VANGUARD PACKAGING'S NEWER CUSTOM-DESIGNED UNDERGROUND FACILITY IN KANSAS CITY, MO., IS A SHOWCASE OF ENERGY EFFICIENT SOLUTIONS. BY JACKIE SCHULTZ

A Model of SUSTAINABILITY

Tucked into a 270-million-year-old limestone foundation, 150 ft underground is arguably one of the most environmentally-friendly corrugated operations in the world. Since 1990, the Kansas City, Mo., headquarters and sheet plant of Vanguard Companies has been located in the Hunt Midwest SubTropolis, an underground world of businesses, warehouses, record storage and corrugated manufacturing and fulfillment.

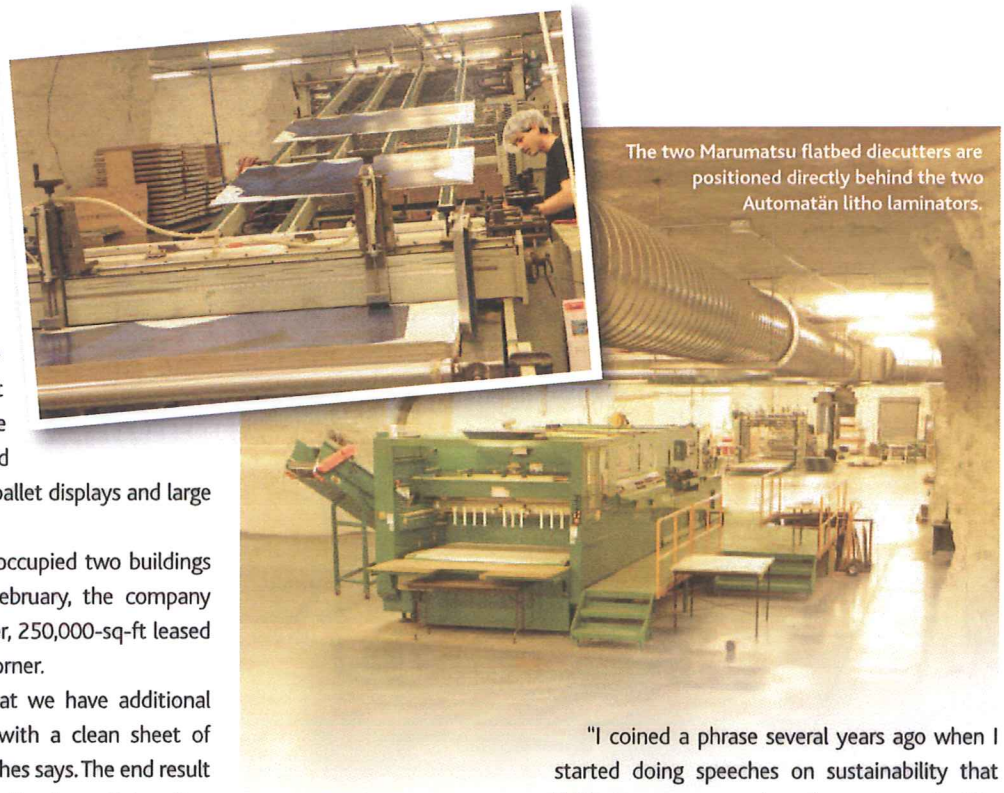
The natural surroundings provide an ideal starting point for sustainable solutions, nature's gift, if you will. Whether it's minus 10 or 98 degrees F outside, the temperature inside the SubTropolis remains at a comfortable 68-75 degrees F.

"We have no heating or cooling. It's geo thermal," says Vanguard CEO Mark Mathes. "In the dead of winter the parking lot could be 40-45 degrees, but that is when it's 10-12 below outside."

Mathes estimates the savings in heating and cooling costs to be about $50,000 a month during peak seasons. "That's $50,000 a month plus how much greenhouse gas got emitted. That plays a big part of trying to keep a low carbon footprint."

Ultimately, Mathes wants Vanguard Packaging to be carbon neutral. Currently, he is investigating the possibility of adding wind-powered generators in the field above the SubTropolis.

Justin (left), Karen and Mark Mathes surrounded by Vanguard displays and packaging in the company showroom.



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Setting An Example

Vanguard Packaging specializes in higher-end graphics packaging and Point-of-Purchase displays. The plant produces an even mixture of litho and flexo printed products. Its specialty is pallet displays and large end caps.

Previously, the plant occupied two buildings in the SubTropolis. In February, the company consolidated into a newer, 250,000-sq-ft leased facility just around the corner.

"It's not so much that we have additional space. We got to start with a clean sheet of paper and lay it out," Mathes says. The end result was a more streamlined, collaborative environment that adds capacity, improves manufacturing efficiency and reduces waste.

Within days of relocating, the plant won the Capstone award for Green Building Design, which recognizes real estate development projects that enhance the Kansas City metropolitan area.

Originally, Mathes was going to move the sheet plant to an above ground location. "I had a 237,000-sq-ft building on 36 acres purchased," he says. "I got to thinking while it would be great to have this facility and the land, it went against everything we've tried to do on sustainability. I couldn't shake that. I'm trying to present myself as a leader in the industry and I would be leaving one of the most sustainable facilities for just another average facility."

Mathes has been championing the merits of sustainability for some time now. He speaks passionately about the subject at industry meetings, serves on sustainability committees and has even attracted the attention of the world's largest retailer. In addition to the Kansas City sheet plant, Vanguard has sales and design offices in St. Louis, Mo., and in Bentonville, Ark., near Walmart headquarters. Vanguard has about 100 total employees.

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"I coined a phrase several years ago when I started doing speeches on sustainability that Walmart now uses and attributes to me. I call it, 'The power of small.' A small change that we each make spread out over all of North America can have a massive change," he says.

Small change indeed. What Mathes has accomplished with Vanguard's new location has captured the attention of companies around the world looking for sustainable solutions.

Employee Input

Much of the energy saving solutions at the new facility was the result of employee input. "When we started designing this facility, we wanted to involve the employees in sustainability. They're really into it here. They're proud of the fact that we have a national reputation for it, that management supports the initiative and they're proud that I get involved," Mathes says. "We want to be sustainable today and we want to prevent actions from occurring that will be counter to that tomorrow."

About five months before the move, Mathes gathered the employees at the new unoccupied space. "I said, 'It's hard to envision it now, but this is where you're going to be and we want you to start thinking about how best you can operate in this facility.'"

Natural formations of limestone pillars separate the machine stations and departments.

The company uses eco-friendly inks and varnishes from BCM Inks. "They fit our model of sustainability perfectly," says Mark Mathes.

The employees offered up a variety of ways to conserve energy. One of the suggestions was to install solar powered motion detectors in the bathroom that operate the faucets and toilets. Water turns on and off automatically, eliminating the need to touch the fixtures.

Another employee suggested using overrun or excess material wherever possible to prevent the manufacturing of something. As a result, light fixtures and material transfer conveyors were overruns from other projects and even from other board converters.

The plant and offices have motion detector lighting as well as high-energy efficient T-5 fixtures. "We'll probably save $30,000 to $40,000 a year just in lighting costs," Mathes says.

The stained concrete floors allowed Vanguard to eliminate 9000 sq ft of carpet. "That means that we clean these floors with water instead of chemicals. In a manufacturing environment, we would change carpet in the main wear areas about every two years. We will never change carpet again," Mathes says.

There are no ceiling tiles, which can break and are often prone to dirt and grime. Cable trays were installed on the ceiling to easily accommodate any future expansion of power and computer cables, and phone lines, eliminating the need for conduit. The forktrucks are electric, and the sales representatives, including Mathes, drive hybrids.

Starting Over

The production area was designed for efficient material flow. The layout is a vast improvement compared to the previous facility, Mathes says.

"We had a number of years in a row of 20% growth and as we purchased more equipment we were putting machines wherever they would fit. It was a horrible layout," he says. "It was a textbook example of how not to put a plant together. This is the reverse of that."

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Mathes worked with an architect and an engineer who specialized in underground facilities and in paper manufacturing to get the desired result.

"When you start with a clean sheet of paper and lay the plant out with material flow in mind, the differences are staggering between a plant that effectively laid itself out as we grew. That's how a lot of the plants in our industry exist today. Very often you don't get the luxury of starting with a clean sheet of paper.

Natural formations of limestone pillars separate the machine stations and departments. Machines are spaced strategically, increasing throughput and reducing material transport efforts.

For example, the two Maramatsu flatbed diecutters are positioned directly behind the two Automatän litho laminators. The transfer of sheets is about 10 ft. In the other location the laminators and diecutters were in different buildings.

"When we first got ISO 9000 certification many years ago, part of the process was to determine primary causes of waste. Our No. 1 source was material handling," Mathes says. "In the new building we've created pods of similar processes. Processes that feed each other so that there is almost no transfer from process to process."

In just one month the improved flow has contributed to reduced labor costs and lead times, according to Mathes.

One hundred and fifty feet underground is Vanguard Companies' Kansas City, Mo., headquarters.

Karen and Mark Mathes at ALF, a fulfillment and assembly operation owned by Karen.

"We're amazed at the improvements in efficiency and flow when in fact we designed for it," he says.

Running two full shifts, capacity at the previous facility was about 45 million sq ft per month. Capacity at the new plant is about 60 million sq ft per month, without the addition of any new converting equipment.

A new trim collection system from G.F. Puhl helps Vanguard maintain its world class status for waste management. Ninety-five percent of Vanguard's waste stays out of the landfill.

The company segregates all waste, including old cutting dies and pallets, into two dumpsters. One goes to the landfill and the other goes to an alternative solid fuel co-generation facility about seven miles away where it is used to generate steam. The steam generates electricity for a concrete company.

"Part of our requirement was that they provide us with documentation that their air emissions are no different from a standard power plant," Mathes says. "The ash from the burn is mixed in with the concrete. Part of our new floors have the ash from our waste from our old facility."

All of the wastewater is treated before it is released back into the Kansas City system. "We think we're the only ones in Kansas City to do this," Mathes says. "What comes out of that cleaning process is solids from inks and adhesives which are dried and incinerated."

All of the machine pits are lined with rubber to protect the ground from the possibility of leached chemicals. "When we broke up a pit at our old building we found old ink underneath trapped by the rock," Mathes says. "We decided we were going to be a good steward and rubber line under each of the machines."

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The company uses eco-friendly inks and varnishes from BCM Inks. "They fit our model of sustainability perfectly. We promote that we're using their inks and all the things that BCM has done in sustainability. We consider them a very close partner in trying to get to the same point," Mathes says.

Vanguard is flush with quality and environmental certifications, including ISO, OHSAS, FSC (Forest Stewardship Council) and SFI (Sustainable Forestry Initiative).

"A real issue in sustainability is greenwashing, someone not telling the truth. The only way you can completely answer that issue is through certifications in these areas and these certifications must be iron clad," Mathes says.

For Future Generations

Vanguard Packaging was founded as a poly bag distribution company by Mathes' parents in 1975. Mathes purchased the company from his father, Jack, in 2007.

Since its founding, the company has expanded into corrugated packaging, higher-end printing and graphics, paper tubes and cores and pressure sensitive labels. Today, all of those businesses are part of the Kansas City operation.

Across the street from the sheet plant is ALF (Advanced Logistics and Fulfillment), a fulfillment and assembly operation owned and operated by Mathes' wife, Karen. Vanguard is ALF's largest customer.

Justin Mathes, the oldest of Karen and Mark's three sons, recently joined Vanguard as Marketing Director.

Mathes admits that his pursuit of sustainable solutions has been a smart economic move, but he insists that his primary motivation was more altruistic.

"The real reason we did this is because it's the right thing to do. We don't have the right to steal our kids' resources anymore. If there was an 'aha' moment, I think that moment came some years ago when I read that if the rest of the world were to achieve the standard of living of North America, it would take the resources of three planet earths to sustain it. There aren't three planet earths."

Since then, Mathes has been on a mission to champion the cause. "We consume maybe a third of the energy of the normal corrugated operation. If all of the industries in the United States cut their energy consumption by two thirds – if all of the vehicles were hybrids and got 30 miles per gallon instead of 20, think of how we could stretch our energy in this country. That buys the time to move to a fuel cell or hydrogen or wind to get us to the next economy.

"Our industry today has simply got to look toward energy savings to remain competitive in the future and to do our part in this whole sustainability scenario," he adds. "This building represents our efforts. At some point it will trickle down to everyone in our industry in every facility."

Employees work on a large cutting die for a pallet display that highlights the new movie "How to Train Your Dragon".