingredients – and the end cup lidded.

PFM says the installation underlines increasing interest in its heavy duty models – which make hermetic seals – from a diverse range of users outside the traditional markets of cheese and meat.

To maintain product freshness, particularly aroma, the new PFM machine employs long dwell sealing jaws that create air-tight hermetically sealed packs, while providing speeds up to 50 packs a minute – more than doubling output compared with an earlier entry-level flow-wrapper, also supplied by PFM.

The Tornado LD is an inverted flow-wrapper, allowing stacks of cups to be loaded directly onto the film, which is fed from underneath the machine and carries them through the wrapping process. As a result, explains PFM, any loose ingredient dust such as tea, sugar or coffee is contained within the pack, preventing contamination of the sealing wheels, which operate from above.

A three-axis servo drive is employed, which also allows the Tornado to offer a no product-no bag facility and misplaced product protection that prevents the sealing jaws closing on any cups.

''We were pleased with the effort from PFM to ensure the machine was installed and in production very quickly to meet a

CAMA 3

Tray loader handles 500 pots of pet food a minute

Italian manufacturer Cama has supplied an undisclosed European pet food packer with a line to load square aluminium pots of wet product into lidded shelf-ready display trays at speeds up to 500 pots a minute, fed in two lanes.

The machine is able to handle ten different sizes of display trays and also create a two-flavour mix inside the same tray. Changeover is said to be a maximum of 15 minutes.

Shelf-ready: *Pet food pots are tray loaded on the Cama machine*

At the beginning of the line, infeed conveyors take the pots into a phasing area where two electronically controlled star-wheels feed a series of continuous motion pockets that collate and position the product ready to be picked up by a robot head.

This has custom tools, designed to ensure that the aluminium pots are held on their flanges with no damage to the easy-peel opening feature.

Pots are then loaded into trays pre-erected on a Cama forming machine at speeds up to 50 a minute and lids secured in place, either individually or in pairs depending on tray format.

T: 01793 831111
E: cama3@camagroup.com

Inverted wrapper: *A PFM Tornado LD has been installed by Brupac*

short delivery deadline we had with a new customer for an initial consignment of what has become large volume regular business,'' says Tim Worthington, production director at Brupac.

''Since then it has been working two to three shifts every day with excellent efficiency and reliability.''

T: 0113 239 3401
E: sales@pfm-ltd.co.uk

AUTOMATED PACKAGING SYSTEMS

Bag-on-reel machine boosts packing speed twelvefold

Consumables for floor sanders and wallpaper strippers packed by Hiretech, Watford, now take 90 per cent less time to pack since the installation of a bag-on-reel bagging machine from Automated Packaging Systems.

Previously, products were placed in polyethylene tubing, heat sealed and labelled entirely by hand. Now Hiretech is using an Excel bagging machine fitted with a load support shelf and a Precision in-line overprinter, forming a complete 'print and pack' system.

The product is picked, packed and labelled on the shop floor in considerably less time than before, points out manufacturing manager Ron Putta.

''It used to take our packer about 45 seconds to pack, seal and label the product, now the same person can do it in less than 2 seconds. A batch of a 1000 that used to take 12 hours is now completed within an hour,'' he says.

Faster packing: *The Excel bagging machine*

Further benefits cited include lead times cut from four weeks to ten days.

T: 01684 891400
E: contact@autobag.co.uk

SEALED AIR

Case-packing for wallcoverings automated by eight machines

Wallcoverings manufacturer Graham & Brown has automated case-packing at its Blackburn factory with the installation of eight Italian-built Mondo & Scaglione machines supplied by Sealed Air.

The machines are operating at the end of four separate production lines and are each able to handle 27 rolls a minute, or seven cases a minute, compared with speeds of four boxes a minute achieved previously by hand.

As a result, Graham & Brown

Case-packing wallcoverings: *The Mondo & Scaglioni machines (above) are fed automatically (below)*

has been able to reduce operating staff by a quarter and anticipates a payback inside two years.

T: 01274 230100

E: carolyn.streets@sealedair.com

TNA EUROPE

Burtons Foods lifts capacity with high speed bagging line

Burtons Foods at Moreton has installed a Robag 3fx 180 rotary triple jaw high speed bagging machine from TNA to provide higher packing speeds following an investment to increase baking capacity for Animals Biscuits.

Robag 2Ci rotary double jaw machines are currently packing the 25g packs of fragile Animals Biscuits at speeds of 140 bags a minute.

However, the new additional machine is equipped with a TNA Delta 1 multihead weigher and handles the 25g Animals Biscuits and 16g Mini Fingers packs at a minimum speed of 200 bags a minute with, says TNA, rejects of less than 1 per cent.

"The stripper tube closer system, open tube former and system integration guarantee high performance, low rejects and high efficiency, even on the most fragile of products, enabling Burton's to comfortably pack the additional oven output on just one packing station," says TNA Europe.

The Robag 3fx triple jaw machine is designed specifically for small bag applications and produces bags up to180mm wide. The double jaw machines make virtually any bag length and bag width up to 320mm.

All primary baggers at Burtons are feeding bags to a TNA Robag rotary flat jaw machine that produces multipacks.

Raising output: *Robag 3fx bagger with TNA Delta 1 multihead weigher*

T: 0121 628 8900

E: mktg_euro@tnarobag.com

SPIROFLOW

Discharger for FIBCs speeds fish food production

Fish food manufacturer Skretting based at Longridge, Preston, Lancashire, is now able to discharge 1 tonne FIBCs of ingredients in 5 minutes following the installation of a bulk bag discharger from Spiroflow.

Previously, with bags held over a hopper by a fork truck, discharging took around 30 minutes and required an operative to stand by, in case of poor flowing or compacted product. With production running at around 100 tonnes a day, this was particularly time consuming.

Because of restricted headroom, Skretting opted for Spiroflow's model T5 discharger which has two sections. The upper, which holds the bags, is lifted off and lowered to floor level where full bags are loaded by fork lift. Once a bag is safely in place, the top section is lifted back on top.

FIBC discharger: *Top section with bag is lifted into place by a fork truck*

There is a dust-tight docking seal between the upper and lower sections while an access door in the discharger hopper allows the bag to be untied without emissions or spillage. Once the bag is untied, flow begins and this door is closed.

Pneumatically operated bag massagers are fitted to the discharger's base to deal with any products that have poor flow characteristics or which may have become compacted during transit.

A Spiroflow aero-mechanical conveyor then lifts product up to a horizontal screw conveyor on the floor above. This has 11 outlets each of which delivers ingredients to their individual storage bunkers.

T: 01200 422525

E: info@spiroflow.com

ISHIDA EUROPE

Custom tray sealer raises productivity for cheese

An Ishida QX 775 tray sealer, customised to meet the needs of specialist cheese manufacturer Abergavenny Fine Foods, has enabled the company to improve production efficiency and throughput on its oven bake breaded cheese production line. Speed is up to 50 trays a minute.

One example of customisation is the line operators' ability to control the speed of the infeed conveyor.

Coated cheese products, for example, feed from the IQF tunnel onto a conveyor from which they are placed by hand into the trays prior to sealing. With several different products and a variety of tray formats – one for example includes 12 compartments for bite size products – the time taken to fill trays can vary considerably.

Rather than a pre-set programme for each product which, says Ishida, would be complicated and inflexible, operators can use a remote control to vary the speed of the infeed conveyor independently.

Similarly, as part of the turnkey design package, Ishida devised a bespoke transfer system to move product from the production line to the tray-filling line, with no need for adjustments or change parts.

Abergavenny uses nitrogen for its MAP process with air first expelled by creating a vacuum before the gas is injected.

Here, says Richard Bowman, Abergavenny's process development manager, the QX 775's ability to control this process accurately is a vital advantage, as consistently low residual oxygen levels are required.

"Many of our packs include dips in a pre-sealed tub," he explains. "When the vacuum is created within the trays, there is a danger that the tubs could burst their seals. However, the Ishida creates the vacuum and injects the nitrogen very accurately and within a short and precise time window to ensure this does not happen."

T: 0121 607 7700

E: info@ishidaeurope.com

Breaded cheese: *Trays are sealed on an Ishida QX 775 machine*

WRIGHT MACHINERY

High accuracy flavour line uses new weighing system

Wright Machinery has supplied a major independent UK snack producer with a turnkey integrated seasoning and coating line to be used for new ranges of super-market own-brand snacks, based on expanded potato, rice, maize and similar raw materials.

Capable of 500kg an hour, the line incorporates a new Weighwright closed loop control to provide the particularly high dosing accuracy required.

Snack flavouring line: *The flavouring drum (above) is fed via a Weigh-wright vibratory weighing conveyor (left) which provides mass flow measurement for the dosing system*

Product enters via the Weighwright, a high accuracy vibratory weighing conveyor developed to provide a low maintenance and easy clean alternative to systems that use conveyor belts. It provides mass flow measurement of the material fed into the rotary flavouring drum, allowing the dose rate of powder and liquid additives to be adjusted in proportion.

The drum is inclined to achieve a continuous flow of product and is equipped to handle both powders and caramel coating. For powders, oil is first introduced by an atomising spray lance, followed by the flavouring, which is dispensed by a tapered edge vibratory feeder that provides an even dosing rate over its entire 1 metre length. For caramel coating, only the spray lance is employed.

Liquids are handled by a variable speed pump while the powder is metered via a horizontal auger. Both are adjusted automatically by the control system to match the product flow rate measured by the Weighwright conveyor.

"The Weighwright operates to an accuracy of better than ± 1 per cent, in turn allowing the flavouring system to work to a tolerance of better than ± 0.30 per cent when adding flavours and better than ± 0.10 per cent when adding salt," explains Wright Machinery sales director Mike Reed.

Discharge from the flavouring drum is fed onto the infeed belt of the dryer, where a Wright Machinery oscillating conveyor ensures even coverage. Wright Machinery also supplied the vibratory conveyors that carry finished product to the multihead weighers and bagging equipment.

T: 020 8842 2244
E: general@wright.co.uk

ISOPAK

Laboratory blister packer handles test packaging

Indian contract research organisation Astron Research has installed a laboratory scale semi-automatic blister packing machine from Isopak to handle test packaging for pharmaceutical development work at its UK site in Harrow, Middlesex.

Built in Italy by Dott Bonapace, the In-Pack machine is packing both tablets and capsules, and is equipped with both thermoforming and cold-forming facilities to handle a range of materials, including moisture-resistant high barrier laminates that require the cold-forming process.

"Ergonomically, the machine is well designed and at the right height and has no start-up waste with fast and easy replacement of parts," says Astron regional director Anupam Kaushal.

Pack trials: *In-Pack blister packer*

He adds that the In-Pack machine was the lowest cost machine of its type he could find.

T: 01780 410093
E: mail@isopak.co.uk

MARDEN EDWARDS

High speed overwrappers for tea cartons in UK and China

Twinings has bought seven high speed carton overwrappers from Marden Edwards as part of a major new project which also includes several new tea bag machines to increase substantially the output at its plants in the UK and China.

Twinings required overwrappers that could produce a high quality wrap incorporating a tear tape at speeds up to 90 cartons a minute – to handle its range of premium flavoured teas – and chose the Series 4LXH machines, which are able to handle a wide range of carton sizes at these speeds.

Premium teas: *Wrapped on Marden Edwards 4LXH machines*

The machines are based on a modular design which Marden Edwards says allows them to fit easily into existing production lines and provide scope for future expansion. They are PLC controlled and equipped with a full diagnostics system.

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RAQUE FOOD SYSTEMS SALES

Compact ready meals line measures just 2 metres long

Raque's new compact tray sealing machine – just 2 metres long – was originally developed in the USA for a snack food application where space was particularly limited, with a single multihead weigher feeding via a diverter to either the tray sealer or a bagging machine.

Now the format has been adapted to ready meals production, giving an output of 35 trays a minute, or twice that with a twin lane system, from a floorspace of little more than 3 sq metres. The pocketed carrier conveyor actually forms the stainless steel baseframe of the machine.

A tray denester places containers into easily removable inserts, which allow quick size change, and the servo-driven intermittent motion conveyor carries them under filling stations, such as a linear weigher to deposit a range of products from salads to IQF proteins and a piston filler to add sauce or other material such as mashed potato.

Compact ready meals line: *Raque system gives speed up to 35 cycles a minute*

Registration is optionally available for printed film and, says Raque, the short web path ensures highly accurate film tracking through the sealing system.

The machine's PLC controller is also able to send production information to upstream equipment as well as the operator interface.

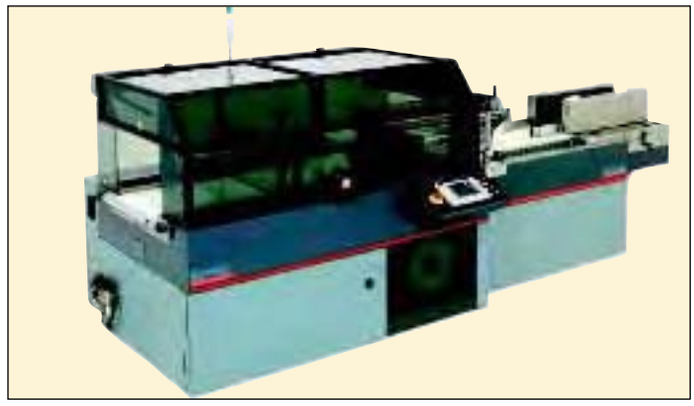
T: 01905 642820
E: sales@raque.co.uk

SEALED AIR

Wrappers operate with 'plug and play' infeed modules

Two automatic side-seal wrappers available with a series of 'plug and play' infeed modules were launched by Sealed Air, which represents the US manufacturer Shanklin.

Infeeds for the new Omni wrappers include single belt, flighted and dual belt versions, which can be exchanged in a matter of seconds and are recognised automatically by the controls once they are attached. The infeeds can also be extended from the standard 1370mm length with further 1370mm sections.



Wrapper range: *Shanklin Omni with Harmonic infeed*

The two machines are the Omni G, which is mechanically driven and capable of handling up 80 packs a minute, and the servo driven Omni S giving speeds up to 100 a minute.

The Omni S has a standard jaw opening of 254mm and is programmable to give automatic positioning for end seal and opening, end-seal centreline, product width and the side-seal centreline.

T: 01274 230100
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G MONDINI (UK)

Tray sealers offer increased hygiene and servo drive

Exhibiting at a PPMA Show for the first time since setting up its UK operation in Stone, Staffordshire, Italian manufacturer Mondini demonstrated the latest versions of its Evolution tray sealer, of which over 100 have already been installed in the UK food industry.

The latest machines are said to offer improved hygiene with improved maintenance access and are equipped with a new touch screen control panel.

Servo drives are now used to provide finer control and smoother operation while tool footprint has also been increased. Changeover, including coming back up to temperature, takes less than 10 minutes, says the company.

T: 01785 812512
E: info@gmondini.co.uk

MARTIS ENGINEERING

Pneumatic conveyors suit fragile materials

The Air-Tec Systems range of pneumatic conveyors launched in the UK by agent Martis Engineering operate on the dense phase principle, said to handle fragile and abrasive materials with minimal damage and degradation to the product and system itself.

Systems are made up from a range of standard modular components which include rigid or flexible pipework, weigh systems for pneumatic dosing, big bag unloaders and pneumatic boosters.

A pilot plant is also now available for customer trials.

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PROPACK AUTOMATION MACHINERY

Flow-wrappers use modules for tailor-made approach

A range of electronic servo-driven flow-wrappers that can be built up from a series of modules to provide what is said to be virtually tailor-made machinery was launched in the UK by Propack Automation, newly appointed agent for the Spanish manufacturer Synchropack of Barcelona.

The Synchropack range is based on three families of machines: the Pack 9 series, a top reel machine for regular shaped items; the Pack 6 series of bottom reel wrappers for irregular, sticky or fragile products; and the Pack 3 series which uses both top and bottom reels to produce a four-side-seal pack for low height products, peelable seal packs, mailing pouches and similar applications.

These three families are available to run at maximum speeds of 30, 40, or 60 metres a minute and, depending on model, with maximum film widths of 300-900mm in 200mm increments. There is also a choice of rotary sealing or box motion long dwell sealing for modified atmosphere packaging.

Modular construction: *Synchropack 900RT flow-wrapper*

All the machines are PC controlled and servo operated. Optional equipment includes a range of feed conveyors, trimming for the fin seal, and a pneumatic or mechanical side gusseting device as well as automatic splicing and format change.

Synchropack also builds special purpose machinery, such as the LTS "window" pack flow-wrapper aimed particularly at the wet wipes market.

This machine punches a hole in the film before wrapping takes place, covering the "window" with either a peelable label or a rigid lid and peelable label for consumer access. A tamper evident label is also applied over the reclosable element.

"Synchropack's modular approach to the design of its flow-wrapping machinery means that what is virtually tailor made equipment can be provided on relatively short lead times at extremely competitive prices," points out Pat Fleming, managing director at Propack Automation.

Propack is also now UK representative for Spanish sachet filling and cartoning specialist Enflex and demonstrated a complete line for filling, collating and cartoning sachets at speeds up to 60 cartons a minute.

The Enflex F17 horizontal sachet machine operates at 100 cycles a minute and can handle a single sachet up to 190mm wide x 225mm high, or operate in duplex format for 200 sachets a minute.

At the PPMA Show it was linked to an Enflex 90deg collating conveyor which collates up to ten sachets on latches and feeds at 90deg into the infeed buckets of the cartoner, which is able to handle the output of two or more sachet machines.

The cartoner infeed is extended back, beyond the collating conveyor, allowing the machine to be fed by hand if required.

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RNA AUTOMATION

Component unscrambler has multiple lanes for high speed

RNA's new ZE high speed multi-lane component unscrambler was demonstrated in eight lane format feeding an aerosol actuator cap in the correct orientation at speeds in excess of 2000 a minute.

The machine is capable of handling further components and closures at elevated speeds and operates without compressed air, reducing noise levels and operating cost. It is also said to provide much more gentle handling than machines based on centrifugal sorting.

At the PPMA Show the unscrambler was handling a 23mm diameter 18mm high aerosol actuator cap ,delivering it in the vertical axis, open side lowermost, onto a rotary table that merges the flow from the eight tracks into a single stream.

The use of eight linear feeders allows the speed of individual tracks to be reduced, virtually eliminating risk of damage and contributing to lower noise levels.

RNA points out that the linear feeder arrangement allows high feed speeds to be achieved using a single unit rather than multiple bowl feeders and that, with the bulk hopper combined within the system, the machine occupies a particularly small footprint.

High speed: *Unscrambler delivers over 2000 items a minute from eight lanes*

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AUTOMATED PACKAGING SYSTEMS

Automatic counting system suits wide range of industries

The AccuCount 200 automatic counting system announced by Automated Packaging Systems can handle a wide range of items including automotive parts, hardware and DIY products, electrical, plumbing and heating parts, as well as cosmetics and disposable healthcare products.

Speed is up to 2500 drops an hour, with a bulk supply of product channelled into a single flow that is automatically counted and batched to a pre-set quantity.

In order to improve accuracy, the AccuCount 200 operates a part profiling analysis, which assigns a value to each part. Any part below this value in weight or size, such as dirt or part fragments is identified as scrap and not counted.

The machine can be installed above an Autobag bagging machine such as the AB 180 to provide an automatic system capable of speeds said to be more than five times that of hand loading.

T: 01684 891400
E: contact@autobag.co.uk

Counting machine: *AccuCount 200 mounted on an Autobag bagger*

SUPREME PLASTICS

Pre-made bag filler aimed at medium volume production

The Swedish-built Pronova 500 pre-made bag filling and sealing machine introduced by UK distributor Supreme Plastics for medium volume users is an enhanced version of Pronova's original Joker machine.

The system works with a continuous chain of pre-formed bags that run along two fixed guide rods which, with no moving parts, support and open each bag at the point of filling. Bags are then closed by heat sealing.

The Pronova 500 uses aluminium profiles for the machine stand, inside which cables are hidden to make cleaning easier. A see-through plastic hatch now covers the sealing bars, so that the bags can be viewed clearly as they are cut off.

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BOTTLING REPORT

DOWN-THE-LINE REVIEW OF THE LATEST EQUIPMENT FOR BOTTLING FROM PPMA MEMBERS.

THE MARKETPLACE

Mixed signals on UK demand for bottling machinery

Forecasts of UK demand for bottling equipment – covering alcoholic and non-alcoholic, carbonated and non-carbonated beverages, as well as dairy products – appear to be carrying mixed signals.

On the one hand, the bigger international suppliers such as KHS are predicting healthy growth rates in global consumption. Up to 2009, the company says, world-wide consumption of beverages in general will increase by 4.3 per cent year-on-year. Non-alcoholic products will outperform this average, KHS forecasts, with bottled water, 'wellness' and functional drinks doing particularly well.

The German-based equipment supplier goes one step further, saying that its own studies indicate annual growth in demand for beverage filling and packing equipment of 5.2 per cent by 2010. But examining this figure in more detail, it is clear that demand will continue to be highest in developing markets from Eastern Europe and the Middle East to Africa and Asia.

In Western Europe, on the other hand, consolidation among beverage brands is expected to intensify. In the UK, this will be a particular feature of the soft drinks sector where the highest consumption growth is also anticipated.

Beer and alcohol brands have been following a similar pattern of consolidation. And the largest dairies will make it hard for some of their privately-owned competitors to fight their corner with high-growth categories such as flavoured milk and yogurt drinks.

Undeterred, equipment companies are working hard at developing machinery ranges which meet the needs of these and other higher-value segments of the market. These include ultra-clean and aseptic lines, those for innovative dairy drinks and those which are targetting the strong UK market for juice in cartons with more flexible bottle shapes and sizes.

PROCESSING

Specialist in filling looks upstream for integration

Although traditionally known as a filling machinery specialist, Krones is currently strengthening its credentials as a provider of upstream process equipment. As Krones UK technical manager Andrew Wilson points out "key components" of its VarioFlash and VarioAsept flash pasteurisation systems are now produced by Krones in Neutraubling, and this trend for bringing process equipment in-house is set to continue.

While VarioFlash is designed for classical flash pasteurisation of beer, carbonated soft drinks, juices, milk and dairy products, VarioAsept is intended for aseptic preparation of sensitive products. For highly viscous and fibre-containing liquids, as well as milk-based beverages, Krones offers shell-and-tube heat exchangers. Mr Wilson estimates that some 20 examples of Krones flash pasteurisers have already been installed.

As might be expected from a turnkey supplier of this size, Krones is emphasising the integration achieved between the flash-pasteurising, filling and post-fill sections of the line. Its use of Zenon touchscreen technology provides operators with a uniform interface, and allows them to access all settings (given the correct authorisation) and view the status of different sections of the line from a single screen.

Where post-fill tunnel pasteurisation is required, Krones subsidiary Sander Hansen has new equipment which overcomes some of the problems commonly associated with belt longevity. The Sharc (safe hygienic active regenerative control) pasteuriser uses the polypropylene and stainless steel Marathon belt which, says Andrew Wilson, is given a ten-year warranty. "The belts used in tunnel pasteurisers

Processing juice concentrate: *Three stage Ytron-Z homogeniser achieves minimum viscosity and avoids fibres*

Eliminating the front table: *Krones F1 filler breaks new ground in a number of areas*

have traditionally been expensive and had short lives," he points out.

While Engelmann & Buckham principal Gerstenberg Schröder is best-known as a supplier of process equipment for yellow fats, its Consistator unit is now used more widely in the food and drink industries, and can process fruit concentrates, purees and smoothies.

The Consistator is a scraped surface heat-exchanger for low-to-medium pressure applications where heating, cooling or crystallisation of the product is required. Models can be specified either for small capacity batch production or for continuous production, in a vertical or horizontal configuration.

For homogenising, Ytron-Quadro has developed a new system in conjunction with German fruit juice brand Eckes Granini. The process, called Ytronising, is used for producing fruit juice concentrate.

Conventionally, concentrate is processed in a high-pressure homogeniser at around 100 bar. As the company explains, the aim is to optimise the sensory properties of the juice, reducing the tendency for settling-out in the final juice by cutting particle size to a defined level.

But as Ytron-Quadro (UK) managing director Dudley Bradley explains: "This conventional process is expensive, with high capital investment costs and energy consumption. In addition, there is the cost of routine maintenance and costly wear parts." He also argues that high-pressure homogenisation adds a metallic taste to the final juice.

Instead, the company proposes passing the concentrate through its Ytron-Z unit. This houses up to three sets of rotor/stators with extremely high radial tolerances. Because it operates on an in-line principle, Ytron-Quadro argues, this applies defined and reproducible shear forces to the product in a single pass.

The system is said to be suitable for juices, premixes and concentrates from 12degBrix up to 60deg Brix. Advantages are said to include the avoidance of fibres, which can block filling valves, the ability to achieve a minimum viscosity, again eliminating filling problems, and a substantial reduction in energy and maintenance costs.

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RINSING AND FILLING

Breaking new ground in carbonated filler design

Perhaps the biggest single launch by Krones at Drinktec 2005 last September was the F1 volumetric filler for carbonated soft drinks, which breaks new ground in a number of areas. First, it does away with the front table, using individual neck-handling starwheels to transport PET bottles from the rinser and on to the capper. Each starwheel has its own servo drive.

Second, the F1 keeps the bottle stationary during filling, instead moving the filling nozzle down to the neck which says Krones, increases output. This has been made possible by the development of a swirl insert in the valve, directing the beverage towards the inside wall of the bottle, and avoiding any need for a filling or vent tube.

This is not the only innovation with filling valves on the F1. Whereas previous fillers have tended to house all electronics in a dedicated 'tower' in the centre of the machine, the F1 decentralises these controls to each valve. This includes the pneumatic controls, three-way valves and the supporting electronics for the inductive flowmeters. By locating them above the filling head in this way, Krones says it has increased response time and accuracy. "As far as Krones is concerned, this is the way things will be in the future," says Krones UK technical manager Andrew Wilson.

Self-contained starwheels

The decentralisation theme is also picked up in the distribution of servo drives. By integrating the servo motors in the column of each starwheel, Krones has ensured that they function as self-contained, synchronised units.

While Krones lays the stress on the F1's modular build, fellow-German supplier KHS emphasises the way in which its latest high-speed system for handling carbonated soft drinks functions as a complete rinsing, filling and capping bloc.

There are similarities between the F1 and KHS's servo-driven Innofill DRV-VF block. Both do away with the front table, for example, and substitute the flexibility of neck-handling for the PET bottles. But in other regards, it is the differences which stand out. While the Krones system lowers the filling valve to meet the bottle neck, KHS stays with its own variant on bottle-lifting technology.

However, the filling process itself is simplified, says KHS, with only two pneumatically-activated membrane cylinders required for the entire volumetric filling process. These cylinders lift the bottle and ensure that the mouth of the container forms a seal with the filling valve. The same basic system, which was shown for the first time at Drinktec, can be used for non-carbonated soft drinks, says the company.

KHS twins the filler with the single-channel Innoclean FR-EM mechanical rinser as standard in the bloc, but points out that two-channel and computer-controlled alternatives are available if required.

The same starwheel concept is developed in

Flowmeter filler: *In-line Breitner IDL 2065 filler for still beverages*

the KHS capper. Here, while the lower section of the star is used to hold each bottle by the neck ring, the upper part acts as a cap conveyor. A pick-up disk transfers the plastic closures directly to the capping head.

The space-saving theme, which is central to many of these filler/monobloc developments, is picked up in a new buffering technology from Krones. Synchronising different operations and allowing for stoppages or slowdowns in critical line bottlenecks remain major challenges for anyone wanting to integrate functions and reduce the footprint of a line. So Krones has introduced the Acculink mechanical buffer as a possible solution.

While an air conveyor requires changeover between different bottle shapes and sizes, the Acculink needs no adjustment, says Krones. It can also be used on aseptic lines and sterilised more readily than air conveyors.

Krones uses the term 'Smart Line' for operations using the Acculink, and these were originally intended for PET lines running at speeds up to 60,000bph. However, in principle the same concept can be applied to different speed ranges, says the company.

Acculink uses just two servo drives, Krones points out, as opposed to 15 or 20 for an equivalent air conveyor. With its 10sq metre footprint, it is said to provide a two-minute buffering option at different critical points in a high-speed line.

Perhaps learning some lessons from the PET sector, Ave UK has installed a line at Princes Soft Drinks using neck handling on hdpe bottles. The bottles, which are filled with pasteurised juices, incorporate a neck profile which allows them to be securely handled this way. By making this design adjustment, the overall light bottle weight can be maintained without risking compression on a pedestal lift, Ave UK managing director Steve Bradley explains. The line runs at around 11,000bph on 2-litre bottles.

Ultra-clean conditions

A second concern for Princes was the filling line's ability to provide ultra-clean conditions which would give the juices a 30-day shelf life. Ave carried out tests to ensure that the 40-head bottle rinser would actually sterilise the hdpe jugs, which incorporate the potential contaminant trap of a handle. By inverting the bottle and using a sterilising solution on a continual rinsing principle, Ave says it has made a significant contribution to achieving that shelf life.

The sterilising agent continues to act while the bottles are on the conveyor between the rinser and the monobloc, Mr Bradley explains. Only just before the filling station are the bottles rinsed with sterile water – with the option of subsequent drying with sterile air. A HEPA filter and laminar air flow ensure ultra-clean air inside the 40-head rotary gravity filler and 12-head capper.

Meanwhile, Ave has also provided its own solution for small-to-medium size fillers wanting to run carbonated and non-carbonated beverages on the same line. Its latest electronic flowmeter filler is currently on order for a South African company wanting to use it for its own cola while running at ambient temperatures. In the past, says Steve Bradley, foaming beverages posed a significant challenge on electronic fillers of this sort, and meant that machine speeds had to be reduced by up to a quarter. The alternative was to invest in a chiller.

The latest patented system from Ave means that the individual head 'sniffs' continuously – at around 100 sniffs a second – during the filling cycle, ensuring there is no build-up of pressure, so allowing line speeds to be reduced by only 10 or even 5 per cent. Filling temperatures can be up to 20deg C.

An earlier version of the same system was installed at Sangs in Scotland. Here, still and carbonated soft drinks, as well as water, are filled into PET bottles of between 250ml and 2 litres at speeds up to 20,000bph. The 50-head rinser and 50-head filler are followed by a 20-head capper.

With a previous PET line, Sangs had experienced problems with the pre-fill handling of bottles, experiencing a high reject rate on the thin-wall containers. The filler was understandably keen to avoid the same problem on the Ave line, which uses a high-level depalletiser to feed bottles to the filling station, while avoiding the need for an additional operator manually feeding bottles onto the line.

For filling still beverages at line speeds up to around 15,000bph on half-litre bottles, Engelmann & Buckham has the Breitner range of in-line fillers. While rotary versions are available, says managing director Michael Henderson, demand in the UK among beverage fillers seems to be for the in-line variety.

The version of the linear machine most commonly specified for beverages is the IDL induction flowmeter model, says Mr Henderson. For a line in this output range, size changeover is said to be relatively easy, with no changeparts required. The line has CIP capability.

Juices and smoothies

Over the last few years, Breitner installations have been made at Gerber Foods for juices and Orchard House Foods for smoothies, says E&B. Bottle sizes between 200ml and 1.5 litres can be handled.

For filling those smaller bottles favoured for the newer yogurt drinks, E&B supplies Hamba machines. These have already been successfully installed with some of the big names such as

Multi-lane: *Hamba Flexline can include up to 14 lanes for speeds up to 50,000bph on 500ml containers*

Danone and Müller and most are specified in ultra-clean versions, which gives the drinks adequate shelflife in the chill-chain. But, explains Michael Henderson, Campina in the Netherlands requested a fully aseptic model for its UHT ambient product.

A multi-lane version of the Hamba filler was launched at last year's Interpack. The Flexline can handle larger bottles and, on an exceptionally wide model with 14 lanes, could fill around 50,000 half-litre bottles an hour, although a more typical installation would be eight lanes wide, says Mr Henderson.

The intermittent-motion machine uses volumetric filling, with hydrogen peroxide as a sterilant throughout. Servo drives allow changeovers to be carried out from the control panel, and in the latest version of the machine, service equipment has also been re-engineered.

Among the more specialist suppliers of fillers is Italian machine builder Sympak Bottling & Canning, represented in the UK by Planet Flowline. Within the Sympak range, machines are available for filling PET and glass, catering for line speeds between 3000 and 60,000bph.

Machines include the Master RS, Volmaster RS, Magic RC, Magic Ultra-Clean and Magic Hot Fill, capable of filling a range of products, from carbonated soft drinks and water to beer, wine, still juices and yogurt drinks. According to Planet Flowline, Sympak's Separated Air Return system ensures that product is kept to the highest quality. The Variable Starwheel system is said to allow fast adjustments between 50 and 100mm, with no need for changeparts.

Rinser-filler-capper: *Sympak Master RS 40-head rinser-filler with twin 8-head cappers*

Wines and spirits

Though not then incorporated into a fully-fledged filler at Drinktec, Krones showed a new method for filling wine without using the traditional systems of fill-level correction. According to Krones UK technical manager Andrew Wilson, the servo-driven vent tube automatically adjusts to the filling height without the need for changeparts.

Stork Amsterdam International continues to supply the wines and spirits sector worldwide with options for standalone fillers, filler-capper monoblocs and rinser-filler-cappers. Part of Stork's success, says the company, has been its CIP unit which can be integrated into a new machine or retrofitted for thorough cleaning of the filling valve, inside and out, and of the central trough.

Aseptic filling

In aseptic filling, the trend among the largest suppliers is to offer both wet sterilisation processes based on peracetic acid and dry processes based on hydrogen peroxide, according to customer preferences. KHS showed both types of system at Drinktec. As the company says, some customers will prefer its Alfill dry technology because of the cost savings, while others will want the reassurance of a traditional bottle and closure rinsing method.

The mini-isolators used on the KHS Alfill lines house Class 100 clean room conditions. Reducing the size of the sterile area has reached the point where the only isolated areas are the PET bottle guide elements in the steriliser, the valve bells in the filler and the capping heads. Output spans the range 3000 to 50,000bph.

Like KHS, Krones is presenting customers with a choice between dry and wet aseptic systems. Says Andrew Wilson: "We launched our hydrogen peroxide technology at Drinktec, and believe that there will be applications where this can be beneficial. We wanted both available, although we think that PAA (paracetic acid) will dominate." Krones notes that PAA remains particularly advantageous where lightweight, heat-sensitive plastics are being filled.

Mr Wilson points out that the Krones hydrogen peroxide system is a true "dry" technique,

with the use of pre-heated bottles meaning that there is no condensation, and so no need to rinse with sterile water. Only sterile air is used.

Four flavours on one filler

Addressing the particular aseptic needs of the dairy industry, Krones has launched a new version of its Rainbow filler for handling four different milk or yogurt-based variants of the same drink, simultaneously on the same carousel. While previous models have used inductive flowmeters, the latest version is based on a weigh cell, to ensure that any gas in the product does not affect filling results.

The four different products arrive from dedicated product tanks, pressurised with sterile gas. One variant will be fed to the first, fifth and ninth filling head, another to the second, sixth and tenth, and so on. To ensure that the right label goes on each bottle at the end of this fully aseptic process, a laser-based batch identification process is used, with an inspection camera used for final quality control.

For these types of added-value milk-based drinks, it seems there is no shortage of equipment available on the market. What is missing, according to Tony Dignam, managing director of Stork Amsterdam International, is aseptic contract filling capacity.

Aseptic contract filling

Existing brand owners, currently using single-layer hdpe and a sterilising process, want to move to a multi-layer variant which gives greater flexibility in pack shape and size, he says. Then there are those wanting to push brands already familiar from confectionery and ice cream. Again, they are eager to use aseptic filling – but in neither case are the companies ready or willing to install these high-cost lines themselves.

In this case, Stork itself has taken the initiative and installed an aseptic line in its technical centre in Amsterdam. Mr Dignam points out that the bigger names in the filling equipment industry such as Tetra Pak's Sidel have focused on PET. He says: "I think we're the only company that can blow-mould three-layer hdpe bottles, and then process and fill fruit juice or milk drinks aseptically."

Stork's isolator technology on its recently-introduced Asep-Tec machine means the footprint on this part of the machine is reduced. The machine is linear, but can be supplied in multi-lane versions able to fill between 12,000 and 18,000 bottles an hour. "If you have a rotary filler, you're dispersing the air completely, and you simply don't want that with an aseptic line," Tony Dignam argues. The Stork machine uses a combination of flowmeter technology and its own Dolphin filling nozzles.

When it comes to ultra-clean filling, as opposed to the fully-aseptic alternative, Stork already has lines up and running in the UK. Starcross Foods, now owned by Dairy Crest, is filling Coca Cola's relaunched Minute Maid soft drinks in 1-litre PET bottles. For this, Stork installed a complete line including a bottle unscrambler, PAA sterilisation, sterilised water rinsing and rotary filling under ultra-clean conditions at speeds of 12,000bph. Caps are uv-sterilised, and the line also includes a labelling station.

Ultra-clean weigh filling

The Starcross soft drinks line uses non-contact weigh filling. But for milk, too, this is the established technology among the larger super-dairies, according to Mr Dignam. Stork has over 35 ultra-clean weigh-filling machines installed across the UK with the likes of Robert Wiseman, Dairy Crest and Arla Foods. Speeds tend to be around the 18,000bph mark on 4-pint jugs.

Tony Dignam explains that, while the smaller dairies will opt for cheaper level-fill alternatives, the larger operators understand that they can recoup the higher capital cost of weigh-fill purely by eliminating product giveaway with the more accurate technology.

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CAPPING AND CLOSING

Standalone cappers for in-line operations

While the trend has been for increasing use of filling and capping monoblocs on higher-speed lines, Breitner is among those equipment manufacturers supplying only standalone cappers. The company has launched a new range of servo-driven cappers – the VRS range – capable of running in line with its IDL in-line filler for still beverages.

Quick product changeovers are a particular benefit of the VRS, says UK representative Engelmann & Buckham, making it especially useful for lines changing between, say, standard screw-on caps and sports caps.

Bespoke capping machines

On slower speed lines, Cap Coder suggests that, in certain circumstances, bottling line managers should consider designing their own bespoke capping machine. Rubber-lined gripping jaws can be selected to suit the chosen cap. These are mounted on a rotating shaft driven by a servo motor which controls both torque and speed. A pneumatic motor can be used as an alternative if required. The system can be made fully-automatic, first picking each cap from a transfer device before placing and screwing it on.

In this type of fully-automatic configuration, says Cap Coder, the three-position rise-and-fall mechanism will allow each capping head to apply 30 caps a minute. The simpler two-position cap tightening operation can achieve speeds of 50 caps a minute, says the company. As an alternative, Cap Coder offers a twin rotary-head unit, comprising two torque heads supported at 180deg on a centrally-pivoting beam. In this case, the heads rise and fall together, but while one head is tightening a cap, the other is picking up the next closure from the transfer mechanism.

Fords Packaging Systems and Relco spent four years developing rotary machines for foil sealing using induction technology. Several have now been installed for major brands, particularly for small pots of drinking yogurt. The principle is similar to that used in conventional induction sealing machines, such as those

Swing torque head: *Cap Coder system gives faster capping*

Rotary induction sealing: *Fords Packaging and Relco have co-operated to build high-speed rotary induction sealing systems*

already supplied by Relco for sealing foil-lined plastic caps in dairies. Rather than using conducted heat, the induction head generates an electromagnetic field which converts to heat in the foil. But this is the first time that the technology has been combined with Fords' direct foil cutting and placement system.

Capping press for forming

The Fords machine has a capping press to form the foil into a profiled cap, with or without a pull-tab, which is then sent down a chute where it is applied to the bottle. An infeed star-wheel takes the bottle into the sealing turret, where the induction heads are lowered into contact for a pre-set heating time.

Systems are now operating commercially in the USA, France, Germany and Thailand, running at speeds of around 600 containers a minute, says Relco.

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LABELLING AND CODING

Steered beam laser moves into high speed territory

Linx Printing Technologies has added a new high-performance laser system to its range of coding equipment. According to Linx, the 500SL laser coder provides letter-quality script in high-speed production environments, making it ideal for high-speed label coding on beer and beverage lines. Up to 90,000 labels can be coded an hour, says Linx, taking this steered beam laser into territory previously reserved for dot matrix and mask laser systems. The peak power of 100W means that almost all packaging media can be coded.

At the 2005 PPMA Show, The Needham Group showed the Macsa range of CO_2 lasers. The F-1000 series is specifically designed to apply high-quality, permanent codes to difficult substrates, particularly in cold-fill conditions, while Needham claims that its Crystal Font offers better code readability on PET than any other laser system currently available. For even better dot visibility, it has developed a specific wavelength version of the font, which generates minor structural alterations and significant colour change.

The F-1000 series offers Ethernet connectivity for easy factory integration, a choice of lenses for different code sizes and high-speed

electronics, software and optics suitable for high-output bottling lines.

Another supplier of CO_2 lasers is Weber Marking Systems. Independent bottler Kingsland Wines & Spirits recently installed a Weber Solar Jet 30W laser coder on a high-speed wine-bottling line. Applying codes 4mm high, the system can mark bottles at speeds up to 18,000bph, says Weber. A further three coders are currently being installed on the Irlam, Manchester site.

Ink jet coding

Having originally invested in five Linx 6000 continuous ink jet coders, Scottish whisky distiller John Dewar & Sons has recently added a Linx 6800 to its production line. Date and time codes up to 3mm high are applied to either the neck of the bottle or the back of the label during pre-rinsing or labelling.

The two-line alphanumeric traceability code is accurate to within a minute of production time. Should a bottler require individual pack traceability, this is also possible with the 6800. Semi-permanent black mixed-base Linx 3103 ink is used on the Dewar line.

Quality manager at Dewar Ian Collins says: "Our production line runs on average 16 hours a day, coding around 400 bottles a minute. With such an intense production schedule, ease of use and performance are key requirements."

Waverley TBS, formed by the merger of Waverley Vintners and The Beer Seller, has similar coding priorities to Dewar. Says production shift manager Jim Sisson: "Our most important consideration when purchasing any new equipment is reliability and ease of use. We currently operate 24 hours a day, six days a week."

Like Dewar, Waverley TBS uses ink jet to code traceability lot numbers onto the bottle neck and sometimes the back of the label. In this case, Imaje S4 and S8 small character inkjet coders are used. The same type of system is used to code information such as the lot number, wine description and best before dates onto the outers used for bag-in-box wine.

In fact, as Imaje points out, Waverley TBS uses four different coding technologies, all from the one supplier, throughout the Gateshead plant: small and large-character ink jet, desktop label printers and label print-apply systems. The plant has two main bottling lines running at around 9000 and 8000bph.

When it comes to large-character inkjet, Waverley TBS has Imaje Crayon coders applying data such as lot number, time of packing, wine description and bottle volume and quantity directly on to the outer case. "Apart from replacing empty ink bottles, the operator intervention is minimal," says Mr Sisson.

Lot number coding: *Waverley TBS uses small charcater ink jet coders from Imaje*

Print-apply labelling

Since Imaje was already a coding equipment supplier to Waverley TBS, the filler agreed to trial the company's Imaje 2000 print-apply system. Jim Sisson explains: "The 5000-label roll was a distinct advantage, as our previous label applicator could only accommodate a 2000-label roll – plus the labels had to be pre-printed. We were also impressed by the minimal time required to change consumables." In both cases, the reduction in downtime has significantly improved output, says the customer.

Variable data for the Waverley TBS outer case labels includes the customer name, wine description, size of bottles, weight of case, barcode and customer-specific codes.

For applying barcode labels to multipacks of beverages in bottles and cans, Princes Soft Drinks in Glasgow has installed two SPA 720 print-apply labellers from Sessions of York. "We use individual software to produce unique coding, and have to give credit to Sessions who worked hard to incorporate our requirements and solve any initial teething problems," says the company.

Since the installation of the print-apply labellers, Princes says there has been a noticeable reduction in the need for re-labelling.

Logopak chose the 2005 PPMA Show to launch its 500 range of print-apply machines, which targets industrial applications including the bottling industry. Of the two models available, the 515 F90/600 allows front-of-pack labelling at speeds up to 80 packs a minute on a 150 x 50mm label size. This is said to allow producers with no pack-turning capability after case-packing to label packs broad side-leading at normal line speeds.

Print-apply: *Waverley TBS has also installed Imaje print-apply and large character ink jet equipment*

The second variant, the 515 B90/600, is designed for side-of-pack labelling under the same line conditions, and will achieve speeds of 100 packs per minute.

For ease of cleaning and maintenance, the thermal transfer unit is built as a cassette, and can be removed with a single Allen screw. The drive system is also easily removed, says Logopak, and the entire design is open to facilitate maintenance.

Orders for the new range have already come in, Logopak reports, with Quinn Glass installing

two units on its Krones filling lines and Weston's Cider in Herefordshire ordering a further two machines for its new factory.

High-speed labelling

The key catchphrase for high-speed bottle labelling is "modular design". As KHS points out, this approach aims to provide customers with the maximum advantage when it comes to future-proofing. The latest Innoket SE generation of label applicators from KHS can be used on a wide range of container shapes and materials, and can cope with line speeds in excess of 75,000bph. All labelling heads are equipped with servo drives, and the number of mechanical drive components has been correspondingly reduced.

Customers have the choice of mechanically-controlled cam rotation or electronic VarioDrive. Using VarioDrive gives the greatest flexibility, says KHS, with the bottle turret, motor and electronic equipment forming a single unit and communicating directly with each other. It can be used in conjunction with a camera-based alignment system for precise label placement.

Krones, meanwhile, showed its own second-generation modular labelling system at Drinktec. Again, servo motors predominate, with motorised docking stations for the various labelling stations making them even more independent of uneven floors and varying conveyor heights. A single operator can raise and position the station and its sub-frame, and the station will automatically centre itself.

Krones' new APS3 labelling station, suitable for soft drinks bottle labelling, includes automated splicing of label reels. This means that no output is lost for reel changes, and the overall dimensions of the machine have been reduced. Another feature, the loop buffer, feeds labels without expending a significant amount of energy, says Krones, allowing the servo drive to focus on application itself. With this new generation of servo drives offering 20 per cent more power than was previously the case, the applicator can meet line speeds of over 50,000bph.

Krones points out that on its integrated lines filling juice into plastics, labelling is now most commonly carried out before the filling station. With many high-speed lines for major soft drinks brands the standard procedure is to blow sterile air to provide positive pressure inside the bottle while the label is applied. "The advantages are that neck ring handling can be used, minimising change parts, and there is no danger of the full bottle bursting inside the labeller."

For Ave UK, the concept of pre-fill labelling of plastics is relatively new. In fact, says managing director Steve Bradley, the Princes Soft Drinks line filling juices into hdpe (see page 20) is the company's first in this country to locate labelling upstream of filling. The pressure-sensitive labeller is positioned between the bottle debagger and the rinser, using sterile air to allow a three-side label to be applied. When filling at 2deg C, Mr Bradley explains that condensation, and consequent poor label adhesion post-filling, can be a problem.

Sovereign Labelling Systems' Monarch range of all-stainless steel machines is specifically designed for the dairy and juice industries, says the supplier. Coombe Farm Dairies has just installed its fourth machine from Sovereign, adding to the three Monarch high-speed three-panel-and-cap applicators already running on various sizes of polybottle for fresh milk. The latest Sovereign Monarch round-bottle labeller applies wraparound labels to 250ml bottles of a newly-launched Real Fruit Milkshake.

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DOWNSTREAM EQUIPMENT

Servo drives herald higher speeds and accuracy

For multipacks of smaller bottles, what Cama Group calls the 'upper bridge' style of board sleeve can provide a cost-effective solution. On Cama's MP103 system, the sleeves, which fold over and lock around the neck of the individual bottles, are supplied as flat blanks. A system of tightening ensures the completed sleeve, glued with hot-melt adhesive, is rigid and strong.

The MP103 is operated by six servo motors, with the infeed designed around starwheels and a clamping system. Size change is quick and semi-automatic, says Cama, while 'easy-entry' safety doors allow good access. On the version with a rotating feeder, speed can be up to 250 packs a minute.

Shrink wrapping continues to hold its own in the collation-packing market thanks to improvements in quality and speed. KHS Kisters claims that the Innopack SP150 holds the current world record for this type of equipment with speeds of 150 cycles a minute.

Once again, KHS has opted for the lavish use of servo motors on the SP150, helping to explain the short cycle times, high performance and high positioning accuracy. Format changeovers are also fully automated.

Key features on the SP150 include variable pitch which adapts to the collation dimensions. The film fold-in process is also variable. Instead of the mechanical dancer normally used to maintain film tension, this system uses a dedicated servo drive synchronised with the main machine drive. This approach eliminates any strain put on the wrapping film, KHS says, allowing customers to use thinner gauge materials.

Sealed Air reports a good response from distillers north of the border to the latest Mondo & Scaglione case erecting and inserting equipment. Companies which have purchased these machines include Morrison Bowmore and contract packer Drampac. Sealed Air says the system is just as suitable for other bottled beverages, while further equipment supplied includes a range of case and tray erectors, case sealers, case packers, palletisers and pallet wrappers.

Multi-level plants pose a challenge for many bottling specialists, especially given the weight

High-level refurbishment: *Conveyor Systems uprated this conveyor for William Grant*

of many traded units towards the end of the line. At Diageo's whisky packing lines in Shieldhall, Glasgow, individual cases can weigh up to 15kg. When the factory wanted to replace side-grip elevators linking case-sealing with palletising, it chose instead to install a spiral conveyor from Conveyor Systems.

Snatch effect

With the previous system, says the supplier, the cases or six or 12 bottles of whisky could be damaged by the 'snatch' effect of the grippers when starting and stopping under load. High-friction inserts are used in the spiral conveyor slats.

At William Grants & Sons, Conveyor Systems has also increased handling efficiencies and the flow of cases from a case erector located on a mezzanine floor, down to a manual packing station in the bottling hall. Access to refurbish the conveyor was difficult – the overhead part is 6 metres above floor level – but the company completely reinstated and re-routed the conveying line, feeding cases down to a packing height of 750mm.

This conveyor was then integrated with new sections of conveyor – including belt, powered rollers, gravity rollers and two 90deg bends – to feed an adjacent bottling line.

Automatic film reel change is one of the newer features helping high-volume bottlers to maintain output at the pallet-wrapping stage of the line. For example, the Modelo Mexico Brewery has installed over 60 Genesis ring wrappers from Robopac Sistemi over the last few years, and the most recent are equipped with this latest ARC/3 reel change facility.

According to Robopac supplier Aetna UK, Modelo began to replace its previous generation of rotating ring machines on its export line since they were beginning to pose health and safety problems, were costly to maintain and were only achieving 90 per cent efficiency. Modelo wanted production peaks of 100 pallets an hour with 99 per cent efficiency which, Aetna says, were achieved by the Robopac stretchwrappers while also reducing maintenance costs, thanks to the lack of slip rings in the Genesis design. ■

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

In-line approach means Raising the limit on tube filler perfomance

MOVING AWAY FROM THE RESTRICTIONS OF AN INDEXING TURNTABLE HAS SEEN TUBE FILLER SPEEDS INCREASE DRAMATICALLY FOR HIGH VOLUME PRODUCTS.

Now and again in the evolution of a category of packaging machine fresh thinking arrives to leapfrog the limitations of existing designs, creating a radically new approach.

So when German manufacturer IWKA launched the first of its TFS 80 range of tube-fillers at Interpack 1999, the fresh thinking was immediately apparent. Gone was the conventional turntable, with diameter and indexing speed limitations imposed by its mass, to be replaced by an orbital track which accepts empty tubes horizontally, raises them to vertical for filling and closing, and returns completed tubes to horizontal for cartoning.

In effect, this means an in-line layout which, as UK representative IWKA PacSystems points out, allows the new machines to be built on a cantilevered basis for ease of cleaning to GMP standards, and gives the operator clear access to all parts. Also, closing systems to handle plastic and aluminium tubes can be readily mounted side by side, for immediate changeover.

That original design, in which a single track indexed two tubes at a time for filling, has now been extended with the addition of twin track models, creating a range of TFS 80 machines that fill one, two, four or six tubes on each cycle to give speeds of 100-500 a minute.

The orbital track, in single or duplex versions, carries quick-release, magnetically secured holders for the tubes, which are fed in horizontally and rotated to bring print into register. Following this, there is a tube-cleaning station employing a vacuum suck-blow system.

As the track passes round the end of the loop, the tube holders are carried diagonally through 90deg to upright, presenting the tubes ready for filling.

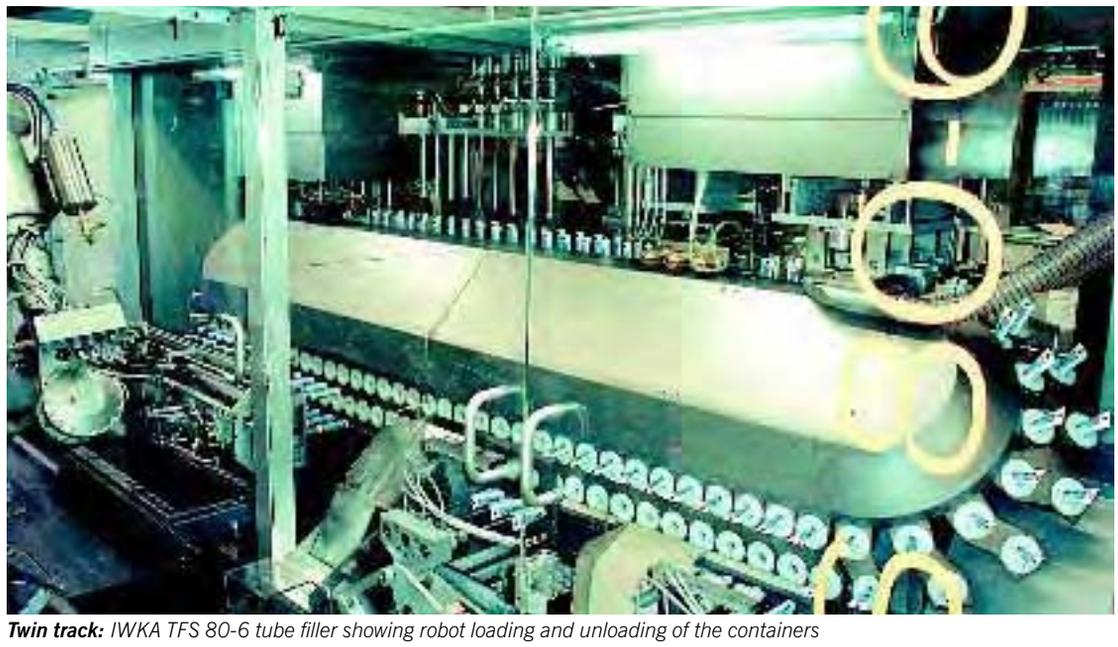
Servo drives are employed for the dosing system, providing programmable changeover in the volume range 2-350ml, and to elevate the tube holders up to the filling nozzles, one, two, four or six at a time depending on the model. Servo drive also allows on-the-run adjustment from the control panel should humidity, temperature, viscosity or other variables cause changes in product flow.

The dosing system, together with a hot air sealing station for plastic or laminate tubes and/or folding tools for aluminium tubes, is supported on an upper frame, which is simply raised or lowered via handwheel to cater for different length tubes. Below the filling and sealing stations, the machine surface is inclined for ease of cleaning.

Filled and sealed tubes then pass along the track, down the other diagonal, and in the case of single lane machines are discharged horizontally for cartoning via drop gates directly into the cartoner's product buckets. No chutes or conveyors are required, eliminating size dependent adjustments and providing gentle transfer.

On twin lane machines – the TFS80-4 and TFS 80-6 – the tubes are picked from their holders and placed automatically in the infeed buckets of the cartoner. This pick-and-place arrangement prevents risk of scuffing and ensures that the tubes lie in the correct orientation for the side-load cartoner.

Servo drives are used throughout the TFS 80 range to provide electronic adjustment via the touchscreen control panel for size changeover of



Twin track: *IWKA TFS 80-6 tube filler showing robot loading and unloading of the containers*

Top of range: *Norden's high speed tube filling machine is the NM 5002S-HA capable of speeds up to 500 a minute*

most machine functions via the PC control system within 15 minutes.

This consistent use of servo drives makes virtually all cams in conventional tube fillers obsolete, points out IWKA PacSystems. "Product dependent cam adjustments such as stroke settings, timing adjustments or even filling cam settings now lie in the past, since movement characteristics can be set and adjusted by programming the servo motors. Movement profiles can now be optimised, which could not previously be achieved by cams."

IWKA launched its high speed TFS 80-6 machine at Interpack 2002 and has since installed 30 lines world-wide. Two of these are in the UK, one of them at GlaxoSmithKline, Maidenhead, where the machine is equipped with IWKA's dosing system for monopaste and deep stripe toothpastes.

This uses a total of six dosing pumps which have a total of 18 servo drives to allow each tube to be dosed with two additional colours or active ingredients, co-extruded into the tube with the main paste.

The latest IWKA machine to be launched is the TFS 80-1 tube filler, shown for the first time at Interpack 2005. Capable of 100 tubes a minute and based on the same operating principles as its larger stablemates, the TFS 80-1 is similarly servo driven.

This servo drive allows the TFS 80-1 to be programmable for settings such as transport speed, diving nozzle movement and closure dwell time, which means that optimum settings established during R&D or short runs can be employed immediately when production is scaled up to much higher speed TFS 80 models.

IWKA also builds a range of traditional rotary tube fillers giving speeds from 40 tubes a minute upwards. These include the entry level TFS 10, said to cost 40 per cent less than comparable machinery as a result of extensive value engineering, the use of parts common to other IWKA machines, and production in much larger batches than usual.

Norden's high speed tube filling machine is the NM 5002S-HA capable of running 1-200ml tubes at speeds up to 500 a minute. The machine operates in single lane, with five filling heads, and can handle plastic and laminate tubes which are loaded from trays into the transport system by two robots synchronised with each other.

Several functions in the tube filler are servo driven including the main drive, the tube transport system, the filling pumps and the tube lift, while two or three colour co-extrusion filling is possible. Filled tubes are transferred from the pockets of the transport system into the infeed of the Norden 5002S cartoner by a servo driven pick-and-place unit that lifts five tubes at a time.

At the other end of the scale, Norden builds machinery for speeds down to 25 tubes a minute. Indeed, the company recently introduced the 80-a-minute Nordenmatic 702 tube filler and has sold the first in the UK to Universal Products, Preston, equipped to produce Design-a-Seal shaped tube seals. The machine will help Universal raise its production to 20 million tubes per annum and is fitted with Norden's Store Magazine, increasing the tube infeed capacity and overall efficiency of the line.

Reduced changeover time

Meanwhile, Romaco's Unipac division has introduced equipment to reduce tube filler changeover time, using a triple set of dosing contact parts which, it is claimed, can save up to 700 hours production time a year by eliminating downtime for cleaning.

The three sets of contact parts are mounted on a rotating turret, so that while one set is in use, a second set is available for immediate use when the current dosing hopper is empty or when a changeover is required, and a third set is under preparation. This allows continuous production to be achieved, with the prepared dosing set ready to swing into place the instant it is required.

The potential financial benefits of this new system are significant, says Romaco. "Based on an output of 70 tubes a minute and two changeovers a day, the estimated production time saved annually is 700 hours, equivalent to the time required to produce at least 2,500,000 additional tubes."

This system is available as an option on Romaco's new Unipac U20100 tube filler – a 12 station turntable machine capable of 100 tubes a minute – which is to be launched during February at the Ipac-ima exhibition in Milan.

The machine incorporates all the key features of its predecessor, the U2080, combined with the latest servo drives to control the dosing pistons and diving injectors.

This is said to offer several advantages. Ease of operation is improved since the appropriate filling profile for the product can be set up and controlled completely via the touchscreen panel, while feedback from a downstream checkweigher allows automatic adjustment of the fill volumes.

Servo control also means that the filling profile can be optimised to suit the flow properties of the product, with parameters including speed, acceleration, deceleration and diving depth of the feeding nozzles all variable. This, points out Romaco, improves fill characteristics and, in the case of high-viscosity products, eliminates entrainment of air.

Adelphi Manufacturing now offers a wide range of equipment for filling and sealing tubes, from bench-top, hand-operated machines through to automatic systems.

Handling thick paste: *Adapted TGM machine*

For laboratory or small-scale production, aluminium, plastic and laminate tubes can be filled on the Adelphi Centrac hand-operated filler or the Adelphi Response semi-automatic filling machine. Separate bench-top tube-sealing machines are also available from the company, allowing users to employ the filling machines on other types of container.

Italian built range

For integrated tube filling and sealing, Adelphi offers the Italian built TGM range which includes a machine developed last year for speeds up to 300 tubes a minute. At the opposite end of the spectrum, TGM also last year introduced its new E150 semi-automatic machine for customers with modest output requirements – up to 25 a minute – and a limited budget.

The E150 is available equipped for metal closing or sealing with hot air which, says Adelphi, reflects an increasing trend for users to choose hot-air sealing for plastic and laminate tubes rather than hot-jaw sealing because of the higher seal quality achieved.

TGM's standard range of machines includes models for filling three-colour products while specially adapted versions have been supplied to cope with the most demanding applications, including filling thick DIY pastes.

Italian manufacturer CO.MA.DI.S, part of the IMA group, builds tube filling and closing machines to pack cosmetics, pharmaceuticals, chemicals and food into aluminium, polyethylene or laminate tubes at speeds of 17 to 250 a minute and has just introduced a new medium range model, the C1090, capable of 90 a tubes a minute.

The machine closes aluminium tubes via normal, double and saddle fold while plastic, laminate and polyfoil tubes are sealed by hot air. IMA says that size change has been simplified and can be carried out without tools, while there is also a colour touch screen control monitor.

Tube feeding is from outside the base frame of the machine and there is clear access from all four sides to the drives and other parts below the machine table. A new dosing pump is also used, designed for quick disassembly without tools.

Finally, Excel Packaging Machinery, which represents Italian manufacturer Axomatic in the UK, has recently added two new machines to its range. Aimed at contract packers, the Axomatic Optima 700 is a semi automatic filler for handling metal, plastic, laminate and polyfoil tubes at speeds up to 20 a minute and, says Excel, has limited need for change parts.

The Axomatic Optima 800R is an entry level automatic tube filler giving speeds up to 40 a minute. Available to handle plastic and laminate tubes with either hot jaw or hot air sealing, as well as metal tubes, the machine has an automatic magazine feeding system or can be fed by means of an inclined chute. Print registration is also available.

Further machines in the Axomatic Optima range include models capable of speeds up to 260 tubes a minute. ■

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

High speed pizza packing: *Part of a Bradman Lake cartoning line handling 800 portions a minute*

Robotics move upstream

THE DAYS WHEN ROBOTS WERE THE SOLE PRESERVE OF CASE PACKING AND PALLETISING ARE LONG PAST. SHORTER PAYBACK PERIODS COUPLED WITH TECHNICAL ADVANCES ARE DRIVING THE ADOPTION OF ROBOTS TO LINK UPSTREAM PROCESSES.

Robots are a familiar sight on case packing and palletising operations. But up until now their use upstream has been limited by a combination of cost and technical complexity. However, all the indications are that this is changing rapidly.

For example, packaging machinery supplier Bradman Lake has observed two principal areas of dynamism further up the line. The first is the use of robots to link the end of the processing stage with primary wrapping – whether a flow-wrapper or a cartoner. "What we're finding is that people are using robots to pick up product coming off the belt and place it in the infeed of the flow-wrapper," says Simon Wheatley, Bradman Lake group sales director. He cites the example of frozen beefburgers, which typically come off the belt randomly at high speed in large volumes and need to be sorted and loaded into the flow-wrapper.

The second area is using robots to transfer unwrapped product into an end-load cartoner. Again, this involves replacing the long infeed of the end-load cartoner with a short infeed and a robot.

Both are operations that have traditionally often been carried out manually because, as Simon Wheatley points out: "People are very good at dealing with random situations because they have the unique ability to see what is in front of them and decide what to do with it. Robots aren't very good at that because they are used to being told where to go, what to pick up, where to put it and when to go back again."

However, the shift towards robots for such applications is occurring, he explains, because robots are now smart enough to look at 'what's coming down the pipe' and make a decision based on a number of parameters. This, he adds, is a result of improvements in vision system reliability and processing power.

"Vision by definition is a hugely PC intensive

activity,'' Simon Wheatley explains. ''You're taking a picture, making decisions based on a set of matched criteria and telling the robot what to do. That takes fairly chunky processing power from a PC or PLC.

''What has happened is that PCs have become more powerful and, at the same time, the price of processing power has come down. This has made vision technology more cost effective for complicated applications that would previously have just been hopelessly expensive – and hopelessly unreliable.''

Also, robots themselves are becoming better suited to packing tasks, he says. ''Robot providers are starting to see packaging as a dynamic market and are investing time and effort in developing products specifically for that market, rather than asking us to use robots which are great for automotive but not so good for packaging.''

Creating 'bumper packs': *Sewtec multipacker at Fox's uses two ABB FlexPicker robots for transfer duties*

Progress in gripper solutions, meanwhile, is bringing applications which were previously considered too tricky as a viable economic option into the realm of possibility.

Dave Bradford, managing director of robotics integrator RTS Flexible Systems, is able to give examples of gripper technology that have helped the company build a library of gripper solutions.

Most recently, RTS developed a gripper for transferring pancakes without touching the product. Instead, a device pushes air out of a special chamber around a ring shape. This creates a pull in the centre – or a 'doughnut of air' – which causes the pancake to lift off the conveyor.

Another application that required a combination of vision technology, high speed robotics and a fresh approach to grippers was a system RTS designed for a poppadom producer.

The irregular size and shape and the brittleness of poppadoms makes them difficult to handle without cracking. So RTS conceived a solution that picks the poppadoms as they are coming out of the fryer at a rate of 400 pieces a minute, then deposits them in groups of six or eight in a Multivac machine. Key to the system is the patented gripper design, which picks up the poppadoms without contact by allowing them to be sucked into a chamber.

While the adoption of robotics has traditionally been measured in terms of payback periods through labour savings, Mr Bradford says that in the past few years, the increases in output afforded by robotics have become a much more interesting and persuasive economic argument.

''We looked at an automation project for a seafood manufacturer which cost £900,000 and enabled it to increase output by £750,000 a year. Measuring the saving in terms of labour costs would have meant a much longer payback period.''

Moving further downstream, a second area that has come under the spotlight in recent years is the space between primary and secondary packing. While the use of robots to load flow-wrapped product into cartons is not in itself a new application, what has changed in the last couple of years is the take-up of this technology.

''Many more companies are now finding there is a return based on using that technology today,'' says Bradman Lake's Simon Wheatley, ''whereas one or two years ago they looked at it and said it was too expensive.''

Greater flexibility

Squeezing greater flexibility out of robots is also a prime objective of companies who are buying robots for linking primary and secondary packaging machinery. ''It's not just that the number of applications in which companies are using robots to load products into cartons is increasing, it's also about maximising the duty cycle of the robot and getting it to work harder,'' explains Mr Wheatley.

Bradman Lake, for example, has come up with ways of loading into cartons and flow-wraps off the same robot by using dual outfeeds, so the robot is packing into a carton one minute and into a flow-wrap multipack the next.

David Marshall, business development manager, robotics, with ABB – the company that pioneered picking robotics with its FlexPicker robot – says he has seen a number of cases where the FlexPicker is being deployed to link the flow-wrapping and cartoning processes.

Indeed, two ABB IRB 340 FlexPicker robots form part of a multi-pack autofeed system installed last January at Fox's Biscuits' Kirkham site in Lancashire.

The confectionery manufacturer was relying on manual labour to transfer multipacks of Rocky and Classic biscuits into a flow-wrapping machine to create a 'bumper pack'. However, following an audit of the manual operation, the company's management realised that automating the operation offered scope for increases in efficiency and reductions in cost.

Fox's commissioned Sewtec Automation to develop a system which had to be easy to use with a foolproof control system, capable of automatically balancing the speed of the two independent product infeeds with the existing rate of product outfeed, and able to provide payback within two years.

Sewtec designed a system comprising two servo-driven, vertical racetrack collators, two slat band conveyors, a Siemens-based control system and two ABB IRB 340 FlexPicker robots, which are used to transfer the stacked multipacks from the slat conveyors into the flow-wrapper infeed. Only one operator is needed to oversee the new system, whereas four operators were needed for the previous manual operation.

''The Sewtec system is a well thought out and effective solution, which meets the demands of the application in every way,'' says Paul Fisher, engineering project manager at Fox's. ''Though the application could have been met with a non-

robotic solution, the concept of using ABB FlexPicker robots means that through their excellent application versatility, they can be readily redeployed anywhere in the factory, which certainly adds to flexibility."

While the use of robots in case packing and palletising operations is well established, incremental technological improvements are still being made.

ABB, for example, launched a new second generation robotic palletiser at Interpack last year, which it claims has a longer reach and faster cycle time than its predecessor. Called the IRB 660, the machine combines a 3.15 metre reach with a 250kg payload. The robot's four-axis design means it can track a moving conveyor, so users can palletise cases without stopping the line, while its long reach means it can service up to four infeed conveyors, two pallet stacks, one slip-sheet stack and four palletising outfeed lines.

Palletising might be a 'solved problem', but depalletising is more complex, according to Barry Millin, general manager at systems integrator Robotic Solutions. "Putting boxes onto pallets is something anyone can do. Taking them off is more difficult as you don't always know what is on the pallet."

With this in mind, the company has designed several systems for depalletising boxes and crates which use vision technology.

Looking to the future, the expansion of robots into previously uncharted processing and packing applications looks set to continue. In addition, advances in vision technology could mean robotic systems making decisions based on ever more complex parameters.

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PALLETISING

Robots bring progress all round

Chronos Richardson has worked with Kawasaki Robot to develop its Chrono-Pal RP robot palletiser for bags, pouches, drums, cartons and cases.The palletiser is said to occupy minimum space and offer the flexibility to cope with different product formats in one palletising process. Operating speeds up to 1000 packs an hour can be achieved.

It incorporates a gripper with in-built controls allowing it to switch between different pack sizes.

However, while robot palletisers are often championed for the flexibility and ability to overlap bag edges and palletise onto non-standard pallet sizes, Chronos Richardson is quick to point out that they are not the panacea for every palletising problem. In fact, the company says that when cost and flexibility benefits are fully analysed, traditional palletisers can be just as economic.

This was the reason why Chronos Richardson developed a hybrid palletiser called the Chrono-Pal Compact palletiser, which draws on the best features of both types of palletiser. It combines the layer forming and side compression benefits of traditional high level palletisers with the innovative bag gripper designs of a robotic palletiser.

While the ability to overlap bag edges is a useful feature of a robot palletiser when bags are well filled, if they have been poorly filled it can lead to unstable pallets. The Compact palletiser eliminates this problem by allowing layer compression and lateral layer pressing techniques to be employed, stabilising the load to give pallets that can be stacked higher if required.

Drawing on the experience of Italian palletising company Zecchetti, Planet Flowline can deliver robotic palletising systems for transferring shrinkwrapped packs, cartons, multipacks and individual containers from infeed to pallet. The company has just completed an installation at Amcor's factory in Gresford, Wrexham, in which unstable empty PET bottles are being transferred automatically from the discharge of blow moulders onto pallets.

The system collates a range of containers coming from the blow moulder, picks and places them two rows at a time on the pallet and stabilises them. The robot also automatically picks and places tier sheets and top frames. Empty pallets are automatically fed into the system by the conveyor system and full pallets are discharged through an integrated strapping machine.

Planet Flowline says it is currently working on more sophisticated designs of robot palletisers where the robot handles the empty pallet, tier sheet, containers and top frames – reducing the cost of the installation and minimising the floorspace required.

Italian packaging machinery group OPM, represented by Hansel UK, has developed a new generation of modular frame mounted heavy duty robots with vision-driven grippers. A plastic tray or display case loading, lidding and palletising line is an example of how the robots can be used.

The system has a capacity of 12 to 37 display cases a minute and six plastic trays a minute. It can accommodate tray sizes of 144 x 232mm to 400 x 600mm and changeovers are said to take just a few minutes.

Palletising: *Chronos Richardson Chrono-Pal RP machine*

Vacuum formed trays of product are scanned by a vision system on their way to the packaging system. Acceptable product is then picked individually by the robots and placed into either a display case or a plastic tray. The display cases are held on a special servo-driven step chain that tilts the case to receive the product standing upright, while the plastic trays are loaded flat. Plastic trays are then sent directly to the palletiser, while display cases are delivered to a robotic lidding module, which forms the lids and folds and glues them around the trays.

The OPM Samas palletiser has a single

ELAU. On the best machines

THE WORLD'S PACKAGING AUTOMATION SPECIALIST EXPANDS ITS UK PRESENCE

With the right technologies, skills and always supporting open architectures, ELAU has become the world's largest and fastest growing automation supplier for packaging machinery – and beyond.

With its expanding United Kingdom presence, ELAU is supporting both domestic machine builders and users of advanced packaging machinery. And for machine builders interested in export sales, there is no better automation partner worldwide.

New UK facility

ELAU Ltd moved to new premises at Milton Keynes, a central location in southern England, in late February 2005. The building includes a fully equipped, modern training centre and has enough space for further expansion.

The training centre will benefit major ELAU end users in Great Britain, including GlaxoSmithKline and Unilever UK, along with OEMs such as Marden Edwards and Arcall Wright Pugson.

The facility supports a growing list of specifications for ELAU. For example, to simplify its FDA 21 CFR Part 11 compliance, GlaxoSmithKline has utilised PacDrive™ in every new machine from all its OEMs for the past three years.

Focused on packaging automation

In 1994 ELAU focused its resources exclusively on the automation of machines for the consumer packaged goods industries. With the introduction of its PacDrive automation system with integrated motion/logic control in 1998, ELAU set the world automation standard for machines in the consumer packaged goods industries.

Today, PacDrive automation systems control more than 25,000 of the best machines worldwide – with thousands of new installations every year.

Unparalleled domain expertise

Specialisation has proved a key factor in ELAU's success. This knowledge base enables ELAU to invest in and apply advanced technology with an unparalleled understanding of the market requirements in its domain, the consumer packaged goods industries. ELAU's application-specific skills and software infrastructure, along with optimised hardware and mechanical configurations, maximise the business value its customers derive from a PacDrive solution.

Mike Clarke: *ELAU's UK sales director*

ELAU PacDrive: *Integrated motion and logic control for packaging*

Global customer support

Thanks to ELAU's global application support, 24/7 service and logistical networks, machines with PacDrive can be readily commissioned and maintained anywhere in the world.

In 2005, ELAU AG joined the Schneider Electric Group, which provides assistance with global support and service. Since Schneider Electric has more than 85 000 employees and a service network in 130 countries, ELAU has the backing of a strong parent that will be giving the company systematic help in achieving the joint goal of becoming market leader in packaging automation.

Both companies share the common goal of world market leadership in packaging automation. ■

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Simply integrated!

One controller – all functions

At the end of 2005, ELAU AG presented the robot functionality of its PacDrive automation system, an innovation that reflects the trend towards integration of robot modules into packaging processes. Conventional robot systems predominantly use proprietary control architectures, which are tailored to the specific robots. However, using such controllers in the construction of packaging machinery results in a considerable workload to synchronize them with the packaging machine controller that automates the rest of the packaging process. With the high performance requirements in the consumer goods industry, this can cause problems with real time synchronization at the interfaces. With PacDrive™, ELAU now enables the packaging machine AND multiple robots to be automated using a single controller. ELAU AG has been nominated for the Automation Award for this functionality.

Ten products are nominated yearly during this exhibition for the so-called Automation Award – the "Oscar" of the German automation industry, so to speak. This Award is granted in cooperation with ZVEI (Central Association of the Electrical Industry) and VDMA (German Machine and Plant Construction Association) by the trade journal "Elektro Automation" for innovations in the sector of automation technology.

infeed lane, single pallet station and single pick-up tool. The unit incorporates paper interlayer positioning as well as de-nesting and feeding of empty pallets, with height detection of each pallet load.

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CAMA3

Handling ice-cream: *Cama line uses a 4-axis robot*

Ice-cream line robot loads 330 a minute

Secondary packaging specialist CAMA has designed a flexible packaging line for an ice cream producer.

The line is made up of a four-axis robot, which loads flow-wrapped products into a continuous motion cartoner at speeds up to 330 cartons a minute, or into three-flap cartons at rates of up to 120 cartons a minute. The cartons are erected by an electronic glue forming machine and closed after loading by an electronic closing machine.

After loading, the cartons and boxes are packed into a display case using a second electronic cartoning machine or into a corrugated case using a wrap-around case packer.

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Stacking mouldings: *Illig handling system*

ILLIG UK

Automatic handling on thermoformer

Illig UK, the subsidiary of the German thermoforming equipment manufacturer, can now supply its RDK 80 pressure former equipped with an automatic product handling device.

Formed and cut items are removed from the material web by vacuum suckers and placed, in counted stacks, onto an intermittent motion outfeed conveyor.

Illig says the main benefit of this handling system versus conventional stacking systems is the ability to arrange the forming layout for optimum material utilisation.

A universal adapter plate can be supplied with the handling unit to allow existing tool sets to be used. If automatic handling is not required, the unit can be turned off and the thermoformer run with conventional stacking.

Illig recently installed a pressure former with automatic product handling for the manufacture of polypropylene dairy pot lids. The 35 impression former is capable of producing 40 lid high stacks – a feat that Illig says would have been virtually impossible using conventional mechanical stacking methods.

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RAQUE FOOD SYSTEMS SALES

Bulk feed system for ready meals

Ready meal producers who buy in pre-frozen products or meal components in bulk are the target of a new vision-driven bulk feeding system from Raque Food Systems. The system, which incorporates an ABB FlexPicker robot, allows ready meal manufacturers to transfer meal components direct from bulk storage or a freezer into primary ready meal trays at speeds up to 180 trays a minute.

Product is taken from a bulk hopper via a lugged belt and fed into an overhead metering unit which combs off excess product, allowing only the correct level to pass onto the feed conveyor. Individual items on the feed conveyor are then screened by an overhead vision system, which allows the robot to pick, orientate and place the items into trays on a parallel conveyor.

The vision system and variable speed drives cross-reference product feed and conveyor rates to identify any products which have stuck together.

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ISHIDA EUROPE

Loading transit packs: *Ishida FPS system*

Primary packs gain flexible transfer

According to Ishida, one packing operation which is often still done manually is the transfer of primary packs into secondary or outer transit packaging. It was this that prompted Ishida to develop its Flexible Packing System (FPS).

The FPS is said to allow a range of 'building block' modules to be linked together in a fully integrated end-of-line packing system operated via a single touch screen.

A multi-axis pick and place module is at the core of each FPS. Units upstream and downstream of the pick and place module can also be linked into the system, creating a smooth path for product flow.

QUIN BUILDS A BETTER CASE PACKER FOR NORTHERN FOODS

AUTOMATING CASE PACKING, THE LAST MANUAL PROCESS ON ITS PRODUCTION LINE, WAS PROVING A CHALLENGE FOR NORTHERN FOODS, THE MANUFACTURERS OF FOX'S BISCUITS, UNTIL A RADICALLY NEW CASE PACKER FROM QUIN SYSTEMS PROVIDED A CONVENIENT AND VERY COST EFFECTIVE SOLUTION.

At Northern Foods, biscuits are produced at a rate of over 100 packets per minute. The production line has, for some time, been fully automated except for the final step of case packing – loading the finished packets of biscuits into the cardboard boxes (cases) which are used for shipment. Recently, the company decided that it was time to automate this last remaining manual process.

This is not as simple as it sounds. The case packer must handle the packets of biscuits gently to avoid damage, and must place them accurately within the outer cases. Further, the pattern of placement varies with the type of biscuit being produced. And, of course, the packer must be able to handle the required 100+ packets per minute throughput.

Searching the market for equipment to meet its needs, Northern Foods quickly discovered that conventional solutions were unsuitable. In particular, these solutions, most of which are robot-based, would struggle to reach the required operating speeds. They would also need to use at least two pick up heads, leading to a complicated – and costly – installation which would also be difficult to reconfigure to suit new pack sizes and formats.

Other shortcomings of conventional case packers were also revealed, including their large size, which meant that extra space on the factory floor would have to be found.

There were also doubts about whether the machines, when operating at high speed, could provide a smooth enough motion to ensure that fragile biscuit packs were not dropped or damaged. Another concern was the high level of maintenance which would be needed to keep these complex mechanisms in good working order.

At this stage, Northern Foods became aware of the Rtheta™ Casepacker from Quin Systems, which takes a new and innovative approach to the challenges of case filling. Unlike robot-based systems, this new machine uses unique Rtheta™ technology to provide exceptional levels of performance in end-of-line packing.

This arrangement minimises inertia, allowing the high operating speeds needed by Northern Foods to be achieved easily. In conjunction with Quin's specially developed control algorithms, it also ensures that all motion is smooth, thereby eliminating the risk of product damage.

The Rtheta™ Casepacker is based on direct drive from two brushless servomotors. No gearboxes are needed, which not only eliminates positional errors due to backlash, but also greatly reduces maintenance requirements. The machine is compact, and suitable for mounting above the production line. In the case of Northern Foods, this meant that no additional factory floor space was needed to install it.

According to Rick Lloyd, Chief Engineer at Northern Foods: "The specification appeared to meet all of our requirements and the price – about half that of the other systems we'd looked at – was certainly attractive. Accordingly, we decided to install one of the machines on a trial basis."

In operation, the machine quickly proved its capabilities, meeting Northern Foods' target of handling over 100 packs per minute with ease, using just a single vacuum pick-up head which can be changed rapidly to suit different types of biscuit packaging.

The new machine controls the flaps of the cases, which it receives from a carton erector also supplied by Quin, collates the biscuits, then loads them into the cases. According to the product type, there are between two and six layers of biscuit packs per case, which means that high positional accuracy is essential if product damage is to be avoided.

The Rtheta™ Casepacker features a touchscreen interface which makes it possible for the machine operators to change in seconds between the fourteen different products which the line currently handles.

Further, the straightforward menu-driven programming system used by Quin means that technicians at Northern Foods can quickly and easily reconfigure the system to handle any new pack sizes.

After exhaustive trials lasting several months any reservations which Northern Foods may originally have had about adopting new technology were entirely dispelled.

"The installation easily meets all our requirements, and we have had no hesitation in making it permanent," said Rick Lloyd. "By eliminating the need for manual case packing, it has cut our costs substantially, and it will have a very short pay-back period, especially when its low initial cost is taken into account."

"It has now been operating 24-hours a day over the last couple of months, and its reliability has proved to be excellent," he continued. "Based on our experiences, we believe that Quin's Rtheta™ Casepacker has huge potential within Northern Foods, and beyond."

For further information please contact Robin Maidment at Quin Systems on 0118 977 1077; E: rmaidment@quin.co.uk; or www.quin.co.uk

Potential applications include trays of fresh, chilled and frozen food such as meat, poultry, fish and ready meals, as well as blocks of cheese and bagged product.

Ishida has installed a Flexible Packing System as part of a new ready meal packing line at German frozen food manufacturer Frenzel. The system takes sealed and sleeved ready meal trays in sets of three from the conveyor belt and places them into pre-erected cases for closing and palletising.

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HERBERT INDUSTRIAL

Meat line ends in robot tray loading

Weigh labelling equipment specialist Herbert Industrial has completed its largest order to date, supplying ten identical automated packing lines to meat processor Dawn Foods.

The installation formed part of a £32 million investment by Dawn Foods in a new packing plant in South Wales, which gives the meat processor the capacity to pack 500 tonnes of meat every week for retail customer Asda.

Each packing line comprises a metal detector, primary pack weigh labeller, vision system, robot and secondary weigh labeller.

After passing through the metal detector, packs are weighed and labelled using a PC controlled Gemini weigh-price labeller which runs on a Windows operating system and acts as a central control point for the line.

A vision system developed by Herbert then verifies that the correct label stock has been fitted to the labeller and that the label is correctly positioned on the pack. It also checks up to eight human readable fields for legibility and data content and checks the bar codes for scanability and content.

Packs are then placed into crates using a Japanese built Fanuc M6iB robot with pneumatically operated vacuum grippers. Herbert Industrial says the robot can easily adapt to handling differing pack sizes and packaging configurations in the plastic transit crates.

Finally, an outer case marker built by Herbert is used to automatically weigh and label the crates.

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Farewell black box

BLACK BOXES TO CONTROL ROBOTS CAN BE COSTLY - £10,000 IS NOT UNCOMMON - AND SYNCHRONISING THEM WITH THE PACKAGING MACHINE CONTROL CAN BE TIME-CONSUMING. SO IT MAKES SENSE TO USE THE CONTROLLER OF A HOST PACKAGING MACHINE TO CARRY OUT THE TASK INSTEAD.

Last year's Interpack showed clearly the way in which robots are not only being employed in greater numbers to transfer products and packs to and from packaging equipment, but how in some cases are now being run by the same controller as the host machine.

Capital cost, ease of operation, flexibility and press-button changeover are the immediate and specific driving factors, but a general desire from major international machinery users – particularly, it seems, those based principally in the USA – for greater overall standardisation and modularity in control software is having a broader but equally significant effect as well.

Conventionally, robot systems usually incorporate their own specific control architectures tailored to each robot – hence the Black Box. But synchronising these controllers with the controller of the packaging machine itself requires a lot of engineering time, particularly since the programming language of each robot is usually specific to each system.

Number of robots

This, according to German controls specialist Elau is where its latest PacDrive system is coming in, providing the capacity to control both the host machine and a number of robots, using IEC 61131-3 programming for all functions.

On the basis of experience so far, Elau reckons that the time required to integrate a pick-and-place device with a packaging machine can be cut by around 25 per cent while performance can be increased considerably.

The PacDrive centralised control system was

Single controller: *Elau PacDrive runs the host machine and the robots used for loading*

launched in 1998 and is now employed on over 25,000 machines wordwide by manufacturers such as Bosch, IWKA, Cavanna, KP Aerofill, Krones and Marden Edwards, to name but a few, and was developed from the start as a combined motion control and logic system, aimed specifically at packaging machinery.

As a result, points out Elau UK sales manager Mike Clarke, the increasing use of PacDrive systems to control ancillary machinery, particularly but not exclusively robots, is a natural progression.

Extra duties via Intel processor

"Processing speed and the dedicated nature of the instruction sets are two principal reasons why the PacDrive controller is able to take on extra duties such as controlling robotics," he explains.

For example, the PLC includes a dedicated Intel based processor for floating point maths, which is required for servo motor control and, being able to process 1000 instructions in 5 microseconds provides considerably higher speed than standard PLCs, which take typically 75-125 microseconds for the same task.

This processing power also gives the capacity to carry out the logic control within a single system, removing the need for independent logic and motion control systems.

What is said particularly to distinquish the PacDrive system is the ease with which it can be instructed to operate either as a completely centralised and synchronous system, or for one or a group of axes to be decentralised and desyncronised to adapt in proportion to variations in machine speed, the product or the packaging media

Within the packaging machine this allows, for example, sealing time on a flow-wrapper to be kept constant irrespective of machine speed while, on a thermoformer running shrink-prone polypropylene, the web advance can be independent of the forming and cutting commands to ensure correct registration after a shutdown.

Reference point

This concept of a critical element of the process becoming the reference point translates readily into robot control with, for example, the program for a specific product including a set limit on acceleration at the gripper to avoid product damage or risk of dropping.

With the host machine also governed by the same controller it then becomes a fairly straightforward matter to optimise production automatically, using a feedback to instruct the host machine to reduce speed should the robot be unable to cope without exceeding its acceleration limits.

No complicated software

The benefit is that there are no complicated software changes. Each product handled by the packaging machine could be given an individual maximum – the software then automatically adjusts all upstream velocities in proportion.

Equally, should the robot be changed over to load, say, a larger carton using a picking head with more individual grippers, then robot acceleration may no longer be a limiting factor but rather the seal time available on the host machine. Again, production is optimised using few software changes.

Within the PacDrive controller there is usually also room for running a vision system using a PC card although when data processing requirements are particularly high, two controllers can be employed coupled by a high speed data link.

This, for example, would cater for the additional processing required when a vision system is used not just to give position and orientation for picking, but also to carry out inspection of shape or colour.

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Translating the movement

The robotics library of the PacDrive system features a transformation module for each of the various robot kinematics such as articulated, gantry, Delta, Scara, or portal varieties, converting the co-ordinates of the robot's Cartesian space into positions for each axis of motion in real time. Several robots can be addressed simultaneously by a single controller.

The robot's trajectories are preset using special motion commands in Cartesian space, which is said to reduce significantly the effort of creating procedural profiles for different products or formats. An intelligent acceleration monitor is integrated in the control system and directly monitors the acceleration at the TCP (Tool Centre Point) or the centrifugal force on the product in the robot gripper. Direction and magnitude are monitored.

The controller automatically calculates the maximum speed possible and reduces the path speed in such a way that a preset TCP acceleration is not exceeded. This calculation ensures that the product gripper, which has a limited holding force, does not drop the product.

All in one control for vertical cartoner

The vertical G35 cartoner introduced at last year's Interpack exhibition by the Italian manufacturer Cavanna employs a single Elau PacDrive controller for the machine itself, and also all the servo motors driving the central robot island that erects, fills and closes display cartons. Speed is 600 flow-wraps a minute.

The main feature, says Cavanna, is the concentration of the three separate operations of carton forming, filling and closing into a single group, giving considerable space savings compared with the traditional solution of three independent units.

"In a space of about 5 x 2 x 2 metres we were able to integrate the functions of three separate units, allowing considerable space saving with no prejudice to the functionality and performance of the whole line."

The robot cell is driven by a total of 16 servo motors. The three robots use three Elau SM 140 and six SM 100 motors while four additional SM 100 motors operate the dual infeed belt and the carton conveyor and three SM 070 motors drive the product infeed conveyor belts.

The PacDrive C600 controller used in this application is the most powerful model in the Elau range, based on a Pentium 4 processor and able to process 1000 logic PLC commands every 5 microseconds.

Parallel to the PLC program, the controller can operate 24 servo axes at a cycle time of one millisecond. Real-time software integrates the motion control and logic into one package. Standard Vx-Works software from WindRiver is used as the real-time operating system.

All drive communications are based on Sercos. Profibus DP is used for communications to other sensors and actuators on the machine.

METTLER-TOLEDO

Piece counting scale records unused labels on part reels

Contract manufacturer Robert McBride, which specialises in household, cleaning and personal care products, has solved the issue of counting unused labels on a reel at its Bradford factory with a new Viper SC 15 LA scale from Mettler Toledo.

Previously the number of labels left on part-used reels – required for stock control – was determined by weighing and manual calculation, which was time consuming and often inaccurate.

"We chose the Viper scale for a number of reasons," explains label store co-ordinator Vincent Pemberton. "We wanted a scale that could accurately weigh and count labels that weighed only 0.01g as well as a scale that could store up to 1500 individual codes."

The Viper scale is linked to a printer so that everything weighed on the scale can be crosschecked against the factory SAP system.

"We are now confident in the amount of labels on a part reel and in our stock levels," says Vincent Pemberton. "This accuracy has prevented production downtime due to label shortages and has had a positive effect on our label stock accuracy."

T: 0116 234 5005
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WEBER MARKING SYSTEMS

Tag dispenser staples bar code labels to timber products

The new Weber FasTagger dispenses UPC bar code labels and staples them onto the ends of cut lengths or other timber products at the rate of over 100 a minute.

An operator simply places the pneumatically powered hand tool against the timber and pulls the trigger. The FasTagger then automatically staples a label to the wood, cuts it, and then feeds the next label into position.

Housed in an aluminium case, the tool weighs 6.5Ib, including a full roll of labels.

Bar coding for timber: *FasTagger stapling gun from Weber*

Four different label sizes – in widths of 17.5 or 22.2mm and lengths of 35 and 69.85mm – can be accommodated. Acording to WeberLabel sizes can be changed in less than 10 seconds.

T: 01875 611111
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SESSIONS OF YORK

Print-apply machine fits in 1 metre of line space

An ultra-compact print-apply labeller – an inverted machine measuring just 1 metre long – has been introduced by Sessions for lines with restricted space.

The SPA 92X incorporates an integral 64-bit, near edge technology thermal printer, available in 4, 5 and 6in widths and can print to a resolution of 12 dots/mm at speeds up to 300mm/sec.

Compact labeller: *Sessions new SPA 92 X print-apply machine*

A foil saving system is included for economy and the machine is able to accept 300mm diameter reels of label stock.

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PALS PRECISION APPLICATORS

Labelling automation for bird seed presentation

Bird feed supplier Unipet International, Kent, has automated the labelling of its 500g wild bird feed packs using a PA10E semi-automatic labelling system from Pals.

As a result of the new machine, which is integrated into the existing packing line, Unipet is able to control the accuracy of label positioning – which by hand could vary by up to 10mm – and raise productivity.

"The Pals labelling system has enabled us to improve our levels of productivity and to redeploy staff that were previously involved in hand labelling elsewhere within the factory," explains Unipet International director Andrew Ball.

"Perhaps as important, the new labelling machine has enabled us to enhance pack quality significantly by reducing variations in the position of labels to less than a millimetre."

Unipet normally uses 110 x 110mm labels, supplied pre-printed with the customer brand, and product information and weight. Labels are automatically applied to each pouch in the flat, before they are opened, filled and sealed.

Andrew Ball points out: "As the PA10E is a semi-automatic machine it has enabled us to retain a degree of operator control and, if required, intervention at a competitive cost."

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Keg labeller: *The Logopak 906 TK labeller installed at Bulmer's Cider*

LOGOPAK INTERNATIONAL

Print-apply keg labeller for Bulmer's latest line

Bulmer's Cider, Hereford, has taken delivery of a Logopak 906 TK print-apply keg labeller enclosed in a pressurised and heated stainless steel cabinet, with automatic raising and lowering and integrated bar code scanning.

The machine is essentially a newer version of 19 Logopak 906TK labellers bought in 1997 by Scottish Courage, Bulmer's new owners, and which are still operating in a number of breweries from Reading to Edinburgh.

Installed on a new keg line the Logopak 906 TK can handle 850 11-gallon kegs an hour and holds label data in an on-board database for selection by the line operator on changeover.

Best before dates and sequential numbering items are, however, maintained automatically by Logopak's intelligent iLEAP64 controls.

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ATD INKJET SYSTEMS

Small character ink jet coder uses wax-based dry ink

The IP9000 Solidjet small character ink jet printer introduced by ATD uses pellets of wax-based dry ink which is heated in the machine and sets immediately on porous or non-porous surfaces.

Character heights of 1-48mm can be accommodated and up to four lines of text can be printed at 300dpi, providing, says the company, an alternative to continuous ink jet and thermal transfer printing.

"There are no complicated start up and shut down routines," explains ATD. "The IP9000 is simply switched on and off. No daily maintenance is required."

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Dry ink coding: *Solidjet handles a variety of items*

Variable speed drives offer Winter warmers

WITH A WINTER OF POWER SHORTAGES LOOMING, PLANT AND MACHINERY BUILDERS ARE SHOWING A RENEWED INTEREST IN VARIABLE SPEED DRIVES. BOB DOBSON REPORTS.

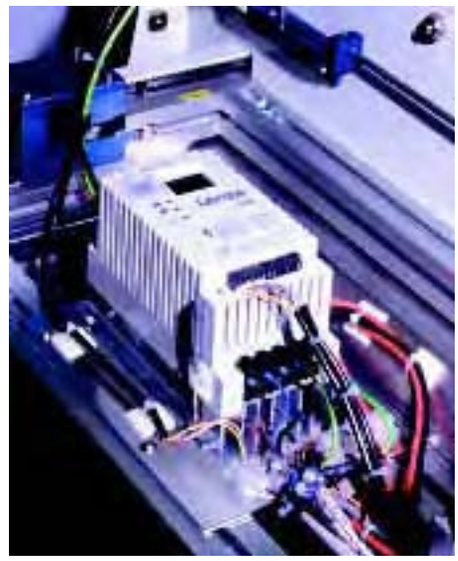
As North Sea gas reserves dwindle, the UK is becoming more reliant on overseas suppliers but the security of delivery is far from certain. And with so many of our power stations converted to run on gas, a shortage automatically means compromises in electrical supply too. The government is preparing us for disruptions throughout the energy hungry winter months and has hinted that industry can expect to suffer as a non-essential consumer.

This situation is compounded by the fact that electricity prices are on a long upward spiral, having been held artificially low in the pre and post-privatisation periods. Industrialists are now planning for year-on-year price rises far above the rate of inflation: many are predicting a trebling of prices from about the 2.2p/kWh they are currently paying to well over 6p/kWh. The effect of this on the overall profitability of major energy users stands to be significant, and even lesser consumers will see an adverse effect.

A related issue worth noting is that the recent hard hitting hurricanes have taken a heavy toll on electricity generation in the US and other Gulf Coast countries. This has served as a powerful demonstration of the effects of underperforming energy supply on both highly developed and emerging manufacturing economies. This is of immediate concern to industrialists in the region and the knock-on effect is that organisations considering relocating major operations to low cost economies are likely to take far more notice of power generation and supply infrastructure in the future.

So, are machinery builders and plant operators changing their outlook on energy efficiency, taking the view that it is imperative and compelling? If so, this is a complete turnaround on just a few years ago when the Climate Change Levy was the government's main tool for encouraging efficiency.

Then, rather than embracing energy saving technologies, many users preferred to shop around the suppliers for the best deal – often ending up with an 'overseas' supplier. The advantages were seen as: energy bills were contained, no capital investment was required and finance directors could brag about how they manfully brought a supplier to heel.



Speed control: *Lenze SMD drives provide a cost effective means of regulating speed on fan motors*

The arguments in favour of using drives to save energy are well known. The basic idea is that power savings are proportional to the square of the reduction in speed at which a motor runs. Reduce the speed by half and you will cut 75 per cent from your energy bill.

Idling most of the time

Many motors in industry actually idle most of the time, only running under load for a small proportion of the working day. Stopping the motors rather than idling them offers the promise of significant savings. Creating a speed profile so that the motor never consumes excess energy, or building a closed loop control system so that the motor responds in real time to changing demands are further options of energy saving with an inverter drive.

Payback periods for the capital outlay of a drive system, plus the cost of installation and any loss of production during installation, are typically under two years. In the early days of drives technology, say 20 years ago, this was simply too long for finance directors whose focus was right on short term profits.

Now companies are being forced to consider a rather more rational approach to energy usage, and seem willing to look at payback periods that extend across more than one accounting year. However, it may be that drives suppliers should not get too optimistic - there is always the possibility that electricity buyers end up doing the same as all those car owners who said they would give up driving if petrol ever went over a pound a gallon!

With such radical changes in the financial landscape many engineers are revisiting previously-shelved projects and wondering if a drive is a justifiable investment after all. However they must pay due account to the advances in the technology since their initial investigation. While the basic concepts of drives can be said to have reached a level of maturity 10 or 15 years ago, each intervening year has seen at least some further development.

So any proposal more that a couple of years old will require significant reworking. The first stage of this is to update the cost figures, but engineers should also re-assess their system design to see if it is still relevant. The developments in drives technology and associated control strategies since they last reviewed the project may also have a significant effect on systems capabilities.

One of the most significant developments just coming to the fore is a blurring of the boundaries between induction motor performance and servo motor performance. Previously, induction motors and inverters were the cost conscious solution, with servos reserved for high performance where costs could be justified. Now

closed-loop vector inverters can honestly claim to encroach into the servo's performance envelope, while 'low-cost' servos are really beginning to make a mark as a viable solution for many applications that previously would have been the domain of an inverter.

It is almost impossible to get a true assessment of the relative merits and market positions of inverters and servos because most suppliers are committed to one solution or the other, and naturally will favour their offering over rival solutions. Those that can offer both solutions consider accurate analysis of the actual breakpoints to be far too commercially sensitive for public discussion, but interestingly some suppliers are rationalising servos and inverters into a single range while others are very firmly in favour of keeping them separate.

Other key developments within the drives spectrum include the adoption of communications capabilities and on-board intelligence options. It is now well understood that drives are an integral part of machine control systems, so must be able to communicate with other local devices and to central controllers.

In Europe at least, Ethernet is on an unstoppable march to become the preferred communications medium, although control companies with vision are also backing a couple of other horses such as Java. At the device level ASi, Profibus and CC-Link continue to slug it out, with each dominating a major economic region (America, Europe and Asia respectively). Significantly, it is often found that drives and servos are best served by a dedicated motion communications protocol, such as SSCNet.

Part of the communications debate is the need for local intelligence, which can either be on board the drive or resident in a nearby PLC or other controller. The on-board camp tends to have to rely on plug-in modules fitted to 'dumb' inverters to personalise them to the job in hand. The PLC proponents argue that their resultant systems architecture is far more flexible and adaptable, so better able to cope with the inevitable reconfiguration that is a regular feature of most plants.

A buzzword current in drives circles at the moment is 'matrix inverters' with some suppliers now claiming commercial viability of a technology that offers the benefits of minimal harmonics and regenerative braking.

Ordinary drives convert the incoming AC supply to DC, and then convert the DC back to AC at the required frequency and voltage. The section of the drive in which this is done is referred to as the DC bridge, and can produce harmonic distortions in the mains supply.

In contrast, matrix drives use an array of insulated gate bipolar transistors (IGBTs) to connect the three phases of the supply directly to the motor in a precisely timed sequence. This is said to reduce harmonics generation to about 10 per cent that of conventional drives, while also offering almost unity power factor – that is, no wasted energy.

The elimination of the DC-bridge section of the drive makes it easy to arrange for energy to be returned to the supply during braking, and also removes the need for energy-wasting, heat-generating braking resistors.

Matrix deals with harmonics

Thus matrix drives are promoted as being an attractive option in applications such as lifts, cranes and presses where regeneration is a particular benefit, and in sensitive environments, such as hospitals and computer centre installations where harmonics must be minimised. However they are likely to cost more than equivalent conventional drives, a hurdle which will have to be overcome in a market where price is often the deciding factor for purchasers.

While the matrix route claims to deal with harmonics issues by removing the generating mechanism, the conventional way to address the problem is with RFI filters.

Harmonics became an issue as the amount of equipment using 'chopping circuits' increased, and came to a head about ten years ago. At this time Europe introduced legislation requiring users of such equipment to protect the mains from their corruption. However America took a different view, saying that mains pollution was inevitable and advising users that they had a duty to protect themselves against it. This legislative difference is still in place today, so machine builders with customers on both sides of the Atlantic may need to have two different designs to hand.

The initial European solution was to provide a small filter for each piece of equipment likely to create harmonics. However another concept is now also available, interestingly based on technology developed in America. This is to provide a large filter that covers the whole machine, suite of machines or even an entire factory. These filters are not simply scaled up versions of standard filters, but actively identify how much machinery is in use at any moment, predict the expected levels of corruption and adjust to this level.

The most obvious attraction of a central active filter is the simplicity of its installation and maintenance compared to a mass of individual filters. But a notable secondary benefit is that it is a more energy efficient solution, which is pretty much where we came in. ■

Decentralised vacuum pump cuts costs

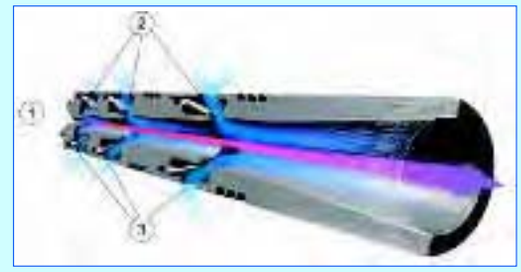
Piab has announced a new compressed-air driven vacuum pump said to provide increased flow and reduced energy consumption compared with conventional units.

The compact nature of the P6010 pump – 77 x 73 x 214mm – allows it to be mounted much closer than usual to the point of suction, reducing compressed air requirements and so saving further energy.

In addition, the system can be equipped with the Piab Cruise Control which automatically maintains a pre-set level of vacuum in a suction cup when handling leak-prone materials such as paper and corrugated board, and Automatic Vacuum Management that stops the air flow when the set vacuum level is achieved on materials such as plastic or glass.

The pump itself is based on the Piab Coax system in which compressed air flowing through the pump nozzles entrains an additional volume of air, creating suction at the inlets.

According to Piab a study of a US application showed that vacuum cups powered by decentralised Coax-based pumps each cost $1 a year in energy consumption against the previous $200 each in a system based on a centralised vacuum pump.



The Coax system: *When compressed air (1) flows through the pump nozzles (2), air from outsiude the pump will be entrained by the jet of air at the nozzle outlet. Suction will then be generated at the openings to the various stages (3)*

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ENDOLINE MACHINERY

Scanning raises speed for random size case taper

The Endoline 734 random size case-taping machine uses a scanning system to establish case size, enabling faster automatic adjustment of head heights and guide widths, so raising speed to some 20 cases a minute.

Separation of flap folding and taping sections also allows one case to be taped while the height of the folder head is adjusted, if necessary, to cater for the height of the next case.

The machine is equipped with a new digital message display for quick set up and with quickly removable interchangeable tape heads that are said to be easily threaded at changeover.

Faster operation: *Endoline 734 taper identifies case size via scanners*

Low tape sensors with a visual or audible alarm are available.

T: 01767 316422
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CSI UK

Depalletiser can handle layers of different packs

CSi's Flexible Layer Depalletiser has been developed to handle mixed pallet loads by automatically de-palletising layers of different products, regardless of their size, shape, layer pattern or weight. "Small boxes, open top trays of glass jars, loose tins in trays and display cartons are just a few examples of products which are almost impossible to order-pick automatically and reliably, layer by layer," says CSi.

So, in place of the usual vacuum head to lift each layer of product, the new system uses a combination of friction rollers and a servo-controlled skimming table to strip each layer off the pallet.This arrangement is said to be compact and, when attached to a robot, provide maximum flexibility and the opportunity to pick from a number of pallet locations.

Handling different layers: *CSi depalletiser*

Layers are delivered to an unscrambling table, stripped and fed out in a single lane.

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SPIROFLOW

Flexible screw conveyors aimed at abrasive materials

The Rhinoveyor range of flexible screw conveyors has been introduced to extend the scope of screw conveyors into handling particularly abrasive materials, such as sintered metals, PFA, sand, silica and carborundum.

Spiroflow points out that unlike traditional flexible screw conveyors, which need to run full of material to avoid excessive noise and wear, the conveying tubes of the Rhinoveyor can also run empty without problems.

Air conveyor: *Rhinoveyor carries abrasive materials*

Maximum throughput is up to 5 tonnes an hour depending on the material and the angle of lift.

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New Machinery continues on page 72

BDL DRUM MOTORS

Quick release brackets for motorised drum conveyors

BDL has announced quick release assembly brackets which allow the belts of motorised drum belt conveyors to be released rapidly for maintenance and washdown.

Laser cut from stainless steel, the brackets are fixed to the conveyor bed and pulleys and motorised drums simply lock into position. No special tools are required and the snap on design provides for self alignment and tensioned belt conveyor assembly.

The brackets fit motorised drum diameters of 80, 113 and 135mm and can be supplied with pulleys and IP66 rated BDL motorised drums, which are sealed for life and maintenance free.

T: 01536 408899
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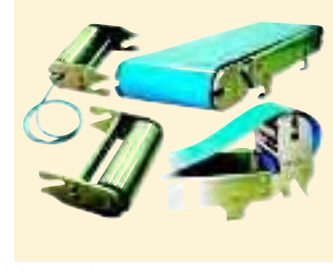

Quick release: *Belts remove easily for cleaning or maintenance*

LOGIC TPS

In-line filler and capper caters for short runs

The Swiss-built Zellwag Z201 series in-line monobloc filler-capper machine shown for the first time at last year's PPMA Show by UK representative Logic TPS uses an adjustable walking beam container transport system to eliminate the need for changeparts.

Aimed at small batch production, where changeovers are frequent, the balcony style machine can run containers up to 70mm diameter and 270mm high.

Applications include pharmaceuticals, cosmetics and toiletries and there is a choice of filling systems to handle liquids, crèmes, tablets or powders. In addition, there is a choice of full and semi-automatic capping stations.

These are available to handle plug, screw or crimp closure as well as mascara brushes and dip tubes.

Quick change: *Zellwag filler-capper from Logic TPS*

Logic TPS says the line can be run at speeds up to 30 metres a minute by a single operator.

Also shown was the new Collischan TC8210 starwheel-based tare and gross checkweigher hosting a Minicount tablet counter.

Aimed very much at applications involving glass, where container weight often varies, the machine can also be used to improve accuracy with powder and liquid filling lines. Speed is up to 80 weight checks a minute.

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METTLER TOLEDO

Checkweigher runs at speeds up to 1000 items a minute

The S3 checkweigher from Mettler Toledo Garvens has been specifically designed for the food industry, with protection against ingress of water and stainless steel construction to an open design for ease of cleaning.

A chain checkweigher, it is said to be particularly suited to dynamic weighing of difficult-to-handle and unstable products, ensuring that even tall items with a small footprint are transported quickly and gently over the machine.

Speed of the machine is up to 1000 products a minute to an accuracy of up to ±4g.

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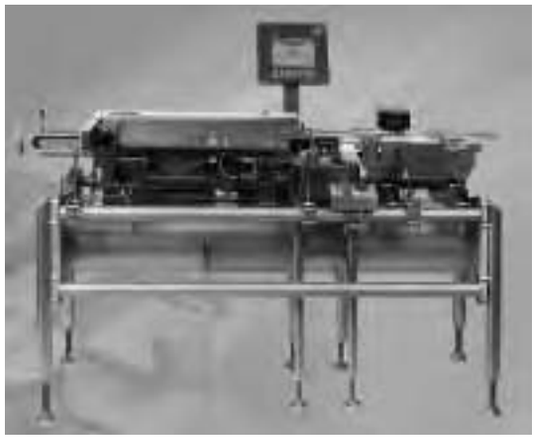

Fast checkweighing: *Garvens S3 runs at 1000 a minute*

WALDNER UK

Budget price pot filler can handle 100 a minute

German manufacturer Waldner has introduced a budget priced pot filling machine capable of handling pots up to 110mm diameter in two lanes at speeds in excess of 100 a minute. In single lane format maximum pot diameter is 140mm and speed some 50 containers a minute.

Mechanically driven, the machine occupies a footprint of less than 1.4sq m. Construction is in stainless steel.

Both heat seal and snap on lidding stations are included as standard while quick change format parts are said to allow size changes in a matter of seconds.

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SANDIACRE ROSE FORGROVE

Range of intermittent motion baggers extended

Sandiacre Rose Forgrove has added the TG 450 vertical form-fill-seal machine to its range of intermittent baggers.

The new machine, which offers a maximum flat bag width of 450mm and a bag length of 600mm in a single pull, is available in several variants.

These include the LE and L versions, featuring a clutch-brake film transport system with pneumatically operated jaws. There is also the LD model, equipped with a servo driven film transport system and servo driven cross seal jaws.

Allen Bradley ControlLogix with a PanelView 1000 touch screen are standard on the L and LD models while the LE variant is offered with Allen Bradley CompactLogix and a PanelView 400.

Self-centring transport belts are fitted as standard on all models and all TG450 machines are suitable for sealing polyethylene or heat seal laminates.

Different finishes are also available across the range, including painted mild steel for dry applications and stainless steel for the dairy, fresh produce and frozen food markets.

The first TG450 to be delivered is an LD version, built to full USDA specification, and supplied to a company in the USA for packing 13kg bags of liquid cheese.

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