# The Atrium House:

Studio and Residence of Bede Van Dyke:

The **Atrium House** was originally known as the "Dogrun House" until the dog run was enclosed forming a green house, atrium, porch area between the halves. In the following article the Atrium House will be referred to as the **Dogrun** House.

**The Land:**

The Valley is made up of the West parcel of 4 acres, the **Dogrun** parcel of 4 acres, and the East parcel of 3 1/2 acres. The adopted concept is to maintain Laketown Township's feeling of large, undeveloped acreage. The three parcels have specific building location zones defined by the natural tree areas. Each home, when built, will have limited view of other homes for at least three seasons of the year.

**The House:**

The house was designed to be simple and flexible. Presently used by the artist/architect as his own home and studio, the enclosed space can embrace up to 5 bedrooms and 3 ½ baths supported by various types of living spaces. The square footage can vary from 2000 square feet to 3000 square feet depending on which and how the enclosed parts are used.

The house has a barn like scale and detail both inside and out. With its galvanized metal siding, two story central sunroom, greenhouse, exposed ceiling joists, and exposed roof trusses, the feeling, inside and out, is in the true character of rural Laketown Township.

The simple stainless steel kitchen with adjoining large dining area is perfect for the events where every guest wants to be in the kitchen, but can't be.

The architect's ***green building*** philosophy points the ***Dogrun House*** toward a unique and ***sustainable design***. Healthy materials and products, energy efficiency, choices provided by zoned living including water heating, ventilation, heating, cooling, and lighting combined with the flexible, and zoned physical layout, make this house fun to live in.

With green design as a guiding principle, this house is constructed of structural insulated panels (SIPS) for walls and roof (not wood studs). You won't need lights with all its natural light poring into the interior, an exponent of the unique use and abundance of glass. The entire design is zoned with separate heating, cooling, hot water, fans, and various choices of natural ventilation for both the east and west wings.

Surrounded by meadows and groves of trees, you'll have the feeling of being away from it all except when you are not there!

The "dog run" or "dog trot" is an architectural term for early southern home designs that split the kitchen off from the main living quarters and connected them by one roof structure. This was

done in an attempt to reduce heat in the summer and provide protection from fire. Sam Houston lived in a house of that design.

The **Dogrun** House was designed to embrace adaptability. It has a very flexible plan. It can be outfitted as the ***Living/Studio Version.*** This layout provides the East Wing, containing the garage, laundry, toilet, living, dining, main bedroom, and main bath and the West Wing containing office and studio space (tax deductible). The open **Dogrun** deck between has been enclosed as a tempered studio. (3000 SF minimum including west basement)

Another layout variation could be the ***In Law Version.*** This layout provides separate quarters for a couple in the East Wing and separate quarters for another family member such as a grandmother, mom, or dad, in the West Wing with the enclosed **Dogrun** deck/studio between. (3000 SF minimum including west basement)

Lastly, but not limited to, might be the ***Family Version.*** This layout can provide one connected house with up to five bedrooms, 3 ½ baths, and several large gathering spaces. The West Wing could have one or two bedrooms up and one or two bedrooms down located in the look out basement. The enclosed **Dogrun** deck/studio/great room lies between. (3000 SF minimum including west basement) The modifications have been planned for in the unique design. (3000 SF minimum including all portions under roof).

Filtered by the trees, the house with its barn like character and rural, farming location fits the tradition of early Laketown Township architecture. This style is indigenous to the area and far from the vinyl designs of sprawling suburbia sometimes found much to close to the **Dogrun.**

# The Fourth Little Pig:

Studio and Residence of Bede Van Dyke:

Well, we've all heard the story of the three little pigs and each of their successes or failures as architects/builders. I am no exception. My choice of materials was not straw, not sticks, nor masonry, but structural insulated panels (SIPs).

The story starts with the remodeling of my North Shore Drive Studio (***Fine Home Building Magazine***, *March 2001*). Three issues were apparent in the North Shore Studio project. Zoning was very awkward. Simply put, the separation of my office/studio and living area just didn't exist. Secondly, the incredible ease of construction and energy efficiency of using SIPs, although limited to the roof panels, provided an energy efficiency that more than offset the energy loss through the large amount of glazing. Lastly was the issue of scale. The interior and exterior scale of the North Shore Drive Studio was comfortable. The open trusses, spanning 24 feet, felt right from the inside and the roof wasn't too big from the outside.

Designs developed since then incorporated greenhouse-like spaces across the entire south elevation and had another layer of glazing between the greenhouse portion and the living quarters. This made for a large roof span and was very costly. In the new design, the greenhouse is absorbed into or between the house parts, achieving a narrower footprint as well as supporting the concept of separation (living quarters/office). This design also incorporated the ability to be transformed into a more traditional home.

Through evolution, I designed a house that had the true scale of a barn. To some it looked like a giant box car with the doors rolled open. It would accommodate my simple living requirements as well as provide separate office and studio space. Simultaneously, the solution could also be converted into a family residence containing at least three and not more than five bedrooms with a minimum of additional construction.

The design became known as the 'Dogrun' House'. The 'dogrun' or 'dog trot' is an architectural term for early southern home designs that split the kitchen off from the main living quarters connected by one roof structure. This separation was done in an attempt to reduce heat in the summer from the wood burning cook stoves as well as to provide protection from the common fire resulting from their sparks. Sam Houston, first president of the Republic of Texas, lived in a dogrun house in Huntsville, Texas, just north of Houston, in early 1800's.

The elongated North Shore Studio, Dogrun, Box Car House was ready to build. The Dogrun-future Greenhouse/Gallery would be left open for the interim. The honest philosophy of exposing structural elements and mechanical systems, as well as the use of more rural/indigenous materials such as common galvanized corrugated steel for exterior siding were applied. All exterior, above grade, walls and roof are comprised of structural insulated panels ranging in size from 4 feet x 8 feet to 24 feet x 8 feet. The size limits of panels were determined by the manufacturer's press size and the largest available size OSB panel.

The North Shore Studio didn't sell until late September 2000. I took the chance that the closing would go smoothly and ordered excavation, placement of footings, and foundation walls,

windows, and SIPs in advance. This aligned construction during what was to become one of the worst winters for the month of December that Michigan has had in some time. There was some 56" of snow before Christmas.

By the time we were ready for the first structural insulated panels to be tilted into place, snow was happening and it got worse. We had to protect the panels during the night and inclement weather. We had to un-wrap them after each snow after snow.

The plan allowed the lower wall panels to tilted by human power, but after framing the second floor deck, which was made up of special clear Douglas fir plywood and # 1 structural select Douglas fir 2 x 10 framing, all that had to be protected from weather too. We began to call ourselves "tarpologists", experts in placing and removing big plastic tarps. Ten huge blue tarps pulled on at night and pulled off each morning until the roof was completed in February.

With the help of a "Sky Trak" we completed the wall tilts to the second floor. In the mean time, the roof trusses were framed in three sections along the south side of the structure on three level sets of rails simulating the top of the SIP wall. The SIP roof units were secured to each section of trusses, braced, and fitted with rolled roofing ("duck's back").

A large crane arrived on two occasions, on time (not that we were always ready), and lifted each section into place using four hinged lifting hinge-brackets fastened to the top layer of OSB on the SIP roof units. The heaviest unit weighed near to 5000 pounds.

On a whole each operation went off without a hitch except that during each lift the wind would get stronger and stronger similar to it snowing harder and harder. During the final west lift, It began to snow and blow. The crane operators were incredible, as were the carpenter that climbed atop the roof structure to free the hinged lifting plates.

During this whole ordeal, I was temporarily living in a 30 foot Avion, aluminum skinned, trailer (see photo). Inside were two 100 pound black labs, one black cat, my office computer and printer, and miscellaneous construction garb such as an insulated cooler filled with construction adhesive and blue EPS caulk, nail guns, and compressors, not to mention the other necessities of living.

At night deer and turkey would reveal their presents and curiosity by leaving footprints all around the building site. I found turkey footprints in the sand inside the foundation walls in October before the basement slab was complete. They substituted as alarm clocks on some mornings by gobbling the dogs into a frenzy of barking.

So what the forth little pig learned could be boiled down to four things. First, I would most certainly use SIPs again. Second, I would never live in a 30-foot trailer again. Third, I would never attempt to do any construction in the dead of winter in Michigan again. And Forth, I would never again borrow money to build a house without including my sweat equity in the construction estimates.

**The Hinge Brackets:**

The steel hinge brackets were conceived of by **Jarzembowski Builders** and fabricated by the **W.H.Porter Inc**. (makers of SIPS). Damion Jarzembowski and I have worked on many projects. Out of his great kindness mixed with pity he allowed me to borrow all four hinges.

**Jarzembowski Builder**s had several projects utilizing SIP roof panels (one designed by me). They felt that it would save time/money to fabricate the trusses and roof panels on the ground and lift them into place with their ***Skytrak*** using a large extension boom. It worked for them.

The hinge-brackets had two leaves and a pin as a regular hinge and a loop welded to the butt. The loop allowed for attachment of the yoke from the crane or in their case the ***Skytrak.*** The leaves were approximately 20 inches long and 8" wide fabricated of 3/8" steel. Each leaf had holes drilled to accommodate well over 100 # 10 screws.

We calculated the approximate weight of each unit. The East and West units were approximately 3500 pounds each and the center unit was approximately 4500 pounds.

**The Structural Insulated Wall Panels:**

The panels were stored level and flat in most cases and choked off the ground. In that they were not erected as quickly as originally planned some panels warped from unequal surface tension caused by moisture coming up from the earth and forming on the underside of the lower panels under tarps. These panels were straightened using 2 x 6 stiff backs or abandoned.

Ideally the larger the wall panel the more savings in labor, but some of our panels were just too big to manage by hand. The largest main house wall panels were 8'-0" high by 20'-0" long. The garage panels were 8'-0" high by 24'-0" long. We cut these in half to save our backs in that we lifted them into place by hand.

Each gable was comprised of panels. We erected the East end gable panels and fastened them into place before lifting the East roof unit into place. As we lifted the roof unit the gables, even though they were the proper size caused us to lift the roof unit 10 feet higher into the winter wind to drop in into place. This endangered the crane, the people, and the gable end panels. We abandoned the gable panels for the West side, first, for the above reason and second, because they were the most susceptible to warping. We framed, sheathed, and insulated the gables on the West side conventionally.

So in hide sight don't order your panels too big for the method used to erect them and if not placed immediately, store them vertically to prevent warping due to moisture build-up on any flat surface.

**The Structural Insulated Roof Panels:**

The roof panels were 4'-0" wide by 8'-0" long. Each unit was skinned with 7/16" OSB on the exterior and ½" select clear rough-sawn fir on the inside. All these were scheduled last for

erection. We had to store them on site until all the wall erection was complete. Any water allowed on the panels can potentially cause stain lines or big black spots. This surface was to be exposed to the interior as the final finish. We did a great job of protecting these panels under tarps, while on trusses framed on the ground protected by the "ducks back" roofing and blue tarps, and while in place waiting for roofing, protected by the "ducks back" and on-again, off-again, flying, flapping, ripping and tearing, blue tarps.

**The Galvanized Corrugated Steel Siding:**

The Galvanized corrugated 29 gauge steel siding was ordered from a local farmer's cooperative lumberyard. This material is commonly used for agricultural buildings. It comes in standard lengths, which afford the best pricing ( approximately $ 0.52 per SF not including accessories) and the minimum of cutting. The design used standard lengths of 20'-0" (uncut in most cases for the entire wall) and 24'-0" (some of which were job cut to accommodate windows, doors, and gable ends). Standard galvanized trim and foam end seals were used.

The galvanized sheets were pre-drilled on site in layers of at least three to prevent deformation. Galvanized, self-tapping screws with neoprene washers were used to fasten the siding to the wall panels. The process and end result were near to seamless. All joints and seams were caulked where necessary, such as around all doors and windows.

The material produces quite a glare when the sun shines on it at just the right angle, mostly early morning or late afternoon.

**The "Duck's Back" Material:**

Manufactured by Drake Roofing, Halls, Tennessee, 901-836-2400, "duck's back" was recommended to me by Jarzembowski Builders, Holland, Michigan. This material although a little pricey, doesn't blow off the roof after stapled down like 15# felt does. It is manufactured from recycled tires.

The "duck's back" remained in place from the time the roof panels were placed on the truss frames at ground level and on the garage roof with out a tear for almost four to five weeks in some places. As extra insurance for the main roof, we covered the truss frames, panels, and "duck's back" with blue tarps while waiting for the roofers to arrive and or to complete their work. Ducks back is a little more slippery than felt, especially with powdery snow what little might stick to it.

**Energy Usage:**

To date the highest monthly gas bill has been $ 85.00 (175 cu. Ft.) that services two 50,000 BTU high efficiency heat units serving approximately 1500 SF each and the range unit for cooking.

The electric consumption related to heating and cooling amounts to that used while running the fan units in the winter and the fans and compressors in the summer if needed.

**The Dogrun/Greenhouse Enclosed:**

The dogrun is now enclosed as a tempered green house, sunroom, living room, gallery. This was done to unify the entire house as one (Family Version).

To achieve this I chose 10 mm extruded, 4 x 8, double wall polycarbonate panels (Verolite, used locally for greenhouse walls and roofs manufactured by Matra-Plast Industries, Ontario, Canada) for the upper 8'-'0" half of both north and south openings of 24'-0" wide by 16'-0" high. This set up a mullion spacing of 4'-0" oc. The lower 8'-0" would be 5/8" insulated tempered glass.

The window structure was fabricated of 2x8 Douglas fir at 8'-0" oc both horizontal and vertical, doubled at the door jamb location with 2x6 intermediates at 4'-0" both horizontal and vertical. This satisfied the wind load requirements and reinforced the existing pattern of 48" x 48" windows used throughout the house.

Four operable 48" x 48" windows at the side-walls and 48" x 96" rolling doors and screens were custom fabricated to provide ventilation and egress to the gallery. The frames for these were fabricated using "responsibly harvested hardwoods" from the rain forests of Brazil, known as Pau Lope, imported by Greenheart-Durawoods, inc., Bayville, N.J. (Fine Homebuilding, Issue on Houses, Spring 1992, # 73).

Cutting and finishing this wood produced an ultra-fine dust so watch out for allergic reactions. It was extremely heavy, but is water/rot resistant and very straight and stable. The door and window frames were sealed using a paraffin-based sealer in combination with Sikens, Cetol, SRD. Application brought out the richness of the wood, homogenized the color, and made each frame as slick as a greased pig.

It is rare when there is no breeze blowing through the dogrun, but to provide as many options for ventilation as possible, the plan is to retrofit two Velux skylights with operable sash allowing for exhaust and circulation by the chimney natural effect. Also planned is a 1000 cfm whole house exhaust fan at the roof. In addition to the Ceiling fans in each module, a whole house fan will be installed to draw outside air through the East and West wings through the green house or by closing the windows to the east and west wings to draw outside air through the green house. This fan could merely exhaust hot air summer or winter.

To supplement the solar gain through the South facing greenhouse, a 40,000 Btu gas fireplace will be installed and ducted to the perimeter walls through the crawl space below the dogrun deck. This space will be considered a tempered space and not intended to be heated or cooled during the extremes of the year both summer and winter.

The enclosure of the dogrun has indeed unified the house as well as provided the stimulus for me to paint and play music again. It has always been the center of attention of this house. It is my opinion that magical environments boost the human spirit, sparking people's creativity!