



## Section 3:

### CATEGORIES OF MITIGATION OPTIONS: DOORS

## HISTORICAL SIGNIFICANCE

Consider a door's place both as a component of the facade and as a contributor to the interior space. Original or older doors can add to the special character of a historic residence or commercial building. As an example, board-and-batten doors often contribute to the character of Tudor, Spanish Colonial and Spanish Eclectic styles found in Florida. Rectangular transoms and side lights are usually integral features to the Greek Revival style, just as elliptical fanlights and broken pediments are associated with the Colonial Revival style. Removal of or obscuring such features would detract from the overall historic character of the building.

## TREATMENT OF HISTORIC DOORS

Historic doors should be retained and protected, not replaced. This includes both entry doors and garage doors as they are integral elements to the design of a historic building. Historic doors that are sound and repairable should be properly maintained. Historic glazing and hardware should be preserved. The original frame should be retained along with original associated features such as the transom, sidelights, portico, and pediments. Assure that the frames and doors have regular painting, and that caulking and weather stripping is applied as necessary. When repairing or altering a historic door, avoid removing historic materials that are in good condition and instead replace severely deteriorated components and reverse earlier, inappropriate repairs. Original or similar finish should be maintained. To the extent possible, required alterations should be reversible.

## PROTECTION

Doors and windows are the weakest places on a building during a hurricane and if these openings fail, the wind can rip off the roof and cause walls to collapse. Even if the structure remains intact, wind and water can scour the interior and wreck the contents. Unprotected standard doors can be penetrated easily by wind-borne debris in a hurricane. Covering all French doors and sliding glass doors is the most effective way to secure the building envelope and ensure building integrity during high wind events. If the door has glass inserts, measures should be taken to protect the glass (see section on window protection). There are four things to consider for exterior entry doors in reducing the likelihood of damage or water intrusion during a hurricane. They are:

- The strength of the door including its ability to resist windborne debris impacts
- The anchorage of the door to the door frame in its closed and locked position including its ability to remain closed
- The anchorage of the door frame to the wall structure
- Reducing the potential for water intrusion

## MITIGATION TREATMENTS

**WHEN WORKING WITH HISTORIC DOORS, THE FOLLOWING IS RECOMMENDED:**

### Flexible Wind Abatement Systems

There are several new plastic mesh curtain products (flexible wind abatement systems) that may have application in protecting large open areas like screened porches, elaborate entry compositions including doors, sidelights and transoms, or the entire sides of buildings. Typically these products are attached to a series of hooks or loops in a metal track anchored above the opening to be protected. The bottom of the curtain is commonly anchored to the ground a distance away from the base of the wall and stretched tight. This type system is designed to stretch a pre-calculated amount to allow for the deceleration and deflection of impacting missiles. One extreme example is a curtain that extends over an entire structure, anchored to the ground on opposite sides of the structure, providing protection against flying debris while anchoring down the entire building. These whole-structure systems appear acceptable for use on historic buildings with simple roof forms and without features such as dormers and chimneys.

### Weather Stripping

When subjected to wind-driven rain, doors are going to leak. The key is to minimize or manage the water intrusion. Keeping water from being driven against and building up on doors is one way to try and minimize the water intrusion during a hurricane. If the historic door is sound but the weather stripping is damaged or has lost its flexibility, then consider replacing the weather stripping.

### Shutters

Some doors historically had shutters associated with them. For such doors, restoring the shutters to functional condition and upgrading them can protect against the impacts of windborne debris. However, shutters won't keep the doors from bursting open from wind pressure if they are weak or poorly anchored to the walls of the house. Choose shutters with a code approved pressure and impact rating.

### Storm Panels

If shutters were not installed on the building historically, a fully demountable storm panel system is recommended. Storm panels are one of the most cost-effective solutions for protection. However, they may not be the best for use on all historic resources as their installation may damage historic fabric.

Storm panels can be constructed of aluminum, steel, or clear (Lexan®) panels that are designed for temporary installation. Upon initial installation of a storm panel unit, channels or tracks are bolted into the building's exterior. Often the head and sill channels for these panels are installed and left in place during the hurricane season and removed at the end of November each year. To reduce the visual impact of such installations, it is recommended that the head and sill channels be painted the same color as the finish material to which they are mounted. These pre-mounted channels then

facilitate easy installation of storm panels upon the approach of a storm. Direct wall mounting of panels is also an available option. Typically, threaded inserts are installed at the perimeter of the opening to anchor head and sill channels (or, in the case of direct-mounting, the panels) to the wall structure. Such panels must be stored when not in use. These fully demountable storm panels are generally considered a compatible treatment for the protection of historic resources. However, they require significantly more preparation effort than a flexible wind abatement system and consideration must be given to the provisions for storage and weight of the panels.

### Storm Doors

A storm door would also improve the performance of the historic door. Select one that is Miami-Dade or Florida Building Code approved for impact resistance. The storm door should be designed and installed to minimize the visual impact on the building's appearance, ideally resembling a traditional screen door with either impact glass or woven wire mesh panels. The storm door may also be painted to match the colors of the historic door and its trim, or painted the same color as the historic door frame. Avoid the use of storm doors or metal grille security doors that obscure or detract from the architectural character of the original door.

### Plywood and Polycarbonate Panels

One of the easiest and least costly ways to provide protection, plywood panels must be prepared in advance so they can be easily installed during a hurricane threat. Measure each door and add eight inches to both the height and the width to provide a four-inch overlap on each side of the door. Sheets of plywood are generally 4 x 8 feet. Consider the size and number of openings that need to be covered in order to determine how many sheets to buy. Installation requires bolts, wood or masonry anchors, large washers, and minimum 5/8-inch exterior grade plywood. Polycarbonate sheets provide another type of do-it-yourself panel that is much more resistant to debris impacts than plywood and is about as easy to cut and drill. Installation of such panels does result in some damage to the building fabric which will require repair after the panels are removed. Polycarbonate sheets are also heavier and more costly than plywood.

### WHEN WORKING WITH **HISTORIC DOORS**, THE FOLLOWING IS **NOT RECOMMENDED**:

Removing historic doors that are in good condition and enclosing or altering the size of a historic door opening. Use of incompatible and obtrusive storm doors or metal grille security doors is also not recommended.

### Reglazing with Impact Resistant Glass & Window Film

Reglazing a historic door with impact resistant glass is generally discouraged due to the thickness. (9/16" impact glass vs. 3/16" single strength historic glass). While it may be possible to retrofit some types of historic doors with this specialty glass, most glazed doors are not able to accom-

modate impact resistant glass. This is because the historic glazing stop and rabbet are not deep enough to keep the glass in the openings. A retrofit of this nature cannot be accomplished without permanent modification of the historic door. Generally, such modification is inconsistent with recommended preservation practices. Impact glass will also substantially increase the weight of the door.

### MITIGATION TREATMENTS: WHEN WORKING WITH **HISTORIC DOORS**, THE FOLLOWING **IS** RECOMMENDED:



Courtesy of the University of West Florida Archaeology Institute



Courtesy of Bonnet House Museum & Gardens



Courtesy of Laura Lee Corbett Consulting



Courtesy of Laura Lee Corbett Consulting

A) Closed Louvered Door, Lavelle House; B) Closed Shutter Door, Historic Bonnet House; C) Storm Door; D) Storm Door

Window film retrofits are generally discouraged as well. Much like a broken windshield, these film systems do not prevent the glass from breaking. Rather, they hold the glass together but will not keep it in place unless overlapped with film covering the frame and a portion of the glass to form a wind and watertight seal. While such film installations would provide some degree of protection to a building's interior, their effectiveness would be limited by the strength of the door construction.

**WHEN WORKING WITH NON-HISTORIC FEATURES, THE FOLLOWING IS RECOMMENDED:**

**Door Replacement**

In the case where historic doors are deteriorated beyond repair, or have already been replaced with an inappropriate modern door, any new treatments should be compatible with the historic character of the building. When replacement is necessary, the original door location, shape and size should be maintained. Original trim should be retained and reused in the new installation. The new replacement door should match as closely as possible the architectural detailing and material of the original door. If the design of the original door is unknown, look to designs that are compatible with the building's style or architectural character.

Many rated doors are available in wood reinforced with metal. Although metal, fiberglass and vinyl clad doors are generally discouraged, they can be acceptable if the product is architecturally compatible and successfully mimics the appearance of the historic door. The replacement door that is installed should be rated for specific wind pressures of at least 38 psf positive and negative pressure (47 psf negative only if installed within 6 feet of corners). Always purchase a replacement product or system that has been tested and certified as passing one of the large missile impact standards (i.e. 9-lb 2x4 wood member striking end on at a specified impact speed).

**Impact Resistant Glass**

If the historic doors are missing, impact resistant glazed doors are available in a variety of sizes and light configurations that replicate historic designs. Typically made of aluminum to resist rot and pest infestation, such impact resistant doors are also available for some styles in wood reinforced with metal. These are a desirable alternative to storm panels as a replacement for missing or irreparable historic doors.

**WHEN WORKING WITH NON-HISTORIC FEATURES, THE FOLLOWING IS NOT RECOMMENDED:**

Use of replacement doors that are incompatible in appearance with the character of the historic building is inadvisable. Unless verified as matching the historic material or the product successfully mimics the historic design and materials, metal, fiberglass and vinyl doors are not appropriate to most

historic structures. Installation of new doors that require the alteration of the historic door opening or loss of historic trim and associated features such as the transom and sidelights is not recommended. Also avoid the use of incompatible and obtrusive storm doors or metal grille security doors.

**Don't forget...**

**Side Latches or Drop Bolts**

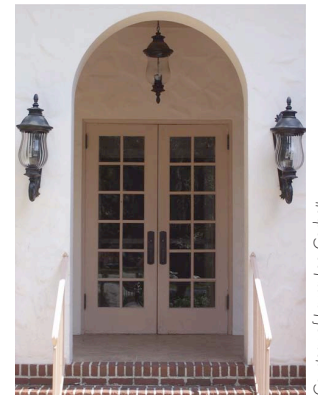
Doors can get pulled out as well as get pushed in. Adding slide latches can add strength to the lock side of the door. Insure the latches are substantial and have long enough screws to hold them in place. Doors should have at least three hinges and a security lock with a dead bolt that is 3/4" to 1" long. However, installation of a stronger lock and supplemental slide latches may not offer much additional protection if the door or door jamb is damaged or inadequately anchored to the wall construction.

**Sliding Glass Doors**

Sliding glass doors are particularly vulnerable and protecting them is more difficult than standard doors due to the size of the opening. They can be protected by some types of manufactured shutters, storm panels and window films. Because of its weight, impact resistant glass may not be a feasible glazing upgrade. One of the least expensive options is to make a wood frame and plywood panel system. Please see the windows section of this manual for a description of these various protection options.

**Double Entry Doors**

Typical double doors are vulnerable to failure from wind pressure. Most double entry doors have an active and an inactive door leaf. The dead bolt is usually located in the active door and it uses the inactive door as the point to which it is secured. It is this point at which the greatest weakness exists. To improve the stability of the fixed door, strong slide bolts should be added to the top and bottom of the doors. Make sure that these bolts have long enough throws to extend a minimum of 1" into the header above door and into the floor construction or threshold. Reinforcing bolt kits are also available. Check with your local home improvement store to find out what type of bolting system will work for your doors.



Courtesy of Laura Lee Corbett

**For additional information...**

**Department of Emergency Management:**

[http://www.floridadisaster.org/mitigation/rcmp/hrg/content/openings/entry\\_doors.asp](http://www.floridadisaster.org/mitigation/rcmp/hrg/content/openings/entry_doors.asp)