

Sustainability: Who Cares?



(Detailed Report)

"As eager as some people are to see recycling and reuse become the law, or at least the habit in the U.S.A., the reality is that there has to be an economic incentive to cause commercial interests to spring into action." Thomas Schneider, CPP/Fellow.

Mr. Schneider went on to say, "Companies and people need to make an effort to address this issue [sustainable packaging] simply because it is the right thing to do. There are lots of ways to accomplish some of these goals on a revenue neutral basis, at the very least."

Excerpts are from November's Packaging World article by Schneider, "Sustainable Packaging."

David Newcorn's article (How to achieve a Greener Package) says, "If the Wal-Mart packaging scorecard has proven anything, it's that it's tough to find two people who agree precisely on how packaging sustainability should be measured, let alone improved."

Anne Johnson, Director of the Sustainable Packaging Coalition and a prominent environmental scientist says, "There is no such thing as a sustainable package." Yet, she is a strong, authoritative promoter of sustainability in plastic packaging.

"In its simplest terms, sustainability is about reducing waste and increasing efficiency - efficient use of resources, efficient design, efficient shipping, efficient disposal, etc." November issue, Package Design Magazine, from Ron Romanik, Editor-in-Chief.

Bill Bregar wrote an article titled "Energy-saving advances consume industry" in Plastics News, Dec 22 issue. Bregar reports, "Constant efficiency improvement is a basic principle of manufacturing. For decades, plastics machinery has been on a march forward to put out more products, faster, using less energy."

Q: So, who cares about recycling, energy efficiency, landfill friendliness, carbon footprint, more production from fewer resources (all together called "Sustainable Packaging")?

A1: The preceding quotes are from people/organizations who promote Sustainable Packaging. They all care, but they have different opinions on what "it" is!

A2: Merchandisers care.

A3: Suppliers of material, consumables and machinery care – caring means sales of replacements that can make "eco-friendlier" happen.

A4: Consumers care (if prices don't go up, too much) and politicians care (if voters care).

A5: Taxing agencies care (if they can create revenue from caring or not caring).



Drawbacks: Heavy energy demand
Dwell time (while pressure is applied) creates a bottleneck
Significant package design restrictions
Tooling and the sealing process restrict package design
Adhesive is a consumable

Note: Popularity of the “original” trapped blister fell off, due to: lack of product differentiation; packaging bulk; impact on shelf-space efficiency (plan-o-gram) and difficult-to-design “stand up” packaging.

UV/ADHESIVE is a process that seals plastic-to-plastic or plastic-to-paper via adhesive that is “catalyzed” (cured) via exposure to focused ultraviolet-light (UV). Adhesive is perimeter-applied (full or “spot”) during production. When closed, packaging makes surface-to-surface contact with the adhesive. After closing, the package is conveyed through Simpl-Seal’s *UV-light tunnel* and a package with a clear-seal (invisible seal) emerges.

Benefits: Predictably consistent seal and reliable operation
Multiple package sizes/types processed simultaneously (no tooling)
Plastic may be any “mil thickness”
Source separation is good
Package design emphasizes what is important (size, paper, recycling)
Energy is minimized (no pressure/heat) thus reducing carbon footprint

Drawbacks: UV-activated adhesive is a consumable
Requires “extra step” (though often automated) to apply adhesive

DESIGN

Design limitations are presented by: 1) the METHOD; 2) PRODUCTION considerations; and 3) retail partner plan-o-grams. Other “potential restrictions” are imposed by sustainability objectives, material cost and by established (desired) packaging brand-themes.

Note: Primary purposes for sealing merchandise in clear plastic packaging are: security; visibility; completeness; cleanliness; consumer safety; shelf-life and; shelf-presence.

All PRESS/FUSE *DESIGNS* must deal with the realities of the METHOD! Plastic thickness minimums and maximums are dictated. Thickness (therefore weight) is not very negotiable. PRESS/FUSE also limits plastic type, in that once set up for a particular type of plastic (e.g. PVC), the METHOD is virtually intolerant of other types. Finally, tooling impacts DESIGN in that sealing energy is delivered by the tooling so packaging, by definition, is restricted to tooling’s limitations.



With PRESS/ADHESIVE (trapped blister) the mil thickness of the plastic plays a vital role in security (too thin and the plastic can be *crumpled* open). And, like PRESS/FUSE, PRESS/ADHESIVE'S tooling impacts design. Finally, the paper used is critical to security. The reason that product differentiation is difficult with this METHOD is the restrictiveness of the DESIGN.

The UV/ADHESIVE method has no mil thickness or plastic type limitations. For a change a plastic, there is a simple change in adhesive. No heat, low energy, no tooling, no dies and no press.

Note: UV/ADHESIVE'S flexibility allows the processing of the Trapped Card. From visual and sustainability standpoints, the Trapped Card competes with the Trapped Blister. But, the Trapped Card adds security, reduces weight and improves product visibility.

PRODUCTION

Sealing speed, cycle-time and flexibility are key to production potential. Cycle-time is the most crucial. When the METHOD dwells on a task (stops to do something), stoppage time limits Production's ability to repeat. The most noticeable cycle-time is when the press (PRESS/FUSE and PRESS/ADHESIVE) closes, pressurizes, heats and releases. This "stoppage" limits production. A seven second cycle (common for PRESS/FUSE) or five second cycle (common for PRESS/ADHESIVE) translates to 514/hr and 720/hr, respectively. Compare that to UV/ADHESIVE'S continuous conveyor (10,000 5X7 packages per hour).

Note: Adhesive application is not a bottleneck. Adhesive application speeds are in excess of other assembly steps. And, adhesive application may be inexpensively automated.

Automation can improve production's potential, but not beyond a cycle's ability to repeat.

ANALYSIS

The above information identifies very significant differences in METHOD... so significant that the differences impact Design, Production and the potential for Sustainability.

(REPEAT) THE ABOVE PAGES MAKE IT CLEAR THAT THERE ARE SIGNIFICANT DIFFERENCES IN METHOD... SO SIGNIFICANT THAT THEY IMPACT DESIGN, PRODUCTION AND THE POTENTIAL FOR SUSTAINABILITY.

As to package Design:

UV/ADHESIVE is the most flexible Method, as relates to package appearance. PRESS/ADHESIVE is the most restrictive and PRESS/FUSE is in between these two.



UV/ADHESIVE and PRESS/FUSE offer the most security. PRESS/ADHESIVE is nearly impossible to secure against pilferage without negative impact on its potential for Sustainability.

Package material choices are easily made with all three Methods. However, the list of material choices is much shorter with PRESS/FUSE than the other methods. Further changing plastic type or thickness is very difficult (expensive) for PRESS/FUSE. Plastic rigidity is important to PRESS/ADHESIVE, so thickness and/or type is an issue. UV/ADHESIVE has no similar plastic type/thickness restrictions.

All three methods offer good source separation potential and therefore all can help recycling and/or landfill impact (through Design). However, when security is an issue, source separation may be sacrificed when using the PRESS/ADHESIVE METHOD.

Note: Post-consumer recycling of clamshell and blister material, occurs infrequently, but it would not occur at all, if it were not for source separation. If post-consumer recycling is going to be encouraged and/or supported, then source separability is a must!

A vital function of Package DESIGN is shelf-presence.

Package shape, colors, material and message are what differentiate one product or brand, from another. When all packaging looks similar, then price and shelf location *decide* which products have the best sell through. Product differentiation (shelf-presence) can leverage good placement/pricing and can overcome poor shelf location and a price differential.

UV/ADHESIVE is a winner for creation of shelf-presence. PRESS/ADHESIVE is the least flexible and is the most prone to “look-alikes.”

Merchandise security is a strong consideration for sealed plastic packaging.

A plastic “shell” reduces merchandise damage due to shipping, eliminates merchandise soiling, protects against loss of components (thereby reducing returns), raises perceived value of merchandise and reduces pilferage for high-demand/value merchandise.

UV/ADHESIVE and PRESS/FUSE share the security honors.

Plastic type/thickness impact cost and the potential for sustainability.

Cost of material is reduced, when less of it is used. *Less used* also means less to ship (fuel consumption and handling expense are reduced).

Note: On a very regular basis, new plastic types are developed/offered (many will provide favorable changes for the environment). The ability to change from one type to another is a strong consideration.

UV/ADHESIVE is the most flexible Method for plastic type or thickness, even mix-and-match, at the same time, on the same assembly line. PRESS/ADHESIVE comes in a very close second, in this issue.



Source separation is not as practical (therefore common) as environmentalists prefer.

Recycling of clamshell/blister packaging does exist and its popularity is expanding, even though it is not commonplace.

Package design is key to source separation. Paper and plastic cross-contamination thwart recycling. Designers can and do create plastic packaging that is maximally recyclable if Method does not demand to the contrary.

If security is not an issue, then PRESS/ADHESIVE has the “natural” edge. Both UV/ADHESIVE and PRESS/FUSE can be as good at source separation, but, in both cases, designer experience is more important than it is for PRESS/ADHESIVE.

Important Design Consideration.

PRESS/ADHESIVE “requires” much more paper (more weight) than either UV/ADHESIVE or PRESS/FUSE. Plus, if security is an issue, the possibility of plastic reduction is impacted because thicker plastic improves security.

When comparing plastic use, compare by weight, not by square inches. And, when calculating landfill-based breakdown, be sure to factor in thickness of all materials, plastic and paper, because the time required for material degradation is impacted by thickness.

As to packaging METHOD

Note: In the past, “METHOD” has not been a Sustainability evaluation issue and this omission must be corrected! Why? Here are just 4 answers, there are more:

1. METHOD avoids/dictates scrap (scrap can be discarded prior to merchandising).
2. METHOD determines energy consumption (not seen in the package, but very visible in the carbon footprint).
3. METHOD can allow automation or demand and labor. Labor cos can push a packager to offshore processing (and offshore services carry the extra burdens of shipping, production volume, etc.).
4. METHOD can feature very rapid or very slow assembly/sealing production line changeover, but not all METHODS do.

ANALYSIS – METHOD SHORTCOMINGS

Consumables (items used in production, but not evident in the finished product) are frequently a problem for the environment or for profitability or for both.

Tooling (PRESS/FUSE and PRESS/ADHESIVE) is costly. Tooling forms a seam for pressure and heat sealing. Tooling demands storage. Tooling needs cleaning, deburring (maintenance). UV/ADHESIVE doesn't use tooling (or heat/pressure).



PRESS/FUSE has historically produced plastic waste (not with all packages, but with a measurable portion). So-called “cutoff” or “trim” is plastic the METHOD requires, but once sealed, may be discarded... hence it is waste. Neither, UV/ADHESIVE nor PRESS/ADHESIVE features this manner of waste.

Energy consumed during sealing is a carbon footprint issue. With PRESS/FUSE and PRESS/ADHESIVE, the amount of electricity required to seal is between 5x and 10x the amount required by UV/ADHESIVE. Energy consumption always leaves a carbon footprint, the only issue is how large is it?

Labor is the most expensive consumable and makes a very significant impact on the business. UV/ADHESIVE has the potential to use the least amount of labor. PRESS/FUSE uses the most labor. PRESS/ADHESIVE is somewhere in between. (More on labor in the “production” section.)

Assembly and sealing automation (labor reduction) depends heavily upon speed. Without speed, labor that is displaced by equipment is at risk of being a dollar-trade. With speed, displaced labor provides a savings over capital cost/depreciation.

So, how well does/can each of the three Methods do with automation?

PRESS/FUSE production (throughput) is limited by dwell time (machinery’s ability to cycle). This is a complicated issue because there are “special” machinery adjustments that can be made to increase sealing throughput. Included is an increase in energy (seal faster with more power); tooling change (sealing 4-at-a-time is faster than sealing just 1 or 2); added labor to facilitate the faster loading or unloading required; and others.

PRESS/ADHESIVE faces the same problems and solutions as Press/Fuse. A difference, however, is that the dwell time (when a press is closed) may be shortened by 20% or so.

UV/ADHESIVE’S “seal” is completed on a continuously moving conveyor. There is no “cycle” or dwell time. Automation’s speed is not limited by “dwell time” if the machinery does not *dwell*. Further, sealing with UV/ADHESIVE is unattended (no labor). Sealing labor is the same (zero) regardless how fast it seals.

As to packaging Production

This is where the “cost rubber” meets the “profit/loss road.” Almost all of Production’s potential benefits are directly related to Method and Design. And, when cost reduction potential exists, it is Production’s choice (responsibility) to maximize such benefits. This is not a disclaimer. This is fact.



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Consider these production steps for sealed plastic packaging:

1. Package preparation (denesting of clamshells/blisters, staging package contents, etc.)
2. Package assembly (insert contents [often multi-step], assure appropriate content positioning, [apply adhesive if required])
3. Securely close the completed package
4. Package sealing (put closed package in a press and after sealing remove the package –or– allow a closed package to continue the conveyor ride through a UV-light tunnel).

In a labor-based system, “production” must work at consistent pace. Steps 1, 2, 3 & 4 must be synchronized or labor is wasted.

Labor differential – Manual assembly/sealing

Assuming that steps 1 & 2 above require the same amount of labor to produce 500 closed, but unsealed packages per hour, regardless the seal method, what is required in the way of workers to affect the package sealing?

With UV/ADHESIVE, the answer is zero.

With PRESS/ADHESIVE, the answer is one or two.

With PRESS/FUSE, the answer is one, two or three.

Reliability differential – Manual assembly/sealing

Assuming steps 1 & 2 above require the same labor to produce 500 closed, but unsealed packages per hour, what machinery maintenance is required to affect package sealing?

With UV/ADHESIVE, lubricate the conveyor and replace the UV light as required.

With PRESS/ADHESIVE, service the press, maintain the tooling and keep the heat source and amount of pressure in synch with the press.

With PRESS/FUSE, service the press, maintain the tooling, keep the heat source (for fusing) in synch with the press.

Production potential – automated assembly/sealing

With UV/ADHESIVE, production potential is based solely on the speed with which assembled and closed packages are exposed to the UV light (activating the adhesive to set the seal).

With PRESS/FUSE and PRESS/ADHESIVE, sealing machinery’s “cycle speed” is the limiter.



SUSTAINABILITY... How is sustainability impacted by packaging choices?

Sustainability begins with the **METHOD** employed to assemble and seal plastic.

UV/ADHESIVE:

- Reduces energy consumed 50% to 90% (less carbon footprint).
- 10% to 15% less plastic (smaller seal welt, thinner plastic, etc.).
- Easily changes to new, friendlier plastics like RPET, PLA and PCR.

Sustainability continues with **DESIGN** employed for the package.

UV/ADHESIVE, when compared to **PRESS/ADHESIVE** conveniently allows:

- Paper reduction (see Trapped Card vs. Trapped Blister) by 25% or more
- Overall packaging weight reduction by 20% or more

UV/ADHESIVE, when compared to **PRESS/FUSE** conveniently allows:

- “Friendlier” plastic choices (RPET, PLA, PCR, etc.)
- Overall plastic reduction by 10% or more

Sustainability continues with **PRODUCTION** benefits.

- 15% to 25% less labor\$\$ (also equates to less commuting fuel – less carbon footprint)
- Production speed reduces time that manufacturing is “on.” (less carbon footprint)
- “To order” production reduces waste, storage, and handling labor, etc.)
- Consumables reduction (tooling, dies, maintenance and housing of them, etc.)

It may be rightly said, “If packagers were to do nothing more than change to **UV/ADHESIVE** sealing, the planet would be better off... far better off... more than 5% better off... far more.

EVERY “SWITCH” FROM **PRESS/FUSE (OR **PRESS/ADHESIVE**) TO **UV/ADHESIVE** CAUSES THE PLANET TO BE GREENER. AND, THE PACKAGER IS MORE \$GREEN\$ FOR IT!**

References – Sustainability: Who Cares?



Sources & Resources

The Internet was leveraged, heavily.

- US Department of Energy
eia.doe.gov & other DOE sites
- US Department of Commerce
- EPA
- Federal Trade Commission
- Southern California Edison
- Department of Water & Power
- MSNBC
- MSN Money
- Packaging Digest
- Packaging World
- Wikihow
- Packaging Resource
- Sustainable Forestry Initiative
- Wal-Mart
- Costco
- Therm o seal
- Sonic Packaging
- Industrial Info
- Modern Plastics Worldwide

Print Publications

- Plastics News
- Packaging News
- Packaging Digest
- Packaging World
- Paper & Packaging
- Global Logistics & Supply Chain Strategies

Competitors, Suppliers and Associations

- CardPak
- Winterborne
- Alloyd
- Therm o seal
- Sonic Packaging
- WestPack
- National Hardware Association
- Pack Expo
- PackEx
- Dymax

Partner Pak Customers/Users

- Honeywell
- Reliable
- MK Diamond
- Gerber
- Costco
- GameStop
- Ingram Micro
- Cokem
- Idea Factory
- Display Pack
- Misty Mate
- First Alert
- Heritage Paper
- Signature Packaging
- Expedex

Other Resources

- ASR (Personna)
- Leviton
- Victorinox