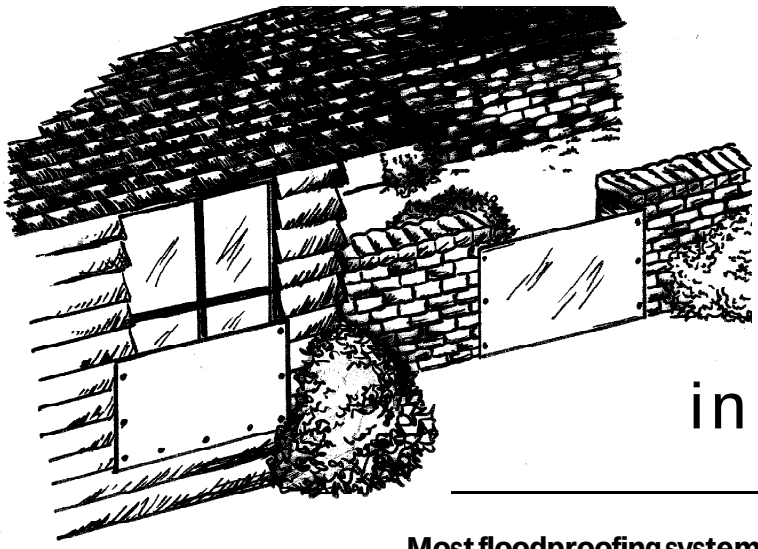
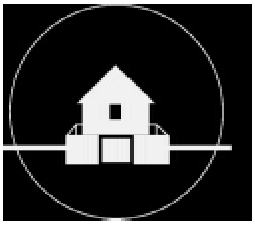


Using Panels AS Closures in Flood Protection

Most floodproofing systems have openings that need to be closed and watertight during a flood. A *panel closure* is any flat, firm sheet material used to block one of these openings. It may be plywood, aluminum, steel, wood planking, plexiglass or any rigid material. It can be permanently attached or designed to be set in place quickly in an emergency.



An opening that needs a closure may be completely clear, such as for a driveway. It may be partially blocked with a door or window that needs additional protection; water may leak between a door or window and its frame or between the frame and the wall.

Things to remember:

- Panel closures must be equal in strength to the strength of the rest of the flood protection system.
- The supporting frame must be strong and securely mounted, because it will have to bear the full force exerted on the panel.
- Never use closures and pumps to create a difference of more than 3 feet between inside and outside water levels, unless an engineer certifies the structure's ability to withstand the unbalanced forces generated.
- Install panels so water pressure tends to push them closed, not open. Use gaskets between hard surfaces to improve the seal.
- Permanently mounted panels are more likely to be used than stored panels that must be found, transported and installed.
- Removable panels that fit into permanently mounted frames provide better protection than panels with no special framing.
- Panels that position themselves automatically can protect the building when you're away or asleep.

Considerations

When floodproofing systems fail, it is often because the closures were improperly designed or installed. In a system designed to hold back 3 feet of water, the panel closure itself must be strong enough to hold back 3 feet of water.

The force from water against a panel is transferred to the frame. In addition to using panels with sufficient strength, be sure the frames and mountings are strong enough to support the panels.

If a panel covers a door or window, the building must be strong enough at that point to resist the force. If a building is structurally inadequate or weakened by decay or termites, you risk damaging it even further by attempting to floodproof the structure itself. Choose a method that holds water away from the building completely.

Floodgates can be hinged so they swing into place. Heavier gates may be installed on tracks so they glide into position. Either type can be designed to close and seal automatically to protect property from flood damage when no one is home.

Another type of panel closure resides underground and floats into place when its storage compartment fills with water.

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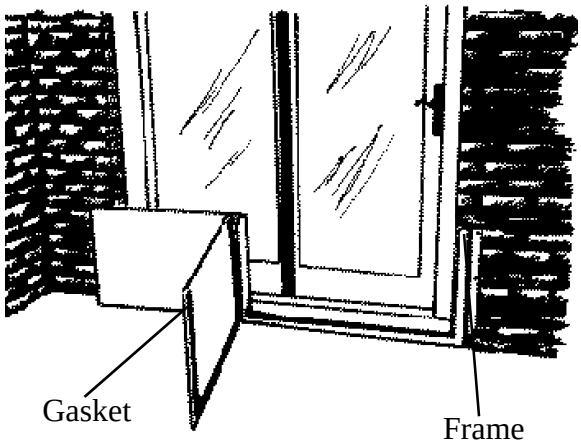
A panel should be...

- **Strong, but not brittle.** It should resist the impact of floating debris.
- **Durable when wet.** It should not dissolve or come unglued in water. If you're using plywood, choose an exterior grade. Don't use particleboard.
- **Weather resistant.** The panel should be painted, galvanized or otherwise sealed to prevent weakening by rot, rust, sunlight or corrosion.
- **Resistant to termites, wildlife and pets,** if permanently installed.

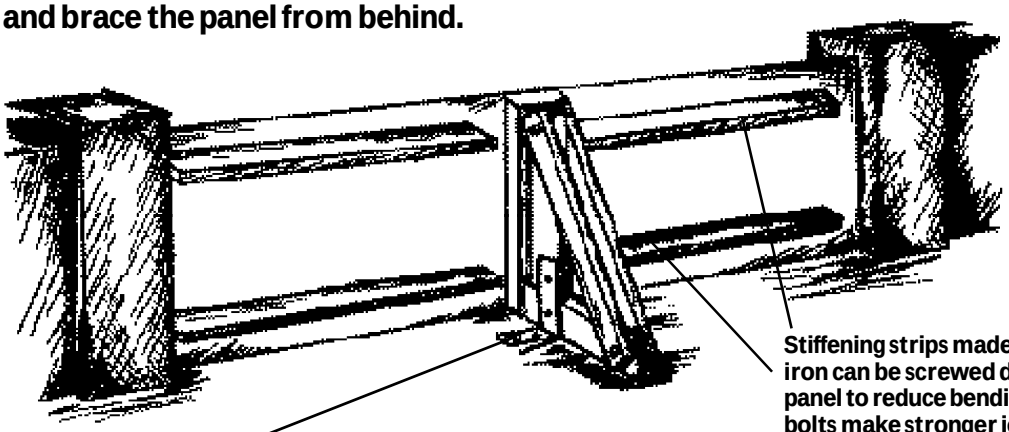
Hinged Panel



Use gasket material in the frame or on the panel. The gasket on a stored panel may last longer than one mounted in the frame and continuously exposed to the weather.

Install a panel so floodwater pushes the panel into its frame more tightly. Install the frame on the water side of the supports so water pressure doesn't try to unseat it. Use latches or screws to hold panels in place. Latches and thumbscrews that don't require tools are preferable.

For large spans, stiffen and brace the panel from behind.



Reinforce the edges of openings where the panels will be set in.

Stiffening strips made of wood or angle iron can be screwed directly to the panel to reduce bending. Screws and bolts make stronger joints than do nails.

Anchor triangular bracing to the driveway by inserting bolts through the brace and into pre-drilled holes in the concrete.

An engineer can estimate the total force on a panel and determine whether a particular material and support structure are strong enough to withstand that force.

Additional flood protection and recovery information is available from the parish office of the Louisiana Cooperative Extension Service or from our web site at ***www.louisianafloods.org.***

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