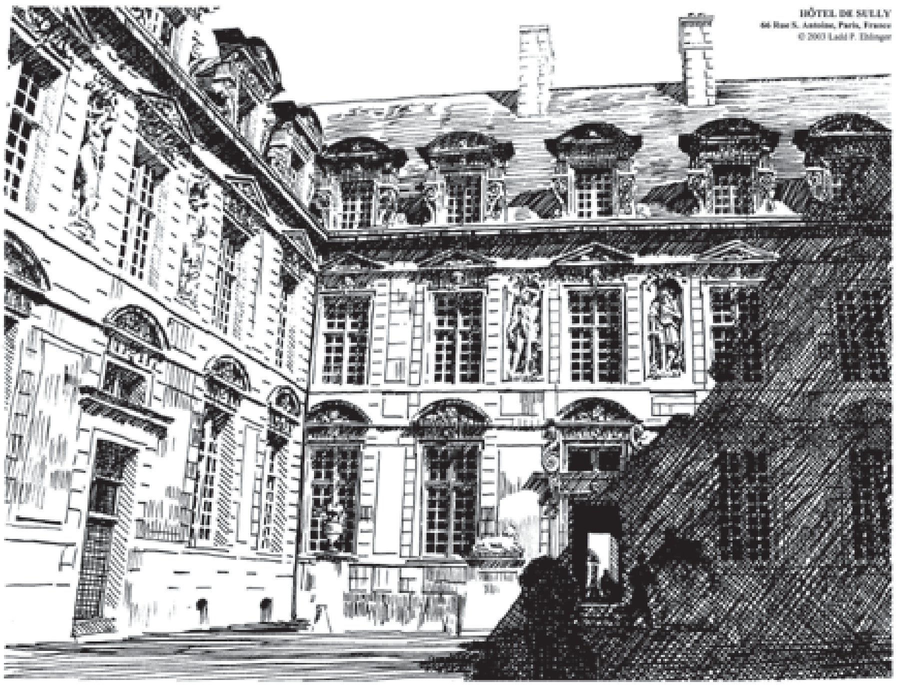
ARCHITECTURE

EHLINGER & ASSOCIATES — SECOND QUARTER 2003



HÔTEL DE SULLY

Paris, France

This issue's limited edition print is of the Hôtel de Sully at 66 Rue St. Antoine in Paris. This outstanding French Renaissance mansion was built in 1625 by Jean du Cerceau and bought by Sully, the aging minister of Henry IV, ten years later.

The view in the sketch is of the outstanding inner courtyard of the building, a Louis XIII architectural composition with ordered decoration, carved pediments and incisive dormer windows. Allegorical figures representing the Seasons and the Elements grace the wall apsidal niches.

A History of Architecture by Sir Banister Fletcher describes the courtyard as "dignified in scale and proportion, but over-elaborated with the coarse ornament of the day". To the writer, the ornament actually seems delicate. The jointing of the panelling in particular is very subtle and intricate. One enters the courtyard through the restored main gate between massive pavilions. These seem powerful, but not coarse.

The main building has been restored and retains its original painted ceilings (restored also). The Duchess of Sully's rooms have especially noteworthy painted decoration. At the far end of the garden, the Orangery opens onto Place des Vosges.

Part of the building is occupied by the Caisse Nationale des Monuments Historiques et des Sites (Ancient Monuments and Historic Buildings Commission). Temporary exhibitions are held in the main building and garden wing.

WELCOME ABOARD!

JASON CRAM

Jason Cram joins the Ehlinger & Associates team as an intern architect. He graduated with a Bachelor of Architecture from Louisiana Tech in 2002 and worked in Monroe, Louisiana until relocating to the New Orleans area.

Jason is originally from Portland, Maine (he'sa Maineiac) and joined the Air Force shortly after graduating high school. His military experience allowed him to travel extensively throughout the U.S. before settling in Shreveport, Louisiana due to its proximity to Barksdale Air Force Base.

In 1995 he left active duty to pursue an education while continuing to serve in the Air Force Reserve. In 2000, Jason married Heidi Stone, who was also a student, attending ULM in Monroe, Louisiana. After achieving licensure in Architecture, Jason hopes to continue his education in Landscape Architecture and in the future run a Design-Build style firm.

LAURAERDELY

Laura Erdely has also joined E&A as a part-time employee for this summer. She grew up in Luling, Louisiana (approximately 20 miles outside of New Orleans). She is a fifth year architecture student at Louisiana Tech University in Ruston, Louisiana. After she graduates in the spring, Laura hopes to reside in a hot climate and attend graduate school in architecture and/or industrial design.

Laura is a dog lover and spends her free time playing Frisbee or running. She is also an avid reader and movie buff.

WIND FORCES

Now that we are well into this year's hurricane season, a discussion of wind and the forces that it exerts on buildings is very timely. It should be noted however that the CABO (Council of American Building Officials) Building Code, the building code adopted by most jurisdictions for one and two family dwellings, does not require wind resistivity until wind speeds reach 100 MPH and the structure is exposed in open terrain or next to large bodies of water. And then, only two story structures are required to have the walls designed to resist the wind pressures until the 110 MPH wind speed is reached. Only then are the walls on one story structures required to be wind resistive.

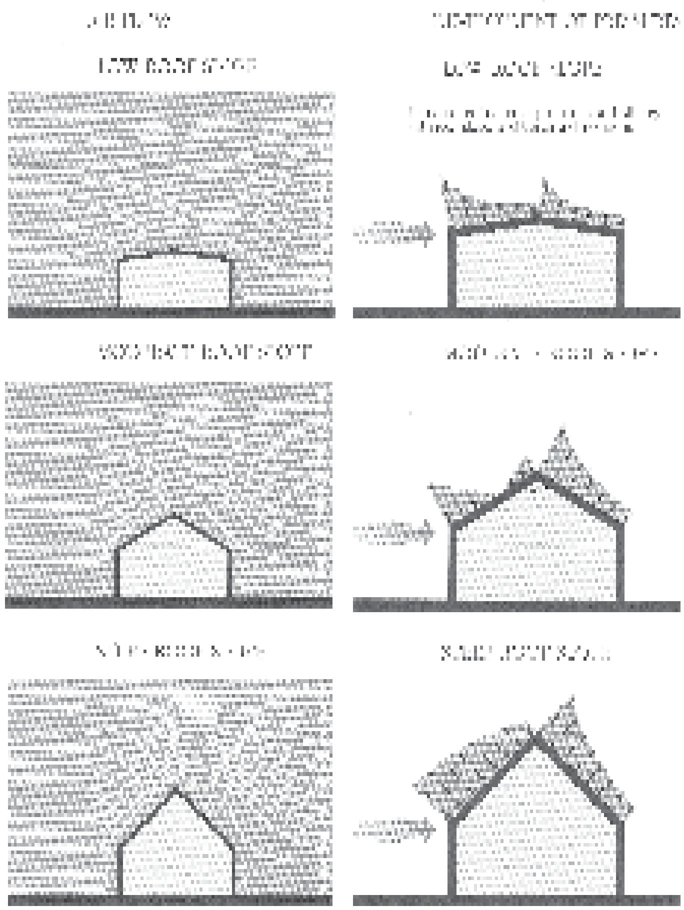
New Orleans is on the 100 MPH wind contour of the CABO wind speed contour map and Huntsville is on the 70 MPH contour. In reality, wind speeds easily reach 110 MPH in New Orleans and in Huntsville (with a much lower probability) during both hurricanes and tornadoes. Hurricanes in New Orleans have reached 135 MPH three times in the writer's lifetime, as have several tornadoes. The tornadoes in Huntsville are usually of the wall type, having a 1/4 mile to 1/2 mile diameter, and wind speeds of 100 to 140 MPH (although some tornadoes far exceed that speed). These wind speeds are certainly defensible structurally, although low wind speed tornadoes in particular are looked upon as "an act of God" and indefensible.

The implication in the CABO code is that wind forces are nothing to worry about. One only has to design for high winds under extraordinary circumstances. On the other hand, if one is designing even a one story commercial or institutional building, wind resistivity has to be consciously designed into the structure. Somehow, because the occupancy is different, one has to pay more attention to the forces of nature. Actually, what is really going on is a result of the influence of the homebuilders. The homebuilders do not want to spend the money to design wind resistivity, nor to construct wind resistivity.

So what can the average homeowner do? Not much if you are buying something already built, other than inquire as to what was done to make the structure wind resistive, and then perhaps retrofitting. If you are having the home built however, there are numerous things that one can do.

The first place to start is to assure that you have an architect or structural engineer calculate the wind loads that you can expect to encounter. Then, design the structure to resist them, and finally, build the building to resist the expected loading.

Wind pressures are highest at the corners or edges of the structure. The pressures are positive on the windward side and negative on the leeward face and the sides as the wind traverses around the structure. The shape of the roof also has an effect on the pressure. The flatter the roof as a general rule, the more negative the pressure is. A totally flat roof has negative pressure or uplift on it. As the slope of the roof increases, the pressure stays negative until the slope reaches between 4 to 12 and 5 to 12, at which point it becomes positive in pressure on the windward side, while remaining negative on the leeward side.



What all this means is that the designer has to make the corners stronger than the field of the walls, and likewise for the juncture of the walls and the roof, particularly at the outside corners. Roof overhangs are a particular problem because the top side has uplift while the underside has a positive pressure. The overhangs are thus doubly loaded. This is why the roof edges tend to peel off during especially high winds — the forces here are much greater than elsewhere on the roof.

The methodology for calculation of the wind pressures is contained in the ASCE-7 (American Society of Civil Engineers) publication. This methodology is based upon stringent testing of structures and measurement of the results. There are several software companies that have written software to make it a less vexing task than to perform the calcs by hand.

Another phenomenon that presents itself with a large impact is that of broken windows during high winds. The result is that the walls containing them are then doubly loaded with both positive pressure on the windward face and negative pressure on the leeward face. This also leads to the interior wall being loaded the same way. This is why the Dade County, FL and the latest building codes' standards for windows requires that the designer use impact resistant glass or shutters so that all openings remain in place with integrity. The impact resistant standard requires that the glass remain in the frame even though it has been broken by a flying missile of some sort. This is accomplished by the mechanical or adhesive attachment of a tail or extension of the plastic laminate in the center of the glass to the frame. The glass may break, but it is kept in the frame sufficiently to resist the wind.

Once these pressures are known, all of the studs, joists and rafters can be sized to resist these pressures. The decking and sheathing are also sized to resist these pressures. Finally, the connections are sized to resist the calculated pressures. "Connections" includes the fasteners of the decking and sheathing to the studs, joists and rafters. It also includes components like hurricane clips and joist hangers to attach the joists and rafters to the top plates of the stud walls and clips to attach the stud walls to the foundation.