Flex Walls

High-strength fabric wall that can be deployed (vertically or horizontally, depending on design) rapidly for flood protection around/between buildings and equipment, across doors of any size or across window walls. Can be arranged to fit around any structure using intermediate support posts. Can be easily deployed or stowed by a single person even in high winds. Flex walls can surround entire spaces (buildings) or free-standing equipment, or span openings and seal against existing walls (doors, driveways, etc.).

Relation to Adaptation and Resiliency

Helps achieve protection of structures/facilities in the event of floods or natural disasters at the ground level.

Benefits

Site-specific scalable fit; rapid, non-motorized deployment; compact point of use storage that can easily be deployed by staff in case of emergency.

Limiting Factors (Constraints)

- System requires installation with support posts or attachments to building wall that can structurally support hydraulically applied loads. Need to determine structurally adequacy of load transfer to building or ground.
- Long horizontal spans may require intermediate support posts.
- Systems are not 100% waterproof and some seepage are likely. Must consider allowable seepage into building to determine bottom constraint (weighted or clamped).
- The proprietary nature of the system can be a limitation should replacement parts be required. In addition, the number of system manufacturers may not meet local, state, and federal requirements. Systems are available for procurement within United States, however, some similar systems may be foreign based, so foreign purchase limitations may apply to those systems.

Design & Preliminary Costs

- All components are stored at the point-of-use. Therefore, supporting structural elements must first be installed prior to use.
- Need to determine how the system will be installed from a structural loading perspective (independent or load transfer to building). For retrofit installations that will rely on load transfer to the building, a load rating analysis of the supporting structure (door header, wall framing, floor beams, etc.) should be performed prior to design and installation if the building will be utilized for load transfer from the flex wall system. A substantial structural retrofit of the existing building framing may be required for installation.
- Vertical flex walls are more suited to new building designs as opposed to retrofit applications due to below ground storage at face of building.
- Numerous systems are available. Choice of selected system should be based on site conditions (door or entry protection versus perimeter site protection). Accessibility to sand or water may be required to fill some types of systems.
- The flex wall will bulge toward the building during flood event. Need to consider horizontal placement far enough away from face of building/door/window to prevent damage.

The initial installation cost varies based on application, installation type, and size of the flex wall. Estimated costs are in the range of $350 to $550 per square foot of opening. Additional costs may be required if building retrofit is required.

Permits & Approvals

No permit issues have been identified. However, the flex wall temporarily closes a likely point of egress for the structure. Authorities having jurisdiction, such as the fire marshal, may need to be consulted and special structure evacuation requirements may need to be implemented prior to deploying a flex wall.

Implementation

Can be deployed in the short term. Staff will need training to know how to deploy. Other considerations include: how will staff safely enter and exit the area to deploy walls. 5 to 20 minutes per opening with crew of one to two trained personnel. System must be in place, operable, free of obstructions, and deployed prior to flooding.

Maintenance Requirements

After installation, typical maintenance is limited to practice deployment once a year with check of metal parts for corrosion/rust, and integrity of flex wall material.

Useful Life

With appropriate maintenance, an undeployed flex wall should be able to achieve over 25 years of service life.

References/Specifications

- Vertically Deployed Flex-Wall® by ILC Dover technical data sheet, https://www.ilcdover.com/catalog/flex-wall/
- Side Deployed Flex-Wall® by ILC Dover technical data sheet, https://www.ilcdover.com/catalog/side-deployed-flex-wall/
- National Flood Barrier Testing and Certification Program, https://nationalfloodbarrier.org/products/#opening-barriers
- The side deployed Flex-Wall® 2510 has been tested and approved to the ANSI/FM 2510 American National Standard for Flood Abatement Equipment for Openings. The Flex-Wall® 2510 is qualified for a range of Design Flood Elevations, up to 6 feet of water height; across varying width openings, up to 21-feet wide; and all without posts across the span.