

The History of Vinyl Windows in America is the Story of Entrepreneurs

*Three pioneers started laying
the foundation for the industry
we know today more than 35 years ago*

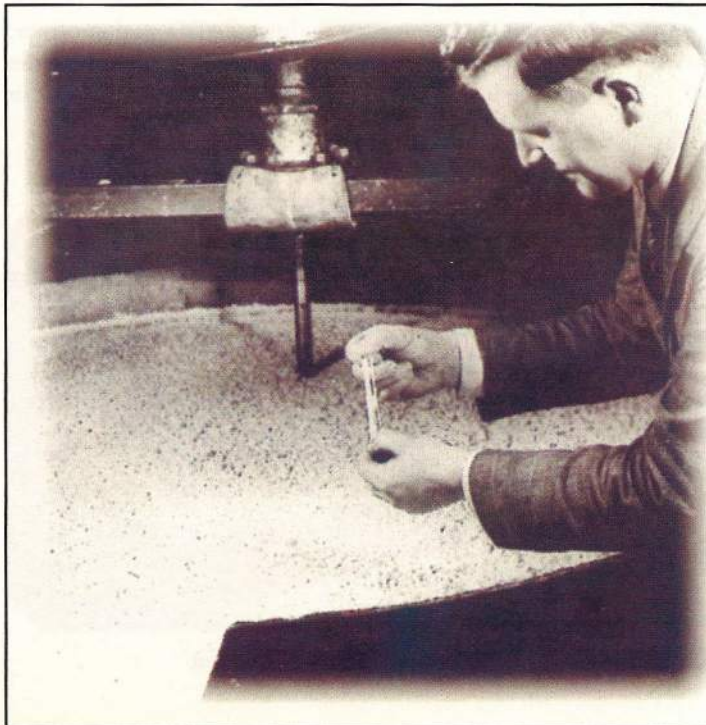
By David P. Pirwitz

In 1997, an estimated 14.5 million vinyl window units will be manufactured and sold in the United States. It wasn't so long ago, however, that it was uncertain whether vinyl windows could ever be a viable product.

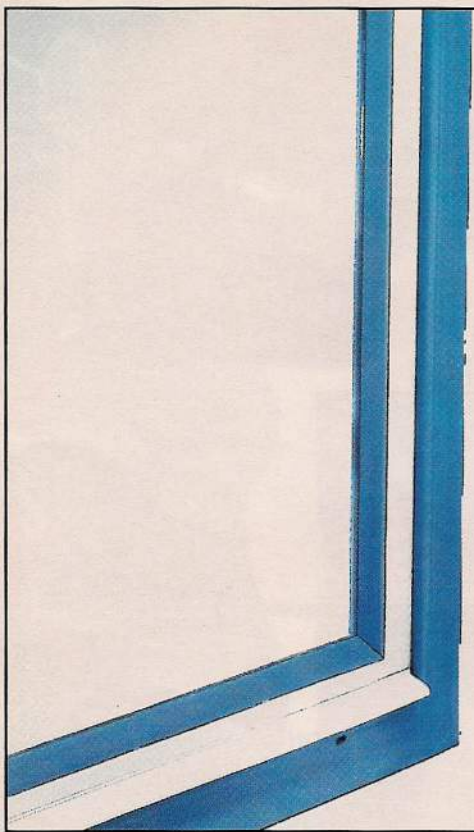
In Europe in the early 1950s, post-War Germany embraced this manmade material that would cut its reliance on dwindling natural resources, and vinyl windows soon flourished there. In America, however, wood and aluminum windows were readily available, and the fickle American consumer placed a stigma on this funny material called plastic. Here is the story of how three entrepreneurs took on the challenge of introducing vinyl windows to America, and laid the groundwork for many of the developments of the '80s and the '90s and the industry as we now know it today.

Vinyl storm windows

It was the late 1950s. The economy was moving along strongly on the heels of the post-war era baby boom, and a



*Searching for a synthetic alternative to rubber,
Dr. Waldo Semon of B.F. Goodrich formulated
the first PVC polymer in 1926.*



Vinyl windows have a longer history in Europe. Trocal introduced one of the first commercially viable window models in 1954.

strong housing market created a good outlet for window production, both new construction and replacement. Vinyl windows, while finding a receptive market in Europe at the time, had not yet been introduced to North America.

While energy conservation hadn't become a big issue yet, people wanted to be comfortable in their homes. Aluminum storm windows had been introduced sometime earlier and while they provided more protection from the elements than a window alone, they still were conductors of temperature, detracting from their performance.

"I had been selling aluminum extrusions to window fabricators, and in 1957 was seriously considering making aluminum my career," explains David Weis, who started Modern White Mfg. in a Pittsburgh, PA, suburb in 1959. He went public with the company in 1968 and renamed it Thermal Industries. "Someone showed me a piece of Koroseal extrusion (a B.F. Goodrich trade name) and I immediately recognized a threat, because I knew all of the problems of aluminum and saw that vinyl offered some of the solutions." After a couple of years of investigation, Mr. Weis made the decision to get into this exciting new product.

Paul Mancuso, who was no stranger to leading edge materials, had also been watching this new product closely and felt it would be a natural fit to his existing product lines. Mr. Mancuso remembers, "We started Fiberlux in New York State in the early 1950s making fiberglass products. At the time, there were a handful of fiberglass sheet manufacturers, but we were among the first to apply it to building materials in the form of patio enclosures. We were also manufacturing aluminum storms at a sister company called Westchester Window, so we were quite aware of the pitfalls of aluminum as a window material." So shortly thereafter,

he too was manufacturing the Goodrich vinyl storm window.

Another wooed by vinyl's initial call was Leon Slocomb. He worked for DuPont at the time and was quite aware of the future of plastics. He had also watched for years as his father struggled with aluminum KD windows. "I knew through him," says Mr. Slocomb, "that aluminum was bad for windows because it was such a tremendous conductor." So he too signed up with Goodrich to make the Koroseal product and started Slocomb Industries in Wilmington, DE.

Pitfalls of early vinyl

It didn't take long, however, for the three to realize what they were up against. "Fools walk in where wise men fear to tread," Mr. Weis muses, "It was soon after I decided to get into the business that I discovered the pitfalls of early vinyl, but by that time, I was committed."

First was the American consumer's impression of plastic as a low-end product prone to breakage. "Plastic meant toys and garbage cans to people," Mr. Mancuso recalls. "They couldn't imagine a useful product like a window being made out of plastic, and certainly it couldn't be lower maintenance. Besides that, it was twice the price of aluminum."

"We fought that battle for 20 years, and the wall didn't start breaking until the 1980s," Mr. Slocomb states. "My head got very tired from hitting that wall for so long."

Despite the public's initial perception of vinyl, selling the window was not the biggest challenge. "There were many people out there, who after a good presentation, could understand why it was a good product," Mr. Mancuso states. "The real problem was getting decent material in a timely manner." He continues, "Unfortunately, a large cor-

poration doesn't often understand how to put a new product out on the market and when there's a problem, they don't have the personnel in place to take care of it. Our salesman was the rubber goods salesman, the same guy who sold rubber boots and you couldn't talk to Goodrich directly." The product came in late and not within specification, and often shipments came in with missing parts, which meant no windows could be made. "It was a nightmare," Mr. Mancuso states.

Mr. Weis encountered similar problems. "The material was certainly unstable at that particular time," he recalls. "Goodrich didn't have the extrusion technology to run a close tolerance part, which was needed even for a storm window. Also the plasticizers they used were not as finely honed chemically, and it didn't take long before extrusions started turning yellow. That combination of factors alone almost knocked the product off the market."

Then there was the actual production. Since this product wasn't like any others on the market, there were no existing technologies to draw from. This first window was designed as a welded product and at that time welding equipment had not yet migrated from Europe. "So we made a welder by hand," Mr. Slocumb recalls. "We rounded up a bunch of stuff we found around the house and garage. We used the elements from an electric range, bent a piece of stainless steel and attached that to a little slide connected to a foot pedal, and there was our single point welder. It was really something and we made thousands of windows like that." Mr. Weis and Mr. Mancuso both teamed with local tool-makers to custom design their welders.

Amid these problems, however, the three weathered the storm and sold enough windows to make it worth their efforts. While Mr. Slocumb toughed it out with Goodrich for the better part of the '60s, Mr. Weis and Mr. Mancuso each set out early in the decade to find a better mousetrap. "Fortunately, there were other options," says Mr. Weis, "There were a couple of custom extruders in Ohio and we eventually hooked up with a company called Vinylast (now Winter Seal). They were using European-style extrusion

dies, which provided extremely tight tolerances and their compound was more stable than anything else we had seen up to that time."

The first vinyl replacement windows

Thermal Industries soon designed a new and improved storm product and because they could now count on tolerated extrusions, success came without the headaches. "This success really gave me the impetus to move ahead in vinyl," Mr. Weis says, and by 1966, he had designed what many say was the industry's first prime replacement window. "It was really a glorified storm window," he recalls. It was a single-glazed, double-hung design and was a side loader with no balances. It had only a half inch sash and a pressure seal on one side holding the sash in place and a handle which looped into the holes in the frame. "It was very primitive, but we sold 25 to 30 thousand the first year and it worked pretty well," he adds.

It was at this time he decided to get into extrusion, but he sourced his dies locally, which he attributes to "unconscious incompetence." "I didn't know what I didn't know and it turned out okay," he says, "but when the market started asking for an insulated product, it became obvious that the sophistication of our technology required a real quantum leap in terms of extrusion and maintenance of tolerances. These technologies were not well understood in the United States and as a result, our dies were pretty primitive."

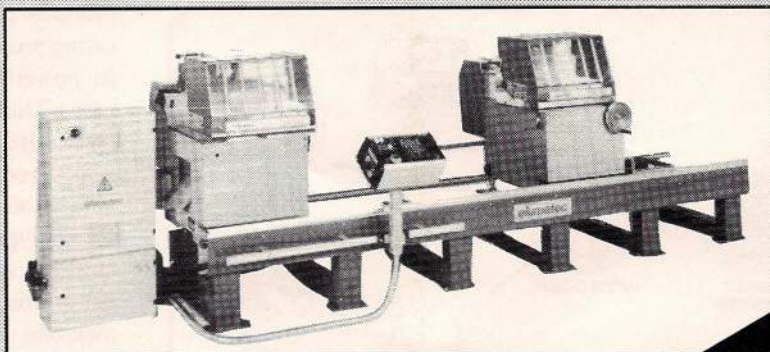
Concurrently, Mr. Mancuso and his Fiberlux group decided to learn what it was the Europeans were doing right. "If working with Goodrich taught us anything, it was that we needed control of the extrusion," Mr. Mancuso notes. He issued a challenge to the Italian extruder supplier who had been hounding him for years to educate him. They came back and showed him the latest technology in elongated dies with vacuum sizers. He understood and he was sold.

Mr. Mancuso's customers were also pushing him to develop a prime window. "We always stressed to our customers that our storm product was not meant to be a prime window. But there was this builder in Buffalo that wanted to use it as

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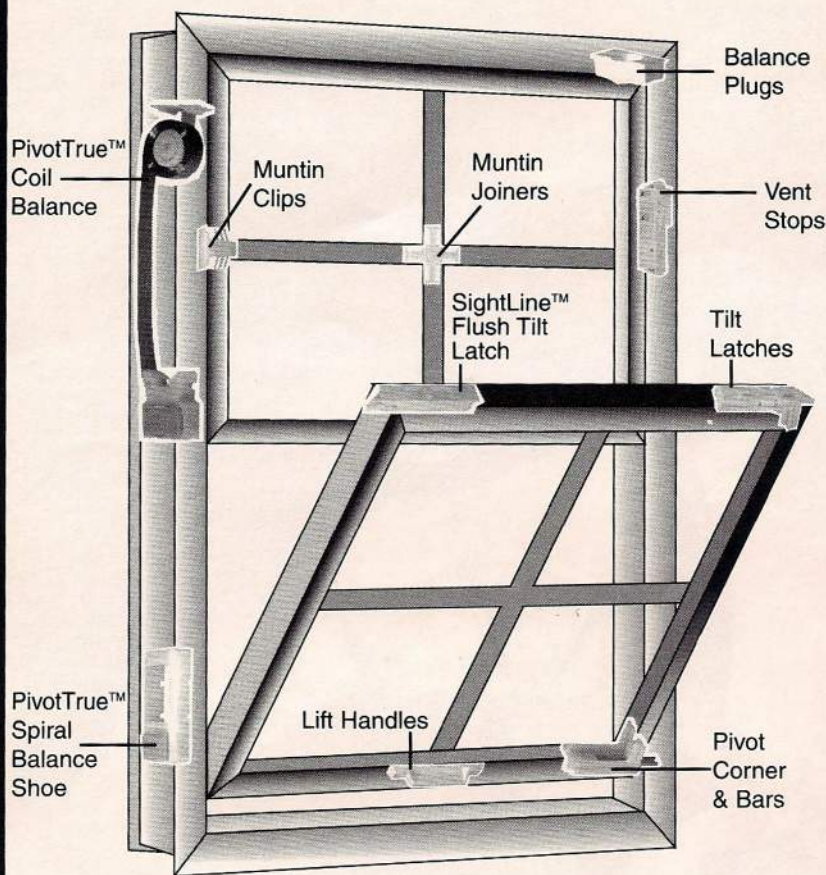
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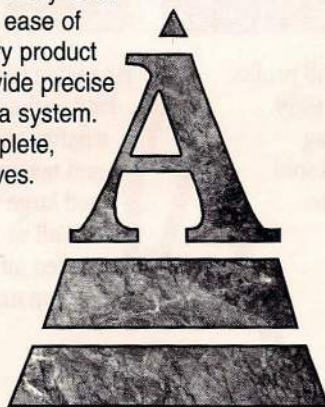
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such and said that he'd even make sure it got the proper approvals. He put up homes using only vinyl storm windows and managed to get local FHA approval." Fiberlux also installed the storms into their fiberglass patio enclosures and Mr. Mancuso would often get comments from homeowners that it was warmer on their porch than next to the windows in their home.

This gave him all the incentive he needed to develop a prime replacement window, one that mimicked the aluminum window technologies of the day. It was screwed together instead of welded, like the aluminum products. Mr. Mancuso notes that was done primarily "to eliminate the cleaning." It also was a single glazed unit, but quickly evolved to an insulating glass unit.

Establishing fabricators

Mr. Mancuso recognized that as a smaller company, he could support the product itself in a local market, but soon he needed a much broader market in which to sell his new found extrusion capacity. "We started setting up fabricators," he explains, "and we developed a program to help them produce and sell products. It was only natural because it was what we didn't have with Goodrich." Many in the industry agree that his program was the model for similar future fabricator programs.

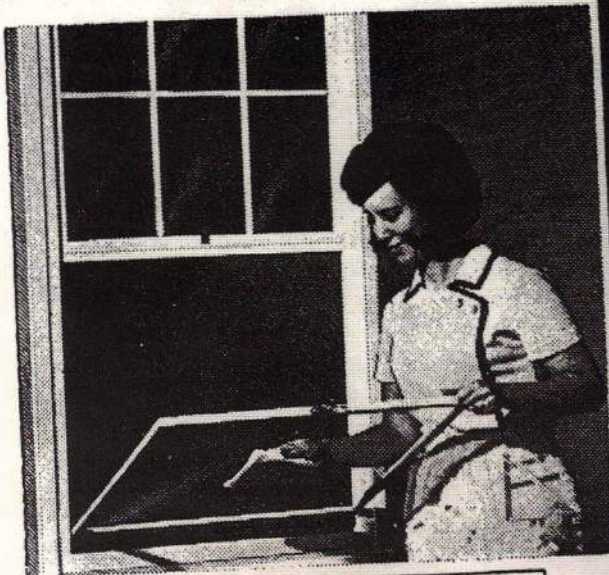
Most of the fabricators were from the aluminum replacement business and Mr. Mancuso worked alongside them to develop their methods and markets. "Vinyl was a totally different animal than aluminum. It was a much slower and costlier process than aluminum, and everything was manual which meant different types of equipment." This led Mr. Mancuso to team up with a local tool and die maker, who applied what he'd learned building fabrication tooling for the aluminum window business, and developed a standard package for Mr. Mancuso's vinyl customers.

Mr. Mancuso also recognized that installers of the windows could be tremendous allies or staunch opponents, and paid them special attention. "It became very important to train and become friendly with our customers'

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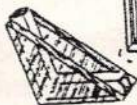
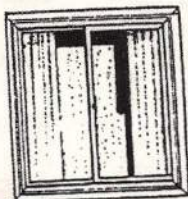
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Although first introduced to the North American market as a frame for storm windows, vinyl soon was adapted for use in the developing replacement window market that began to emerge in the '60s.

installers, as they could have killed the product in the market," he notes. "They were usually paid by the opening, so it was only natural for them to dislike the vinyl window, as it took more care and time to install."

Mr. Weis, by this time, had taken a different approach to the market. He saw aluminum doing well in the remodeling business and decided to go after that market head on. "We realized early on that the window was an accident waiting to happen and that if we were going to be successful on more than a local level we would need good customer service. So we opened up branch warehouses in order to sup-

port the sales." Mr. Weis agreed with Mr. Mancuso in seeing a big threat to the vinyl windows' success in the installer. "While correct installation was an ongoing problem with all window types, vinyl had the most to lose because of its potential to be installed out of square," he says. "Use of a square or level by the installers was often forgotten in the interest of haste and at the sake of quality."

An industry emerges

In establishing fabricators for Fiberlux's vinyl window, Mr. Mancuso was laying the groundwork for an entire

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Once it had extrusion capacity, Fiberlux turned to establishing a network of fabricators to expand sales of its vinyl window line.



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industry. "We were really setting up our own competition," Mr. Mancuso says, referring to his company's fabricator network. "It's a big country and we knew no one company could be out there alone and create credibility for a product. So we set up people in our own backyard. People won't buy when they can't find a product to compare yours against. There's got to be competition."

Vinyl windows were already beginning to pick up a head of steam when the 1973 oil embargo hit, when two interesting things happened. First, people became suddenly aware of why energy efficient products were important. Mr. Mancuso recalls exhibiting at a large exhibition in New Jersey that year and getting a tremendous response. Second, the cost of aluminum skyrocketed, which brought the price of the aluminum replacement window in line with vinyl. At this time, there was a tremendous number of aluminum fabricators in the market, and many began to scram-

ble for new products. "This gave us the opportunity to show these people that there was an alternative," Mr. Mancuso states.

Flood gates open

Through the balance of the 1970s, vinyl's growing acceptance led to a large influx of new faces in the industry. Polytex Co. (now Chelsea Building Products) was the first of several domestic extrusion companies to open shop and target window fabricators in the early '70s. The success of their Maynard design begat a myriad of copycat products. Mr. Slocumb, who had been riding the replacement wave with Mr. Weis's product, was also among this new wave of extruders in the '70s, setting up Acro Extrusion Corp.

Another of these new faces was Nick Cangialosi, who was no stranger to the goings-on in the window industry. An Italian immigrant, he got his start in the business in the mid

1950s sweeping floors at a window company and quickly progressed through the ranks to management. In the early '60s, his storm window company had taken on the Fiberlux vinyl storm product and had moved into the aluminum replacement business later on in the decade. By the early '70s, he had grown his business to include five different companies, each servicing some segment of the window industry.

At this time, he too recognized a future in vinyl and came out with a hybrid replacement product. "The frame was a Polytex design and we had the sash parts custom extruded for us in Italy," Mr. Cangialosi explains. His companies cut their teeth on this product throughout most of the '70s, but he too longed for a better mousetrap. "Those early design all tried to copy the aluminum window, which didn't necessarily work for vinyl. The rigidity just wasn't there, so the same wall configurations wouldn't work."

Like the other pioneers, he also struggled constantly with the availability and quality of material from outside vendors. As a result, he also designed an updated window and began selling extrusions to a mass market of fabricators in the Northeastern U.S. under the name of Vinyl Building Products. By 1980, VBP would be introducing welded window designs. "With my first products, I made the same mistakes as everyone else at the time and made the corners mechanical," Mr. Cangialosi remembers. "But I learned quickly and brought out a welded SH and DH program. From a quality standpoint, welded corners were less likely to leak or fall apart and it gave our fabricators one more fea-

ture to sell against aluminum. Welding is also a much faster method than screwing."

An association formed

With more companies entering the market, as well as his own firm's efforts at establishing new fabricators, Mr. Mancuso saw a need for an industry-wide association to truly give vinyl credibility with consumers and code agencies. So he approached the Society for the Plastics Industry in the late '70s and requested that the vinyl window companies be incorporated into the group. "They lumped us in with the vinyl siding group," he recalls, "and eventually we got shuffled to the custom extruders group, and when we finally had more window members than custom extruders, they dubbed us the Vinyl Window and Door Institute."

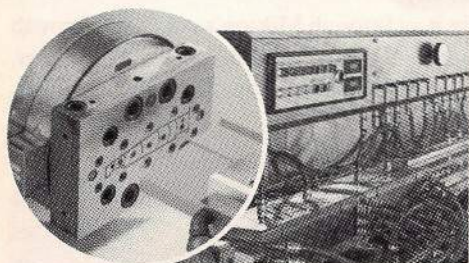
It was a triumph, but hard work laid ahead. The group tackled design and code issues and after a time they got HUD approval. "This was really when vinyl seemed to come into its own," he adds. "Finally the window industry recognized us and the consumers recognized us." In the early 1980s, AAMA (which at that time stood for the Architectural Aluminum Manufacturers Association, and not today's more generic American Architectural Manufacturers Association) also began to take note of vinyl as a credible product. Its efforts also helped vinyl gain greater market acceptance as the '80s progressed.

European window designs

Another catalytic development that began in the late '70s

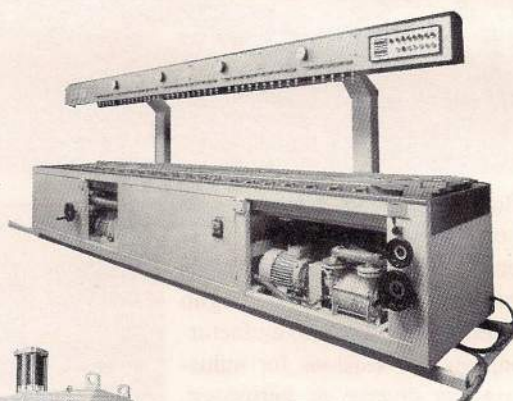
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After modest beginnings in North America, some of the European extruders, such as Veka, developed into large industry suppliers.



and through the '80s was the introduction of European window designs. With vinyl gaining acceptance here, many European extruders, which had been trying to enter the U.S. market for some time, decided the time was right to make the move. "The early European sales techniques were primitive," remembers Mr. Weis. "The Germans thought that if you had quarter-inch walls and a window that would last 5,000 years, people would line up around the block for it. They didn't though and that forced a lot of them to adapt their products. The most successful ones were able to find the right combination of quality design, thinner walls, and low price."

Sigi Valentin, who was among this first group of Europeans agrees. "The windows weren't in line with the market requirements. They were very heavy commercial models far above what the market required." Mr. Valentin, who is now with L.B.

Plastics, had spent all of his professional career in the plastics industry. In 1980, he coupled with one of Europe's leading profile manufacturers, Kommerling, to introduce the Komcraft line of windows to America. "But we just didn't understand the American mentality," he explains. "The European market is technology driven, you could design and introduce a product that was a superior

performer and it would do well because that's what people were looking for. The American market, on the other hand, is market driven, and you have to come in with products that are physically appealing and low-priced."

Geoff Card of Spectus Systems, who had faced similar product incompatibilities when the Germans began to market windows in England in the late '60s, agrees. "The windows were too expensive and had the wrong sightlines. It was the unwillingness of the German to adapt their designs



Welding machines are becoming a common sight in vinyl operation.

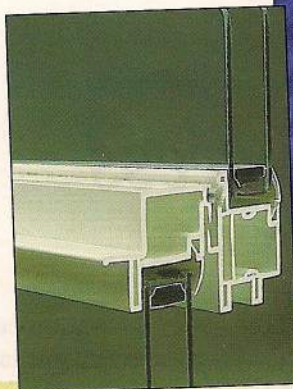
With the influx of European suppliers in the '80s came growth in the use of welded corner construction, a trend covered in early issues of FENESTRATION.

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While much of the early vinyl window activity focused on the replacement market, building code activity had spurred the development of products for new construction applications in the Northwest. The model shown is an early new construction design developed by Mikron Industries, an extruder based in the region.



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that forced us to come up with our own." Mr. Card had been involved in the introduction of vinyl windows to England in the early '70s and was among the the European who began courting the North American market in the '80s.

Other European extruders, like Trocal, Rehau, Veka, and L.B. Plastics, all had similar awakenings upon entering the American market. Unlike Komcraft (which eventually sold out to L.B. Plastics), a number of these companies adapted their products and became forces in the market. While Komcraft did find a limited market, the products would never succeed in the mass marketplace. "We sold to people with European connections and some light commercial work, but it was not enough," Mr. Valentin adds, "and like other European extruders who entered the

market here, we had to go through two or three generations of products before we were in tune with the market. And even after we 'Americanized' them, we were still on the high end."

Despite their difficulties in adjusting to the U.S. market's demands, the Europeans did come at the right time. In 1980, vinyl still had a long way to go in terms of the window market. According to the AAMA Ducker Research, only about 600,000 vinyl windows were sold in the U.S. in 1980. It grew slowly for the next couple of years until 1984, when activity started to pick up, and vinyl achieved 10 percent of the remodeling and replacement market. Even bigger gains came in the following years and by the end of the decade, vinyl sales reached nearly 6 million.

Vinyl in new construction

"One of the biggest reasons for vinyl's huge success was the introduction of the vinyl single hung for new construction," states Mr. Cangialosi. "We brought that product to market in 1983." Prior to that time, the builders were quite reluctant to open their arms to vinyl, he notes. "While the SPI did a good job with standards in the late '70s and early '80s, they were materials people and didn't understand windows," he continues, "AAMA was the group that was accepted by the builders and remodelers as the authority on windows and until they began to recognize vinyl, they (the builders) wouldn't go for it."

Product design was another issue, according to Mr. Cangialosi. "Wood windows were predominant in new construction at that time, so we included a beveled frame design modeled after a wood window." At first the builders

Vinyl's Penetration Increasing in New Construction Market

Growing acceptance of vinyl windows among builders and homeowners, energy issues, and increasing price of wood contributing to growth

By Joe C. Smith III

Many contractors of vinyl windows point to the rapid growth in the new construction market as the primary reason for the growth of the new construction market. But even the price of wood is a factor.

As the price of wood continues to rise, many contractors are turning to vinyl windows. The price of wood is a factor in the new construction market. The price of wood is a factor in the new construction market.

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Vinyl windows enjoyed a certain amount of demand in the new construction market during the '80s, but, as FENESTRATION reported, growth accelerated significantly as the '90s began.

were a bit skeptical. "They wanted to know what made me so smart that they should try this product no one else was making. But we convinced them to try it and find something wrong with it. They couldn't and it was extremely successful after that."

Code developments

While vinyl's increased market penetration in new construction had been fairly gradual, one area of the country

where it got jump-started early was in the Northwest. In 1980, Oregon, Washington, Idaho, and Montana had formed a joint governing body called the Northwest Power Planning Council to provide more public oversight of the regions' utilities, explains Paul Warner, president of Mikron Industries. This council established energy conservation as a new alternative for utilities to adding new power generating capacity to meet expanding energy needs. Its activities have also put the Northwest on the leading edge of development of energy conservation standards, including energy efficiency requirements for windows, he points out.

In a market where single-lite aluminum windows were common, thermal testing and U-value requirements began to appear. Soon, window manufacturers in the region were introducing thermally-broken frames, insulating glass, and interior storm panels. In this environment, Mikron was one of the first extruders to focus on developing vinyl windows for the new construction market. "When these vinyl frames became widely available in the Northwest, thermal-break products simply couldn't compete," states Mr. Warner. "Most manufacturers geared up to work with vinyl instead."

As the '80s progressed, more extruders began developing new construction products, particularly single-hung window models that could appeal to the price-conscious builder. As Larry Irwin, president of Veka, noted in a 1989 edition of FENESTRATION, "There will be continued growth in the replacement and remodeling sector, but the area with the most significant potential is in new construction products. That business will grow at a much faster rate."

Looking back at the '90s, that certainly proved to be true. In 1990, about 500,000 vinyl were sold in the new construction market, according to AAMA. By 1996, that figure was expected to have increased to over 6 million, with projections for it to top 10 million by the year 2000.

Many developments reported on in FENESTRATION throughout this decade contributed to vinyl's gains in new construction. The National Fenestration Rating Council emerged, accelerating the development of energy performance requirements for windows and the shift of many alu-

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The growth in the vinyl window business in the past 20 years can be seen in the expanding extrusion capacities of such companies as Mikron. It not only has increased the capacity and capabilities of its original plant, shown above circa 1980, but it added a second, high capacity facility in Kentucky to serve the still-growing needs of the market.



minum window manufacturers to vinyl, particularly in the West. The cost of aluminum rose as well, providing an extra incentive for turning more production to vinyl. Vinyl's own gains of market acceptance in the replacement market had also laid the groundwork for quicker acceptance in the new construction market in regions where codes had yet to become a factor.

Another major development that contributed to vinyl's growth came in 1990, when the spotted owl controversy emerged in the Northwest and environmentalists succeeded in limiting the amount of federal forest land that could be harvested. In 1991, FENESTRATION reported on a National Wood Window and Door Association meeting where a timber industry representative advised wood product manufacturers to consider alternative sources of raw materials for their windows and doors as the grades of wood they traditionally used would not be available at the same volumes and costs as they had in the past.

Led by Weather Shield Mfg., the list of wood window and door manufacturers that have added vinyl product lines has grown steadily in the past six years.

Today, the American vinyl window comes in many shapes and sizes. The early American designs, the initial European imports, and the later generations of products which might be dubbed truly American have been melded together to form something unique for the American window consumer. And the vinyl window will continue to evolve. Many in the industry believe the introduction and continuing mainstream use of composite vinyl materials may again change the face of our industry.

And while the earliest pioneers are all but gone from the industry (Paul Mancuso retired from Fiberlux 10 years ago and Leon Slocumb and David Weis have recently sold their businesses and verge on retirement), their legacy of innovation and perseverance will live on in some shape or form, for many years to come. E

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