Stairwell Flex Gate

Stairwell Flex-Gates (SFG's) are high-strength, dry flood-proofing closure that can be deployed rapidly for flood mitigation of tunnels, doors or portals of any kind, and can fit openings of any shape, size or orientation; simple to operate and can be easily deployed or retracted in just a few minutes by a single person with very little training; increased reliability, with minimal maintenance, thus providing low life-cycle costs.

Relation to Adaptation and Resiliency

Helps achieve protection of points of entry of underground assets in the event of floods or natural disasters.

Benefits

Stairwell flex gates are specifically designed and installed to prevent flooding. Stairwell flex gates are designed to be installed in a horizontal orientation.

Limiting Factors (Constraints)

- Yearly training is necessary to ensure that staff are educated and prepared to use the system.
- Adequate adjacent space is required for installation of the system.
- The system requires simple portal geometries without obtrusions into the portal, such as handrails or utilities. In addition, continuous conduits or machinery outside of the portal frame, such as a continuous trench drain or an escalator, are incompatible with the SFG without special detailing.
- The SFG anchor frame design and details are significant system components of the system and should not be underestimated. A substantial reinforced concrete or structural steel frame should be anticipated for the portal frame. In addition, the net hydrostatic load on the SFG and portal will need to be resolved.
- The proprietary nature of the system can be a limitation should replacement parts be required. In addition, the number of system manufacturer may not meet local, state, and federal requirements. Foreign purchase limitations should also be considered.

Design & Preliminary Costs

- The SFG serves a unique purpose of preventing flood loads only. A net savings of designing fire doors to also function as floor barriers should be considered when evaluating the SFG.
- For retrofit installations a load rating analysis of the supporting structure should be performed prior to design and installation of the SFG to verify that these components can support the vertical flood loads. It is unlikely that a substantial structural retrofit of the existing portal will not be required.
- The potential for debris and sediment collecting on top of the SFG should be considered.

The initial installation cost varies based on application and size of the portal and can be substantial. Cost estimate is approximately $850k to $1 million (Source: Cost estimate comes from similar systems developed for MTA New York City Transit by ILC Dover). Maintenance costs are minimal.

Permits & Approvals

No permit issues are known of. However, the SFG 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 an SFG.

Implementation

SFG's can be deployed rapidly, likely within a half hour or less by trained personnel. However, the portal must initially be designed or retrofitted for the SFG with a perimeter foundation to anchor the deployed SFG. The SFG should be deployed before any flooding has occurred.

Maintenance Requirements

Maintenance is limited to annual deployment for training and inspection purposes.

Useful Life

With appropriate maintenance, an SFG should be able to achieve over 25 years of service life. However, the SFG system is relatively new and no examples of installation and deployments over a lifespan of 25 years or more were identified. In addition, should an SFG become damaged, replacement parts may or may not be available should the original supplier still be in business.

References/Specifications

Stairwell Flex-Gate by ILC Dover technical data sheet, https://www.ilcdover.com/catalog/stairwell-flex-gate/