

Backing webs for ps look set to disappear

Developments now under way in pressure-sensitive labelling machinery look set to allow substantial downgauging of face materials, and the reduction or elimination of release paper for a number of current applications. The lower material costs should also allow current high volume users of wet glue labelling systems to consider pressure sensitive as a cost effective alternative for the first time.

Over the years, developments in machinery and materials have seen pressure-sensitive labelling costs tumble in real terms as thinner filmic labels – and backing webs – became possible. But the printing, die-cutting and application of ultra-thin face and backing materials has presented technical problems, preventing the great cost breakthrough that would open up really high volume, non pressure-sensitive markets such as beverages to ps labelling.

That all looks set to change. Harland Machine Systems has launched its LaserSoft pressure-sensitive concept – in which eliminating the backing web is just one element – while Sovereign Labelling has announced its Sceptre Enviro, aimed expressly at removing the need for backing material.

Harland's LaserSoft is, in fact, a complete system that brings together three progressively complementary technologies – continuous motion application, on-machine label cutting by laser, and in-house digital print – not only to create savings in materials costs, but also to give end-users complete control over the logistics of their labelling operation.

It starts with Harland's Pulsar continuous motion high-speed applicator, capable of handling much thinner filmic labels – 25 micron or less – than can even currently be produced using conventional die-cutting.

The addition of a laser cutter then allows those thinner labels to be produced and the backing material to be brought down to 12 micron or less, against some 38 micron with conventional machines, and ultimately eliminated.

Machinery developments in pressure-sensitive labelling now look set to eliminate backing webs of release paper, and allow much thinner face stocks to be applied accurately at elevated speeds.

Single colour digital print can then be added for overprinting ingredient information and other variable data on to pre-printed multi-colour labels, although multi-colour digital printers could ultimately take on the entire imaging process. A station to include RF identity tags in the labels can also be included.

On demand manufacture

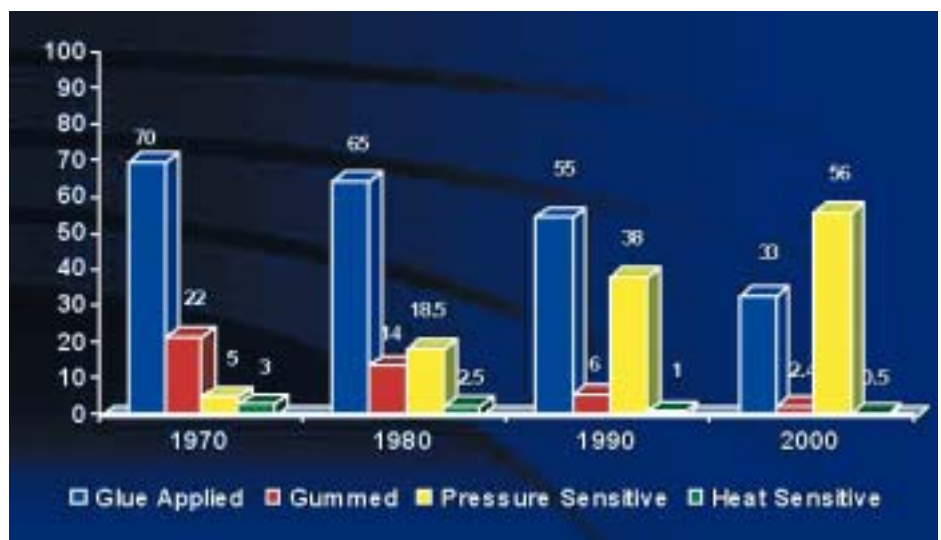
“Over the next five to ten years we expect to see a transition from just-in-time delivery of labels to the end-user towards on-demand manufacture of labels by the end-user himself,” explains Harland sales director Roger Jenkins.

“This reflects the continuing trend of company consolidations, and market globalisation in terms of retailers and brand owners. End-users also want to see further reductions in labelling cost, which conventional converting and printing technologies are not capable of providing.”

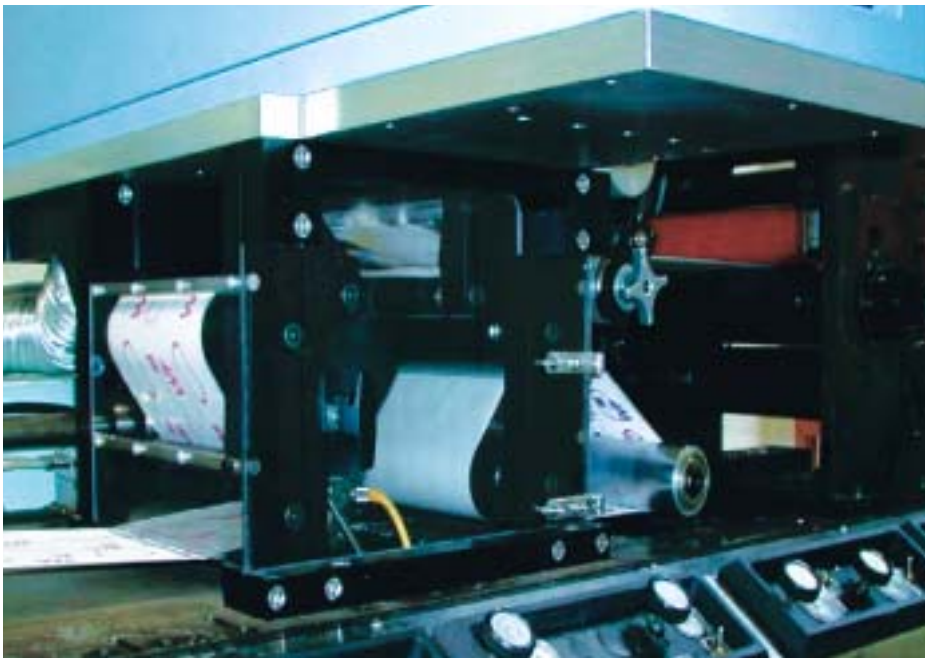
The LaserSoft concept is a direct result of Harland's acquisition last year by the Kansas City based LaserSoft Group which, apart from including label printing in its portfolio, also specialises in custom designed laser systems.

Among them is the LightSpeed, which has been developed specifically to carry out label cutting on the labelling machine itself, replacing the die-cutting conventionally carried out by the printer. This not only allows the backing material to be downgauged drastically or even eliminated, but gives the opportunity for label gauge also to be brought down, typically to 18-25 micron against the 40 micron which is currently considered the minimum for efficient and secure die-cutting.

However, labels this thin are difficult if not impossible to apply with conventional pressure-sensitive labelling equipment, so the LightSpeed has been teamed up with Harland's continuous motion Pulsar label applicator. Launched at



Growing popularity: Evolution of pressure-sensitive market share. (Source: Harland Machine Systems)



Cutting out labels by laser: LaserSoft system can provide materials cost savings up to 60%.

Cost comparison: LaserSoft against traditional pressure-sensitive structures

Traditional BOPP	Thin film with conventional applicator	Thin film with Pulsar applicator	LS Microliner with Pulsar applicator and Lightspeed	LS Linerless with Pulsar applicator and Lightspeed
Structure	Structure	Structure	Structure	Structure
60µm BOPP face 38µm PET liner	12µm BOPP/ 25µm BOPP face 30µm PET liner	18µm BOPP face 30µm PET liner	18µm BOPP face 12µm BOPP liner	18µm BOPP face
Total: 98µm	Total: 67µm	Total: 48µm	Total: 30µm	Total: 18µm
Cost m ² : \$0.78	Cost m ² : \$0.62	Cost m ² : \$0.46	Cost m ² : \$0.39	Cost m ² : \$0.31
	Savings up to 20%	Savings up to 40%	Savings up to 50%	Savings up to 60%

Source: Harland Machine Systems

Interpack 1999, this is able to handle light gauge labels at high speed, up to 2000 a minute depending on size and gauge.

“This speed capability is significant, since the reduced material costs brought by the entire LaserSoft system will open up the advantages of pressure-sensitive labelling to high volume applications currently using glue-applied labels or alternative means of decoration,” points out Roger Jenkins. “These applications, such as beverage containers, are inevitably high speed as well.”

Indeed, the Pulsar was developed by Harland to overcome the speed limitations inherent in traditional pressure-sensitive applicators, which need to work in intermittent motion, arresting the label web after each application to adjust the gap between labels to the usually much larger interval between containers.

“Not only does this mean bringing the web quickly and accurately to a stop, but also requires considerable acceleration forces to bring the web

back up to line speed, within the length of the label itself,” explains Alan Nuttall, technical services manager at Harland. For this reason, dancing arms, festoons and other tension control devices are vital to allow, ideally, a heavy web of labels to unwind in continuous motion while labels are delivered intermittently, without risk of web break or poor accuracy as a result of snatch and slippage.

Speeds become critical

“At speeds of 120 metres a minute, our conventional servo labeller can still retain good control of the web for accurate labelling,” says Alan Nuttall. “But beyond that speed, everything begins to become very critical: the quality of the material itself, the die-cutting accuracy, the condition of the machine and its settings. Attempts to run any faster are usually self-defeating in terms of poor labelling quality and machine stoppages.”

The Pulsar, however, is continuous motion.

The label supply reel unwinds at a constant speed, reducing the effects of inertia within the system to the point where only a single dancing arm is required at the unwind, and none at all on the backing web rewind. Labels are taken up one at a time by an intermediate transfer belt which changes the on-reel label pitch to product pitch.

While label web unwind speed and delivery to the transfer belt is controlled to match labels to products in numerical terms, the transfer belt itself runs at the higher linear speed of the product feed. In this way, as labels are taken from the web, the normal 3mm interval between them is automatically increased and adjusted to the product pitch.

Once the label is picked up on the transfer belt, its position is sensed and adjusted momentarily up or down, to correct any deviation before product feed speed is resumed for application.

Speed alone is however only part of the Pulsar equation. Because the label is controlled on the transfer unit it no longer has to jump across an air gap while being accelerated for application, the point at which low gauge materials tend to misbehave. So thinner materials can be handled.

Going as low as 25 micron

“We can now look at downgauging labelling materials that up to now have been a problem, such as polypropylene,” says Alan Nuttall. “Here we can go from the standard 50-80 micron necessary for a traditional machine to as low as 25 micron on the Pulsar. Also, the backing web can be thinner because of the lack of any snatch in the system. On traditional machines, downgauging from the standard 38 micron PET to 25 micron can present difficulties at high speed, but for the Pulsar it is no problem.”

However, once the LightSpeed laser is married up with the Pulsar applicator, the traditional role of the backing web disappears. No longer is it necessary to have tensile strength since the label face material is uncut prior to entering the machine and can support itself. The choice is to use the LS Microliner approach, with a siliconised PET liner of 12 micron or less, simply to keep adhesive off the label face, or the LS Linerless system in which, for the greatest cost savings there is no liner, just a siliconised coating on the label face.

In both cases the label web is taken immediately from the reel – which can be up to 1 metre diameter – on to the cutting drum of the LightSpeed and held in position, face down, by the attraction of a static charge as the label shape is cut. However, this is not as straightforward as

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today it might seem, since cutting takes place against a moving drum, with the laser beam itself following the motion of the label.

The LightSpeed laser is therefore controlled by software, SoftPlot, which not only calculates the optimum path for the laser to follow in cutting out the label shape, but also takes the 'moving target' into account by adjusting focus and laser power as the range changes with the rotation of the drum.

Integrated software suite

In fact, this software is part of an integrated suite of programs and architecture devised for LaserSoft, covering job management as well as machine control and synchronisation. "This means that all the elements of the job, from importing electronic artwork and label shapes through to details of maximised materials web utilisation to achieve cost effective solutions, are handled by software that is purpose written, with all the links required in place from the outset," explains Roger Jenkins.

Cut labels are retained on the drum while the skeletal waste is stripped off and then taken via an intermediate drum onto the Pulsar's transfer belt for application. The cutting drum itself is subject to a continuous scrubbing and cleaning action, which removes any debris and also the fumes of laser cutting.

"One advantage of using a laser is that difficult shapes, which may create problems for conventional die-cutting, can be cut with confidence," says Allan Nuttall. "Laser cutting also tends to cauterise the adhesive at the edge of the label, eliminating any tendency for conventional die-cutting to produce a halo of adhesive that attracts dirt."

A further attraction is the elimination of lead times associated with conventional die production. SoftPlot, the software that creates the shape of the label, is able to accept files from other design applications including CAD systems.

The final stage in LaserSoft is to add in digital print. "Initially we envisage a single colour print facility feeding directly onto the labelling system," says Roger Jenkins. "This is the ideal way of handling a large number of SKUs where there may well be a pre-printed generic label and only product descriptions or ingredient information needs to be changed. Ultimately, a multi colour facility would cut lead times from artwork to production drastically and also virtually eliminate label inventories."

For the moment, however, Harland is shortly to install its first Pulsar system for ultra thin film



High performance: Pagomat 6HL operates at speeds in excess of 1000 labels a minute

labels at a major household products manufacturer. This rotary machine will be fitted with two labelling heads to allow continuous running and cassette style label wipe-down parts for the various containers involved.

Speed and the capacity to handle ultra-thin labels apart, the Pulsar method of application has also shown itself particularly adept at handling 'banana shape' labels for tapered products.

On a conventional pressure-sensitive labeller the label has to transfer from the flat surface of the backing paper and beak to the taper of the container. This means that the tail end of the label tends to drag against the base web as it tries to line up with the rest of the label around the rotating product, and can cause wrinkling or inhibit speed.

Transfer on the flat

However, on the Pulsar, initial label transfer takes place from the backing web onto the flat surface of the transfer belt, where the label is held by an electrostatic charge. While the attraction is more than adequate to hold the label in place for accurate application, it still allows the tail end of the label to skid round, following the initial portion accurately onto the taper of the con-



Front and back: Tri-Roller from Atwell reverses direction to apply the back label, avoiding the need for registration marks

tainer without any tendency to stick and stretch.

Meanwhile, Sovereign Labelling's development has been to eliminate backing paper entirely. Labels for the new Enviro machines are themselves coated with silicone release agent over the printed face during the conversion process, before being rewound into a reel for application by the machine. Perforations between each label allow them to be separated from the reel.

On the Sceptre Enviro, aimed very much at the three-panel pe milk bottle market, the labels are joined top to bottom at the long edge and fed from above onto a stationary vacuum platen with both ends protruding. The label is separated from the web and the ends are then picked up by



Changing bottle height: KHS Anker system uses a sample reference bottle on the external platform

two pairs of rotating vacuum paddles, carried round between the pre-pitched containers and applied from behind. The vacuum paddles then overtake the container, wiping the label down on both sides.

A second style of machine follows the format of a conventional wraparound labeller for cylindrical products and uses labels joined side by side at their short edge. These are separated and then carried by vacuum belts to the dispensing point and applied in the conventional fashion.

Speed is, of course, still one of the major gateways to new applications for pressure-sensitive labelling and Pago's latest development, the new Pagomat 6HL machine, can typically apply 63mm pitch beer bottle labels at speeds in excess of 1000 a minute.

To achieve the smooth running required for accuracy at these elevated speeds, with no snatch between unwind and label application point, the machine employs an air box system to maintain correct tension in the web. As the web runs through the air box its path is deflected as required, providing what is in effect a non-

mechanical 'festoon' that compensates for the difference between continuous motion at the servo driven unwind and intermittent motion at the dispensing beak.

Venturi plate as a damper

In addition, the web is passed over a venturi plate which creates a vacuum to act as a damper on web tension, again contributing to smooth operation. At the dispensing beak web tension is controlled on a push-pull basis by a further servo drive, while there is yet a further servo to power the rewind for the backing material.

Elsewhere, developments with more traditional pressure-sensitive machinery include versions of the Krones Autocol specifically tailored to pharmaceutical work, using a new rotary design which allows it to handle containers that are non-cylindrical or not rotationally symmetrical.

In particular, the machine can handle extremely small labels accurately and can be equipped to apply an outsert leaflet direct to the container, so eliminating the need for a carton.

Krones has also announced that the Barnsley

plant of glass manufacturer Rexam has become the first user of its Thermocol system for decorating non-returnable bottles. Employing a combination of heat and pressure, the machine transfers reverse printed labels on to the containers to provide a 'no label' look at, says Krones, less cost than pressure-sensitive labelling.

Rexam is using the Thermocol machine to apply body, wraparound and shoulder decoration to bottles of 375ml to 1.5 litre, at speeds up to 500 a minute.

KHS Anker has introduced a new generation of Innoket Roland HS wraparound hot-melt labellers for food and beverage applications in the speed range 67 to 750 containers a minute. Features include fast changeover, in 10-15 minutes, via quick release format parts with the infeed star, for example, locked in place by a quarter turn fastener.

Two means of rotation

The machines are available with two methods of container rotation. The first, for cylindrical containers, uses a belt to turn the bottle platforms and is automatically adjustable, removing the need for manually replacing gear wheels for different size containers. The second employs rotating cams allowing the machine to handle both cylindrical and rectangular or other shape containers, with the label applied to the corner or similar pre-specified point.

A particular user-friendly system is employed to change over for different bottle heights. This simply involves placing a sample bottle on an external platform and lowering the upper bearing rim of the machine until a sensor detects the bottle cap. The new bottle height is now set.

Also new is a separate drive for the gluing drum and glue pump which ensures an optimum supply of glue irrespective of gluing drum speed. The label magazine is fully adjustable and employs motorised belts, rather than pushers, to advance the labels. This, says KHS Anker, means there is no need to rely on the pusher plate pressure to feed the labels, "which at the best of times was a complicated operation".

Atwell Self-Adhesive Labellers has just supplied a double-headed front and back version of its Tri-Roller pressure-sensitive labeller for cylindrical containers to Plastek UK, which produces injection moulded jars.

The heart of the system is, as the name suggests, an easily adjusted three-roller arrangement to rotate the container in front of the dispensing beaks and wipe down the labels. Initially, the machine is being used to label a range of clear

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storage jars of 125-300ml with front and back labels although it is equally able to apply single patch or full wraparound labels. Infeed is from a rotary table.

To allow front and back labelling on the clear jars with no need for a printed registration spot or mould mark, the Tri-Roller applies the back label by reversing container rotation in a timed sequence that provides the accuracy required. However, both back and front labels can be set at different heights if required, each by a single handwheel.

A three roller system has also been adopted by Sussex & Berkshire Machinery for a custom-built machine supplied to herbal remedies manufacturer Higher Nature of Burwash in East Sussex.

Based on an Etipack Flexo semi-automatic labeller, the machine is applying wraparound labels to slightly tapered bottles of tablets, fed by hand at a speed of 12 bottles a minute. As each label is dispensed, the bottles are rotated between three rollers that wipe the label down accurately, ensuring that the ends align neatly at the back.

The trend in many market sectors to highly sculptured and shaped containers has, of course, given rise to increased demand for sleeving



Shaped containers: *NeutraTaste bottles are sleeved with equipment from Graham Labelling*

as a means of providing all-round decoration.

One example is the conical shaped container employed by health supplement manufacturer Seven Seas for its new NeutraTaste taste-free cod liver oil capsules. This is sleeved by an RF 200 machine from Graham Labelling Systems, which includes a pre-heating station for the containers and an immediate post-application hot air tunnel to collapse the sleeve onto the container, before full shrink is applied in a tunnel where the container is spun to give an even effect.

The trend also means that new machinery suppliers are entering the market, such as Aetna UK which recently took on the agency for the shrink

sleeve and tamper evident banding equipment made in the USA by Axon and stretch sleeve systems from Styrotech.

Axon's standard range includes machines to handle sleeves of 20 to 650mm layflat width and can offer speeds up to 750 a minute from a single head system. Styrotech's automatic stretch sleeve equipment handles containers ranging from 60mm diameter items up to 25 litre drums at speeds up to 120 a minute. Semi-automatic starter level machines are also available for speeds of 5-12 containers a minute. ■

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