Sustainability and the Future of Tissue Manufacturing and Converting

Tissue manufacturers and converters have opportunities to not only lean into their own sustainability initiatives, but also help their customers contribute to the global cause.

By Claudio J. Muñoz, Fabio Perini

Sustainability initiatives rightfully continue to dominate global focus, and the pulp and paper industry — long known for massive energy consumption — is once again being closely scrutinized. Manufacturers that routinely budget anywhere from 10-40% of production costs strictly for energy use will raise environmental red flags.[1]

In response, tissue converters and manufacturers are using smart machinery and digital technologies to capture data that provides insights into energy efficiencies — and energy waste — from the granular equipment level through the broader facility and even into the supply chain. And it's working. A recent study issued by the European Commission's Joint Research Center (JRC) reports that tissue manufacturers and converters that implement best available technologies (BATs) and practices could easily decrease their energy consumption by 14% and greenhouse gas emissions by 62% over levels documented in 2015.[2]

However, reducing energy consumption isn't the sole issue. A natural tension exists between the pulp and paper industry and its products' end-users. While consumers depend on the tissue products the industry produces, they are also sensitive to the ecological stressors the processes involved in tissue converting, production, packaging, and distribution pose.

Fiber sourcing, management, replenishment, and alternatives often top the list of concerns — which is logical given the paper industry's reliance on it. However, the broader view of sustainability reveals several more opportunities for better ecological stewardship within tissue converting and manufacturing.

PIVOTING AWAY FROM PLASTICS: SUSTAINABLE PACKAGING ALTERNATIVES

Annual global plastics production is projected to be 650 million tons by 2035.[3] Nearly half of the plastic — about 260 million tons — will be used strictly for packaging.[3] This disproportionate over-reliance on plastic packaging is fueling global plastics legislation.

Several EU nations are cracking down on single-use plastics, tax levies on plastics use, and measures surrounding recyclability. In the United States, plastics producers are forming coalitions and adopting business models intended to optimize a range of environmental, economic, and societal outcomes. One such coalition, the New Plastics Economy, is comprised of global businesses that collectively produce 20% of all plastic packaging. All of the coalition's members are keenly focused on driving change to support a circular economy by as early as 2025.[4]

The pivot away from plastics is also giving tissue manufacturers and converters pause. Bioplastics or other environmentally friendly materials aren't currently available on an industrial scale, which elevates their price points and, ultimately, total delivered costs (TDC). However, this barrier to broad-based use is likely temporary, since less expensive materials will eventually appear on the market as a result of the economies of scale.

The opacity of paper and poly wraps is also a stumbling block, since consumers are conditioned to "see before they buy." However, current buying behaviors in diapers and feminine care products that are shelved in opaque wrap suggest that the "must-see" mindset is shifting due to concerted marketing efforts and brand loyalty building. Further, tissue products sold through ecommerce do not require transparent packaging, since consumers buy online based on brand experience and trust. Taken in total, then, consumer attitudes toward the adoption of paper and poly wraps for tissue products are changing, and are perhaps less prohibitive than they initially appear.

Asserting these prevalent industry objections is a luxury in the United States, where replacing poly material with more sustainable alternatives remains optional. However, as evidenced by eco-centric legislation in Europe and other countries, the option will be short-lived.

Instead of waiting for change to be required, tissue industry leaders are leaning into finding practical solutions now. For example, Fabio Perini and partnering companies explored certain FSC-certified 100% biodegradable virgin papers and recycled papers, developing 100% compostable Bio paper with Vinicotte OK compost certification, and 100% recyclable and biodegradable paper.

Web tuck glueless rewinder technology that allows initial core pick-up without adhesive to make production sustainable, less messy, less wasteful, and more cost-efficient.

Eliminating plastic packaging is just one way tissue manufacturers and converters are contributing to long-term sustainability.

These papers ensure excellent puncture resistance and product protection, and their coupling, lamination, or extrusion to bioplastics provide good pack sealing and an optimal moisture barrier. To aid in the transition and help manage costs, Fabio Perini also developed a technical improvement program known as Bio-pack to ensure all tissue packaging equipment — any size or format — can wrap packs with 100% eco-friendly material or paper reels combined with bioplastics, with no quality issues or line disruption.

AN ADHESIVE-FREE FUTURE

Eliminating plastic packaging is just one way tissue manufacturers and converters are contributing to long-term sustainability. Research and development continue into product and technology advancements that greatly reduce dependence on materials and processes that stress the environment. Of particular focus is the elimination of adhesives — one of the few chemicals used in tissue converting.

Converting paper to bathroom tissue or toweling is an adhesive-intensive process. It requires a total of four adhesives and binders: one used during core winding, a second during pickup/transfer, a third for ply bonding lamination, and a fourth seals the tail.

The traditional adhesives used in bathroom tissue log production, for example, have been studied at length and found to be poorly degradable as solid waste, a threat to wastewater treatment, and exceedingly dependent on oxygen consumption during the prolonged organic breakdown. There is also the matter of cost; like packaging, adhesives, and binders can influence TDC anywhere from 0.5-2.0% on value/super-premium branded products in the U.S.[5]

Removing the traditional core has immediately identifiable environmental benefits: no adhesives needed for core making and pickup/transfer, and the rewinding technology of an extractable roll reduces packaging material by up to 10%.

Tissue converters find themselves stuck between the need for adhesives and the ecological consequences of using them. But, are they?

Removing adhesives from the tissue converting process can simplify operations and generate significant cost savings. Fabio Perini has developed adhesive-free solutions such as:

Sustainable water lamination that utilizes a technology known as Aquabond which replaces adhesive with water during ply bonding and embossing, without requiring new machinery or compromising the machine's mechanical features and final product quality. Available for virgin or recycled paper fiber, this glueless technology ensures quality adhesion of the plies even at high speed, provides efficiency comparable to adhesive-based ply bonding, and cuts production expenses by completely eliminating adhesives.

Web tuck glueless rewinder technology that allows initial core pick-up without adhesive to make production sustainable, less messy, less wasteful, and more cost-efficient.

A tail sealing system that joins the tail to the roll using mechanics instead of adhesive. This glue-free technology ensures perfect sealing, simplifies starting a new roll — no more wasted initial sheets, improves finished roll quality, incrementally increases line efficiency, and ends downtime related to glue in the accumulator, log saw, or packaging unit.

GETTING TO THE CORE OF NO-CORE TISSUE PRODUCTS

Eliminating adhesives is a huge step forward, and Fabio Perini identified an opportunity to also leverage two no-core rewinding solutions — one that eliminates the traditional cardboard core altogether, and another that substitutes an extractable mini roll for away-from-home market use.

Of course, removing the traditional core has immediately identifiable environmental benefits: no adhesives needed for core making and pickup/transfer, and the rewinding technology of an extractable roll reduces packaging material by up to 10%.[5] The advantages of these no-core rewinding technologies multiply exponentially when viewed in the larger context:

- Reduced TDC, since the cost of cores is equivalent to 1.0-2.0% for value/super-premium branded products in the U.S.
- Optimized transportation — up to 16% more product fits on a standard truck.[5]
- Zero waste with every tissue roll.

Sustainability is multi-faceted, and protecting the environment is everyone's responsibility. Tissue manufacturers and converters have opportunities to not only lean into their own initiatives but also help their customers contribute to the global cause. ■

REFERENCES

[1] Siemens, Energy for Industry, Undated.

[2] Chemical Processing, Study Spotlights Pulp and Paper Processes, October 17, 2018.

[3] European Commission, A European Strategy for Plastics in a Circular Economy, Undated.

[4] New Plastics Economy, Global Commitment (web page), Undated.

[5] Fabio Perini North America, Glue-Free Technologies Increase Environmental and Operational Efficiencies, July 25, 2019.

Claudio J. Muñoz is Fabio Perini's Director of Marketing for Americas. He holds a bachelor's in Chemical Engineering from Universidad de Concepcion, Chile, and a master's degree from the University of Wisconsin - Madison. Claudio can be contacted by email at: Claudio.Munoz@fabioperini.com.