Balancing the costs to decide Shrink or fold?

ABOUT A THIRD OF ALL DISPLAY OVERWRAPPING APPLICATIONS CAN PROBABLY BE MET WITH EITHER SHRINK-WRAPPING OR TUCK AND FOLD METHODS. IT'S A MATTER OF BALANCING MATERIALS SAVINGS AGAINST CAPITAL AND OPERATING COSTS.

Anyone choosing a machine to produce a complete overwrap for a product appears spoilt for choice these days, with L-sealers, flow-wrap style shrinkwrappers, one side and two side seal shrinkwrappers and, of course, the daddy of them all: the tuck and fold overwrapper, or envelope end-fold wrapper as it is sometimes known.

But is the choice as broad as it might seem, given the wide variations in types of product and product shape, length of run, degree of protection required and cost of materials, which all need to be taken into account?

Certainly, almost any item of any shape can be shrink-wrapped in one way or another – with the exception of fireworks and ammunition – while overwrapping can deal with most rectangular items such as cartons – even those with rounded corners and tapering sides – as well as soft but regular shaped goods such as paper napkins.

So understanding the role that the overwrap is intended to perform is essential before a decision is taken on the overwrapping technique to be used, and the machine that will be required to perform the task.

For instance, if the objective is simply to hold three cans of beans together, a low density polyethylene shrinkwrap sleeve with open ends is ideal. It won't look pretty, but will contain the cans effectively, is capable of being applied at high speeds and the material is relatively cheap.

But if the aim is to protect a product from odours or moisture, a pack with open ends will not be suitable. For this task a full overwrap will be required, and it will be a matter of judgement whether the perforations required in shrink film to let air out as the film contracts can be ignored, or whether only the fully sealed impermeable envelope of a tuck and fold format will do.

If the objective is to enhance the appearance of a pack, then the look of the seals may be of more importance than their integrity. Neat seals will be essential and this will usually mean a neatly trimmed bead seal from a shrinkwrapper or the folded seal that can be produced on the tuck and fold overwrapper.

Seeing both sides

Marden Edwards has been building tuck and fold overwrappers since 1962 but, six years ago also took on the UK distributorship for Kallfass, the German shrinkwrapper manufacturer. Sales director Chris Granger therefore sees the market from both sides.

Tuck and fold: *Large duty free packs are produced on Marden Edwards machinery*

"Broadly speaking, our experience is that about a third of overwrapping applications call quite clearly for shrink-wrap, simply on a practical basis such as an irregular shaped product, short runs and, certainly in the case of a contract packer, flexibility for the future," he explains.

"Another third of applications stand out equally clearly for the tuck and fold method, on grounds such as appearance, moisture and flavour retention, the need for printed film and close registration with the film, inclusion of a tear tape, or the fact that the goods are flammable or soft and cannot be subjected to heat or the effects of shrinkage. So it's really only on a third of applications that there is a choice between the two methods."

In providing an alternative to the bead seals and inevitable 'ears' of film, however small, on shrink-wraps, tuck and fold machines also provide a clean-sided pack for products that are sold through dispensing machines and might otherwise jam. Condoms are one principal example.

Given that either shrink or tuck and fold can do the job, and all other things are equal, materials cost becomes the single most important consideration. And here there can be some remarkable differences largely, but not entirely, as a result of the variation in cost between polypropylene overwrap film and high clarity polyolefin shrink film.

That difference can be mitigated by a host of factors, not least amongst them the generally lower gauges at which polyolefins can be run compared with polypropylene, the cost of size parts for tuck and fold machinery, the faster changeover of shrinkwrappers and, particularly at the entry level speeds of 30 packs a minute, the 25-30 per cent lower capital cost of an automatic L-sealer compared with a tuck and fold machine.

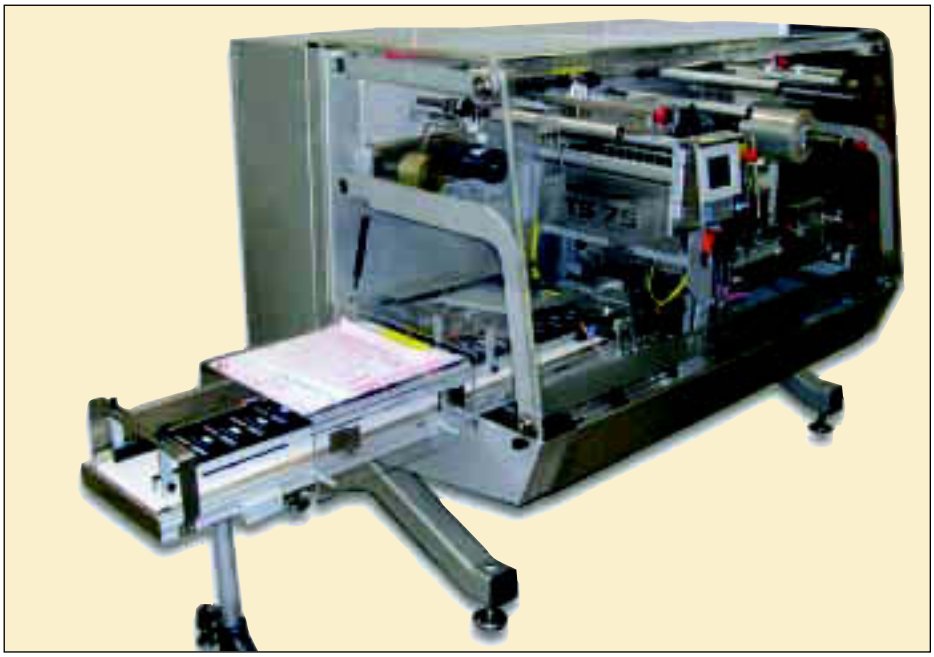
Nevertheless, given the right circumstances, use of polypropylene film on tuck and fold machines can give substantial savings over high gloss shrink film, as the following simple

comparison from Marden Edwards demonstrates.

For a start, the product, a carton measuring 331 x 122 x 70mm, requires 169sq cm of film for a full fold and tuck overwrap against 188sq cm for a shinkwrap. Approximately 10 per cent more film per wrap is required for shrink-wrapping since the bag created around the product cannot be as tight initially as the overwrap from a tuck and fold machine. There is also shrinkwrapper edge trim to take into account.

Costs are based on 25 micron bopp at £1.12/kg and 25 micron polyolefin shrink film at £5.65/kg. Running at an average speed of 40 packs a minute, eight hours a day, 250 days a year gives a bopp cost of £20,923 and a polyolefin cost of £116,241. The capital cost of the tuck and fold wrapper would be in the region of £57,300 while a shrinkwrapper capable of the same output would be in the region of £40,000, but, of course, incur additional running costs for its shrink tunnel.

"In no way are we suggesting that end fold will always produce that level of savings when every cost is taken into account," explains Chris Granger. "But equally there is no doubt that establishing the extent of materials cost savings is a useful starting point in coming to a decision for those applications in which there is a choice of method."



Balcony construction: *Marden Edwards' new TS75 wrapper was introduced at the Total exhibition*

Saving materials

Indeed two recent applications from Marden Edwards illustrate how a change from shrinkwrap to envelope end fold can not only save materials, but also improve appearance.

Working with Köra Packmat, Germany, which specialises in wrapping flat products, the company has developed a means of end-fold wrapping collations of telephone cards, which come from the primary packaging machine wrapped in a four-side seal format, singly or as a daisy chain. The retailer subsequently splits these collations and the cards are then sold separately.

End-fold wrapping produces a smarter pack that requires less film and space within a carton, while allowing a tear tape to be incorporated easily. Even very small stacks of cards – less than 6mm high – can be handled on the Marden Edwards LX100 machines by making the end fold on the back.

Marden Edwards has also recently completed a project for Post-it pads in which individual pads are taken from the converting line, wrapped and then re-wrapped into multipacks. Envelope end-fold wrapping was chosen to avoid the individual pads buckling under the pressure exerted by shrinkage and becoming difficult to control. The ability to add tear strips for both primary and secondary wraps was another consideration.

In a further application, as an alternative to board or paper/pe, Marden Edwards end-fold machinery is being used to create the 1000-cigarette duty-free carry out packs for Lambert & Butler, wrapping five 200-cigarette cartons in 35 micron ExxonMobil white OPP film, converted by Parkside Flexibles. Although the film – OPPalyte MW647 – is not usually marketed as a shrink film, the packs are passed through a shrink tunnel to obtain a small degree of shrink to give a particularly tight fit.

Advantages are that the OPP provides an eye-catching presentation with high gloss and quality flexo printing, the weight of packaging material is reduced compared with paper or polyethylene film and the film's acrylic coating provides enhanced aroma and odour protection.

Meanwhile, the choice of end-fold machines themselves has increased with four new machines launched on the UK market at the recent Total Processing & Packaging exhibition by three suppliers.

Trailing edge seal

Marden Edwards introduced its new TS75 servo-driven end-fold wrapper, which provides a trailing edge seal to give cosmetics cartons an uninterrupted face for graphics on both major sides. The machine is built on a balcony basis for both hygiene and ease of access and will operate at speeds up to 75 cartons a minute.

Smarter pack: *End-fold machinery from Marden Edwards is now used for telephone card collations*

Significantly, the TS75 has been designed from the ground up as a servo machine and differs from traditional end-fold overwrappers in that no elevating table is required to carry the carton upwards into the film before the folds are made. Instead, the length of film is measured digitally, cut off and presented in an adjustable position as a curtain in front of the carton, allowing it to be pushed through and the seal made right next to the carton edge.

Also introduced was the compact WR200S turret style overwrapper, built in Germany by Marden Edwards group company Petri to handle small packs at speeds up to 150 a minute.

In place of the usual in-line pocketed side

Servo driven: *Burnley Packaging's new SDO 400 uses a vacuum belt to position the film*

Low cost: *The DMA Filmstar end-fold machine was unveiled by Jenton at the Total exhibition*

feed used on this type of machine to pitch incoming products correctly, the WR200S employs a 90deg side feed unit, which reduces both space requirements and cost. Incoming products are simply allowed to accumulate on an infeed belt conveyor, which terminates in a combined gate and swing arm that lifts individual items up in front of the infeed pusher.

Burnley Packaging chose the Total exhibition to launch its first new overwrapper since acquiring the Carrington range of wrapping machines in the 1990s. The new SDO 400 is servo driven and is said to be particularly compact for its output, some 50-70 items a minute. Aimed at products such as CDs, fine fragrances and boxed confectionery the machine will operate with film up to 400mm wide although a further machine now joining the range, the SDO 600, will run with film up to 600mm wide.

Unlike traditional mechanical machines, in which the cut film is positioned above the product elevator by grippers that move backwards and forwards to pick and then place each sheet, the SDO 400 uses a patented system of servo controlled side vacuum belts to move the cut film into place. This eliminates the return movement, improving cycle times and reducing mechanical complexity.

The use of servo driven vacuum belts also allows the position of the film relative to the product to be easily adjusted, placing the back seal in whatever position is required. Also as a result of servo operation, the SDO 400 requires the minimum of changeparts: lift platform, track guides and pressure plate.

Options for the machine include print registration facilities, a tear tape applicator, flighted infeed conveyor for multipacks and heated side discharge belts for increased speed.

Electro-mechanical machine

The fourth new end-fold overwrapper at the Total show was the US-built DMA Filmstar, demonstrated by UK agent Jenton International.

Aimed at items such as DVDs and CDs as well as perfume and cosmetics packs, the Filmstar is an electro-pneumatic machine that avoids use of either traditional cam or contemporary servo drive systems. As a result, it sells for some £30,000 yet is capable of speeds up to 60 items a minute. In addition, the machine requires only one size part: the tuckers that turn-in the back of the envelope folds. Adjustments for product height and width are made via two knobs with digital scales while product length is adjusted electronically.

"Until now, one of the big ongoing costs of overwrapping machines has been the cost of changeparts," points out Richard Little, director of Jenton. "Each pack required custom folding parts which were expensive and took a while to make. The Filmstar machine has simple adjustments so that the folding parts can be altered in a few seconds between different pack sizes."

Also at the Total exhibition, Propack Automation demonstrated the CM 40 overwrapper for the first time in the UK.

Part of a range of overwrapping machines built by Italian wrapping and cartoning equipment specialist Bergami, the CM 40 is a compact machine, capable of 60 items a minute, aimed largely at the cosmetics market for small and medium size products. The film feed system is said to be able to handle difficult and thin films while changeover is described as particularly easy. Options include tear tape application, print registration, electronic control of

film length and a spaced outfeed for handling soft products.

Further machines in the Bergami range include the CP 150, able to operate at speeds up to 150 a minute on products up to 300mm wide x 130mm long x 60mm high, and the CP 100 which will handle even larger items at speeds up to 100 a minute. There is also the CMF 60, used in particular for wrapping packs of tissues and paper napkins.

Further new end-fold overwrappers have also recently been announced by IMA's end-of-line division and by CAM, represented in the UK by Campak.

The IMA BFB AC120 is a high speed balcony-style machine for the cosmetics industry on which reel changing can be achieved without stopping production. Almost all motions are servo-driven while changeover adjustments are electronically controlled, with fully adjustable folding plates. Speed is up to 120 cartons a minute.

The BFB AC60 is aimed at single cartons and collations within the cosmetics industry and can run at speeds up to 60 cartons a minute. Optional equipment allows products to be individually discharged to achieve an accurate dot seal on the lateral film folds, giving enhanced presentation for high quality cosmetics.

CAM's new model RV/P is now one of the fastest machines on the market, able to offer spot sealing on cosmetic perfume cartons at speeds up to 180 a minute. The first is to be delivered shortly.

Further machines in the range include the model AP, a simple in-line film feed system with tear tape application, seven of which have been ordered recently for handling tea cartons within the UK. Campak says the AP was chosen on the basis of its simplicity and ease of use and also because the machine has been specifically designed for three shift, 24 hour production.

All CAM machines are equipped with digital adjustment of the film cut-off length while options include the CFR quick size change facility for servo size changing of the main machine functions, print registration, tear tape application, and inverter drives.

Sollas has recently supplied a chewing gum manufacturer in France with one of its M80 overwrappers for handling flip-top cartons fed from the filling machine at 210 a minute. The machine wraps 70 bundles of three a minute, but will also be producing bundles of four, five, six and seven.

Covering bar codes

Print mark registration is fitted, allowing printed film to be employed to cover the individual product bar codes on each carton, while there is also a tear tape applicator for easy opening. Sollas says that changeover from one size bundle to the next is particularly simple, with all electronic settings held in memory for immediate recall.

Shrink-wrapping comes into its own, of course, when a tight fit is required on irregular or non rectilinear items.

For example, Wrapid Packaging Systems has recently supplied egg producer Glenrath Farms with a new packing line that allows boxes of eggs to be either shrinkwrapped or sleeve wrapped, with packs selected automatically via their bar code for a full shrink or a sleeve.

Chewing gum: *Sollas has supplied a machine to bundle and wrap flip-top cartons*

One operator is able to supervise both the BVM sleeve wrapper, which runs at speeds of 12-15 cycles a minute, and the BVM Compacta 5022 shrinkwrapper, which is capable of handling up to 60 packs a minute.

Shrink-wrapping also scores when a variety of goods of different sizes need to be handled on a single machine.

For example Yorkshire Packaging Systems recently installed its first Rochman fully automatic L-sealer and shrink tunnel at the newly expanded premises of stationary manufacturer and supplier Jet UK. The SLAU 50 x 50 fully automatic Rochman L-sealer and TR45/90

Paper overwrap replaces cases

Major savings in secondary packaging materials are being achieved by a principal US food group following a change from corrugated transit cases to kraft paper overwrap for collations of cartons.

The collations are produced and wrapped on a new machine developed by Marden Edwards – the KPB650 Kraft Paper Bundler – which is able to handle a collation up to 400 x 400 x 250mm and has already demonstrated a payback within nine months. The machine can also wrap in film if required.

A study of the application, conducted by Pira on behalf of Marden Edwards, concluded that based on a throughput of 2.4 million cases a year, annual savings from the closed paper wrap – secured by hot melt – would be £743,995 over RSC cases, £603,800 over wraparound cases and £16,443 over shrinkwrap in an open-end format.

Wrapping for savings: *Cartons are overwrapped in kraft paper by the Marden Edwards KPB 650*

This took into account materials costs, raw material storage and handling, capital and labour costs, reductions in finished goods storage and distribution cube, and also environmental costs.

"As well as the cost benefits indicated above, there are also other considerable benefits to using a reeled pack system instead of individual cases, such as fewer SKUs, less wastage and write offs, less handling, reduced space requirements, and so on," says the Pira report.

"It would certainly be our recommendation that companies using low spec corrugated cases investigate this system as a possible alternative."

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shrink tunnel are capable of wrapping Jet's products comfortably at 25 packs a minute.

In fact, Jet UK has a number of shrink wrappers installed around its 200,000sq ft factory, providing a display overwrap for various multi-packed stationery items such as folders.

One of the drawbacks of shrink-wrapping is that higher speeds usually require the heatseal characteristics of the more expensive polyolefin films, although polyethylene shrink films are continuing to improve in terms of clarity.

New side-sealing unit

However, the Kallfass Universa 400 side-seal shrinkwrapper marketed by Marden Edwards uses a new type of side-sealing unit, which is said to give much stronger seals than traditional systems and also allow polyethylene up to 85 micron to be run at virtually the same speed as polyolefin films.

In place of the more usual hot wire or knife used to make the side seal and trim waste from the centre-fold film employed, the Kallfass system takes the film between two rollers, which create the seal through pressure as well as heat. The upper roller, which is heated, carries a ring that locates with a circumferential slot in the lower roller, sealing and parting off the film. A solenoid lifts the upper roller away once the film has passed through.

Controlled by a Siemens PLC with memory for 200 product programmes, the Universa 400 also features an easy-feed system to allow the film to be threaded through quickly.

The main conveyor is mounted on a slide and can be pulled out towards the operator position, providing full access to the forming shoulder from above, avoiding any need for the operator to get beneath the machine. All size adjustments are via hand wheels and digital scales.

For ease of maintenance and fast changeover, the constantly heated cross-seal welding bar uses inserts, which can be removed via five screws.

Kallfass has also recently developed a new type of shrink-wrapping machine in which, for higher speeds and ease of operation, the logic and motion control functions for the servo motors are combined in a single system. The Kallfass Servo Jet 400 operates from a single reel of flat film, which is ploughed round the trays and held overlapped on the underside by ionisation prior to shrinking. Speed is up to 150 cycles a minute.

The machine is able to store operating parameters for up to 250 products in memory for push-button recall and can be equipped with an integrated modem allowing diagnostic checks to be made remotely.

At the recent Total exhibition, Yorkshire Packaging Systems launched the latest Rochman side seal machine, the continuous motion SMAF 4020 designed for high speed operation with both polyolefin and polyethylene shrink films.

"This latest model now allows us to offer a quality, reliable shrink-wrapping solution at speeds up to 85 packs a minute," says sales director Glyn Johnson.

Other features of the machine include programmable computer controlled memory for quick product changeover and kissing conveyors, to allow very small items to be handled.

Erapa UK has introduced the Auto 30L, a compact rotary side seal machine suitable for both high speed production on items such as books and videos – at 50-60 a minute – and long products such as wood, metal and plastic profile, curtain rails and shelving. Items for wrapping are sensed by a photocell, which starts the sealing and feeding process. Once the end of the pack is sensed the transverse sealer is activated to complete the sealing operation.

Variety of work: *Rochman automatic L-sealer installed at Jet UK by Yorkshire Packaging*

A 20-page programmable memory allows automatic pack size changes to be made in seconds, says Erapa. The Auto 40L can accommodate a maximum pack width of 275mm and heights up to 150mm although further models in the range will handle items up to 1.2 metres wide and 300mm high. ■

For further information:

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