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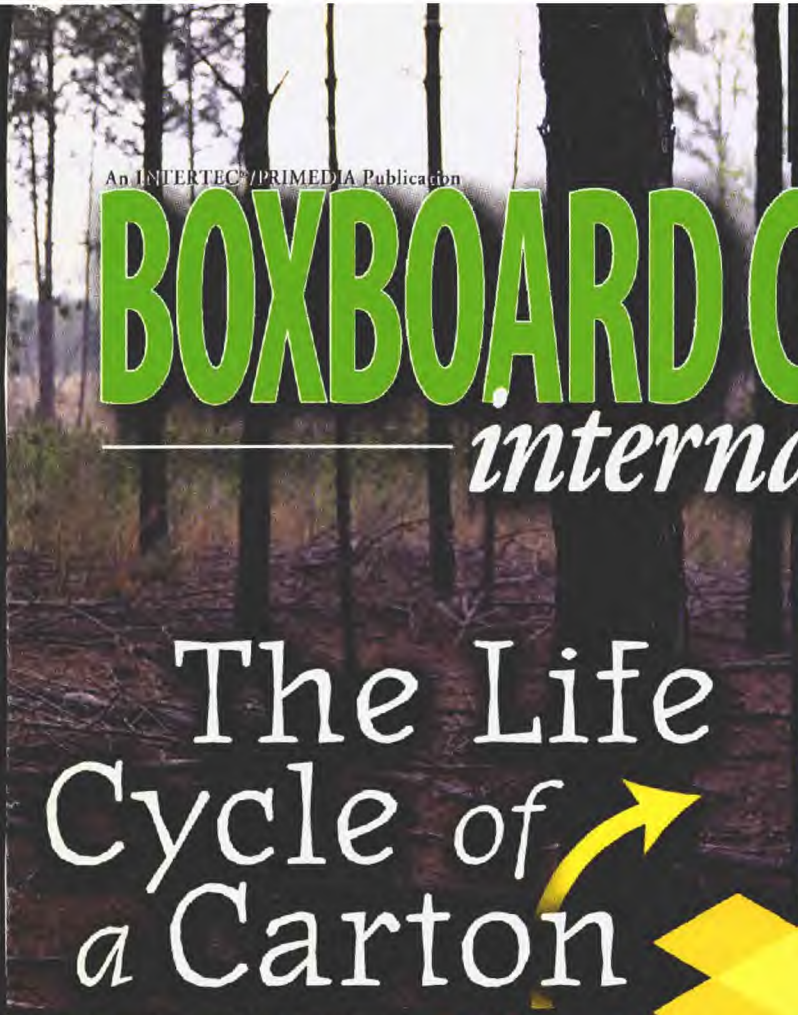
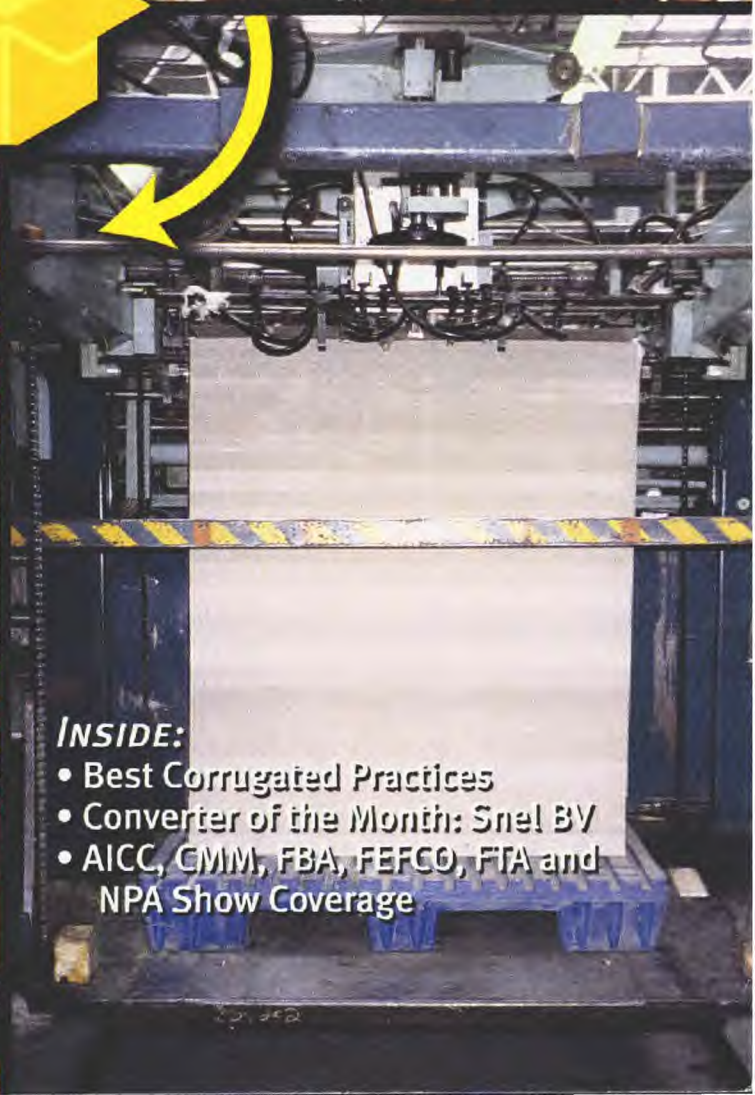
The Life Cycle of a Carton





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Circle 1 on Reader Card

Loads of Paper Work

Recycling mills put recovered folding cartons back into circulation, while some U.S. landfills try to speed up the degradation of those that are discarded.

by Christine Lyall
BCI Senior Associate Editor

Tom Troskey is regional manager of Rock-Tenn Company's recycling division. He oversees seven of the company's 14 paper collection and recycling centers.

Most people dislike paperwork and often complain about the drudgery of "pushing paper all day" at their jobs. But not Tom Troskey.

Troskey, regional manager of Rock-Tenn Company's recycling division, thrives on pushing paper and has been making a living at it for 25 years. Based in St. Paul, Minnesota, he oversees seven of Rock-Tenn's 14 paper collection and processing centers. They are in Minnesota, Texas, Indiana, Iowa and Vermont.

Rock-Tenn's 45-acre St. Paul site contains three distinct business units, including a paper collection and processing center, a 100%-recycled paperboard mill and a folding carton converting plant. In St. Paul alone, approximately 5,000 paper transactions cross Troskey's desk each month, just for the purpose of buying scrap paper. He buys office and writing papers, finished folding cartons and corrugated boxes, newspapers, junk mail and scrap and waste papers from paperboard converting facilities.

"Thank goodness!" Troskey said, jokingly lauding the flood of paper that flows through his office each month. The more paper, the better, as far as he's concerned; after all, it's his livelihood. "I look at all of this electronic and computer stuff and I wonder how it's going to affect paper collection."

As places in which paper recycling, re-pulping and re-processing occur, the Rock-Tenn facility represents one arm of the post-consumer segment of a folding carton's life cycle. The other arm is represented by waste management facilities, such as landfills and incinerators. Some landfills in the United States are testing methods of expediting solid waste degradation. (Please see the sidebar for more information on landfills.) If such methods prove to be safe and cost-effective, it might eventually be easier for some of the nation's landfills to achieve their ultimate goal: To essentially "recycle" the land, as well as their landfills. Thus, either through recycling or discarding, the folding carton industry is closing its economic and environmental loops, although some holes still—and will always—remain.

THE PAPER TRAIL

According to the latest available "Characterization of Municipal Solid Waste in the United States, 1997 Update", which the U.S. Environmental Protection Agency (EPA) releases each year, 6.08 million tons of folding carton products appeared in the U.S. municipal waste stream in 1997 (including milk cartons and other unspecified paperboard packaging). The report states that carton products made up 2.9% of the total municipal waste stream in 1997, while they made up approximately 10% of all packaging within the waste stream that year. For comparison purposes, plastic packaging materials generated through the municipal waste stream amounted to 8.15 million tons in 1997, putting them at 3.9% of the total waste stream.

In recovery rates, the EPA reports that 980,000 tons, or 18.2%, of folding cartons were recovered from the waste stream in 1997. That showed a slight decline from 1996, when 1.08 million tons, or 20.3%, of folding cartons were recovered from the waste stream. In contrast, only 9.8% of all plastic packaging was recovered from the municipal waste stream in 1997.

Despite the slight dip in recovery of folding carton from 1996 to 1997, the rate has steadily increased over the last several years. In 1992, for example,

only 10% of 4.6 million tons of folding carton material was recovered from the nation's waste stream. Contributing to these recovery trends—and their apparent growth—are facilities like Rock-Tenn in St. Paul.

Mike Waldorf, founder of the Waldorf Corp., built the St. Paul recycling plant in 1908 specifically as a paper and paperboard recycling mill. Although Norcross, Georgia-based Rock-Tenn bought the company two years ago, it continued its mission to serve the Minneapolis-St. Paul and surrounding region's paper and paperboard recycling market.

"Recycling (of paper and paperboard) was started here in St. Paul by Mr. Waldorf," Troskey explained. "He built this site between downtown St. Paul and downtown Minneapolis because the only place you can get scrap paper is where there is a population of people.

"The business of collecting paper for recycling has been going on for 100 years and has long been a part of the paper industry, as our product provides it with a basic and cost-competitive raw material," Troskey continued. "Paper recycling is nothing new, as some people might think. It didn't start with Earth Day."

While the business of recycling paper might not be new, the feverish pitch at which is has occurred during the last decade is. And much of that vigorous increase has been attributed to the famous Long Island garbage barge known as "The Mobro", which cruised the eastern seaboard during the summer of 1987 in search of a place to deposit its cargo of trash from Islip, New York. Turned down by six states and three countries, the barge eventually returned to Islip, where the trash was incinerated. That incident stirred up concern in the American public and the U.S. government that the nation's landfills had reached their capacities, and there was a need to step up recycling.

"People were saying, 'We have too much waste, we don't have enough landfills, we have to do more recycling'," recalled Troskey. "With paper being a key recyclable, a lot of focus came onto it. And there is a wide variety of places that paper comes from for recycling."

THE PAPER CHASE

"The whole idea of recycling is to seek out, establish and maintain quality sources of paper in order to feed our mill," said Troskey. Rock-Tenn's St. Paul facility therefore collects some of its own paper as well as buys paper from municipal and independent haulers. It has an office paper collection program in which it provides recycling bins and collection services for companies and office buildings, and it picks up or receives old corrugated containers (OCCs) from grocers, retail and wholesale outlets. Most of its folding carton material is composed of consumer and food packaging that comes from residential curbside programs, or trim scrap and other waste (such as makeready sheets) that comes from paper and paperboard converting plants, printers and grocery bagmakers.

Troskey said the St. Paul facility will not buy—because it cannot recycle—any paper products that are laminated, polycoated or enhanced with metals, films or foils. While equipment does exist that can strip those materials from paperboard products, Troskey said it is expensive to purchase and operate.

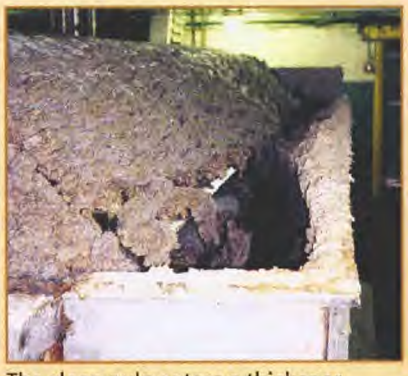
"You can put in banks and banks of cleaners, but the expense of running them is high," said Troskey. "And once again, until all of the other kinds of paper that we use that are less difficult to deal with become short in supply, we're not going to graduate to the tougher types of paper to recycle."

The 1,000 tons of paper that the St. Paul facility recycles each day is sorted and cleaned, then re-pulped, pressed into new paper, rolled and cut. A maze of equipment connected by pipes and conveyors facilitates this process, moving first the scrap paper into the pulper, then moving the pulp in "slurry" form through the intricacies of the plant.

The white papers are separated by hand on a conveyor belt. They are then cleaned and pulped to be used later as part of a white topcoat that is applied to the plant's new, recycled paper. The remaining loose papers are sent on a conveyor to the "beater", a 12-ft.-wide cylinder full of water and equipped with a mechanical drive wheel that literally beats and chops the papers to a pulp—much like a house-

Rock-Tenn in St. Paul buys a little more than 1,000 tons of paper per day.

The "beater" adds water to the paper and chops it up into pulp form.



The clean pulp enters a thickener before it proceeds to a paper machine.

hold blender works. In addition to the beater, the facility has two hydropulpers that perform a similar function.

From the beater, the "slurry" is piped into cleaners, which are engineered to remove all non-paper items and debris, such as paper clips, staples, tape, styrofoam, wet-strength fibres that didn't break up and bits of plastic. The resulting sludge, from which most of the water has been filtered, is extremely thick and sticky. It is shipped to landfills, Troskey said, where it can be used as an alternative to dirt for daily cover.

After the recycled pulp is cleaned, it travels to one of four paper machines in the plant. Two of the machines make clay-coated white recycled paperboard and two of them make corrugating medium. Each machine produces 250 tons of paper per day, said Troskey. The pulp is deposited onto felt blankets that circulate through a series of rollers, coaters and dryers to form the paper. The paper is then wound into rolls and cut to size according to customer orders.

While much of the paper is used at Rock-Tenn's own St. Paul folding carton converting plant, much of it is sold to outside converters. The paper is then made into new boxes that contain cereals, cake mixes, crackers and cookies, toys, automotive parts, videos, CDs, shoes, cosmetics and pharmaceutical goods. Recycled papers are also often used to make game boards, puzzles, book covers and greeting cards.

Once those boxes have served their purpose, they will again enter the waste and recycling stream. As the recovered boxes are processed, their fibres will shorten and deteriorate in strength. But the life span of a single folding carton is difficult to determine, said Troskey, because each box is composed of different fibres. Those fibres that have been through fewer rotations are longer and supplement the strength of the shorter, weaker fibres. Because of this, there will always be a need for tree fibers in the paperboard packaging industry, Troskey said.

"Paper recycling is a virgin-based business, so you can never have a true, closed system," he said.

The segment that needs closure, however, is the consumer's. The 100% Recycled Paperboard Alliance (RPA-100%), a group of North American recycled paperboard manufacturers, is working to encourage packaged goods companies to use 100% recycled paperboard and to label their products with the RPA-100% symbol. The group also runs public service announcements to educate consumers about buying products packaged in recycled paperboard by showing them how to identify the symbol. If recycled products are not bought and the economic loop is not closed, the recycling business will not profit. Judging by the increasingly stronger recovery and recycling statistics provided by the EPA, it appears those efforts are paying off.

Each paper machine at Rock-Tenn in St. Paul makes 250 tons a day.

A new roll of 100%-recycled, clay-coated white paper is born.

Life Goes On in a Landfill

While some old folding cartons become new paper, the rest go to landfills, where they are buried daily with other discarded materials under several inches of dirt. The end.

Not necessarily, said N.C. Vasuki, CEO of the Delaware Waste Authority. His facility in Dover, Delaware, has been using an experimental method of landfill management called "leachate recirculation," in which moisture that collects at the bottom of a landfill is pumped back onto the top to promote the bacteria activity that breaks down waste.

"The natural bacteria that break down waste are called anaerobes, and they survive when there is no oxygen. But they need moisture and nutrients," said Vasuki. "We try to provide good conditions for the bacteria by recirculating the leachate." Vasuki protects the ground from the leachate by lining his landfills with a thick layer of polyethylene on top of a thick layer of clay, which the EPA has now mandated that all landfills must have. So far, the recirculation method has proved to greatly accelerate the decomposition of some solid wastes. Once the waste turns into compost, it can be used as daily cover on fresh landfill material.

Vasuki said the basic difference between his and conventional landfills is the recirculation of the leachate. His was also one of the first in the nation to use polyethylene liners and clay.

In a typical landfill, which is usually kept as dry as possible, the process of degradation is so slow, "You could probably pick up a cereal box in 10 to 20 years and read the label," said Vasuki. Such a lengthy time span precludes the need to dig more landfills or to expand existing ones. At Vasuki's facility, studies have shown that a folding carton will completely decompose in four years. Thus, no additions or expansions to the landfills should be needed.

"Our goal is to stabilize the landfill in 20 years," said Vasuki. "We plan to dig up the whole landfill, screen it, remove the compost, replace the liners and put the items back in that did not break down. So the idea is really to recycle the landfill."

So why doesn't everyone use this method? According to the National Solid Wastes Management Association, several other states have started to, but the EPA is still waiting to assess the long-term results before it gives the green light to all states in all climates.