

Foldable Water Stop Plate “F-Shield”

1. INTRODUCTION

In recent years, Japan has experienced record-breaking torrential rains across the country due to linear rainfall belts, etc., and inundation damage caused by river flooding and inland water flooding are expanding. Since it takes time for local governments to implement flood countermeasures through river improvement and sewage system development, residents and private businesses are required to take their own measures against inundation. As an emergency measure, it is common to install sandbags, but in addition to the work required to fill the bags with sand, they are heavy at 15 to 20 kg per bag, and there are cases where they cannot be installed in time during sudden heavy rains. On the other hand, L-shaped resin water stop plate is commercially available as an alternative to sandbags, but it is difficult to handle because it is large and heavy, it cannot be transported by ordinary vehicle, and it requires a large storage space. In view of the above problems, we have developed a compact, easy-to-use, foldable water stop plate (F-Shield) that is easy to store and transport based on the design

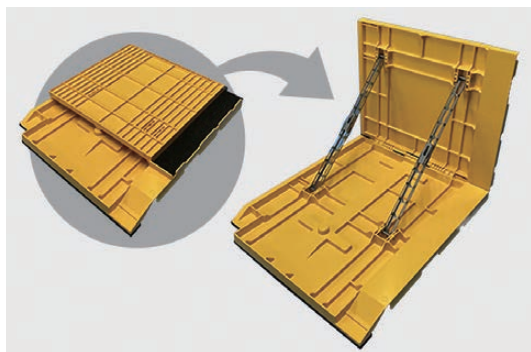


Figure 1 Appearance of an F-Shield.

and manufacturing technology that we have developed over many years. This product is installed at the entrance of houses, facilities, factories, etc. to prevent water from entering the building. By installing it on the road, it can be used to guide the flow of water in the event of a flood and secure an evacuation route.

2. FEATURES

2.1 Easy Installation

F-Shield can be installed in a short period of time without construction work at the entrance of the building. By reinforcing the resin body with metal fitting, it achieves a high strength that can withstand water pressure even though it is a folding structure, and assembly is completed simply by opening the body from the folded state (Figure 1). In addition, just by placing it on the ground, it uses water pressure to compress the packing at the bottom, demonstrating an excellent waterproofing and efficient bonding property (Figure 2). A wide range can be covered by connecting them horizontally, and it is possible to fine-tune the width and angle at the connection part (Figure 3).

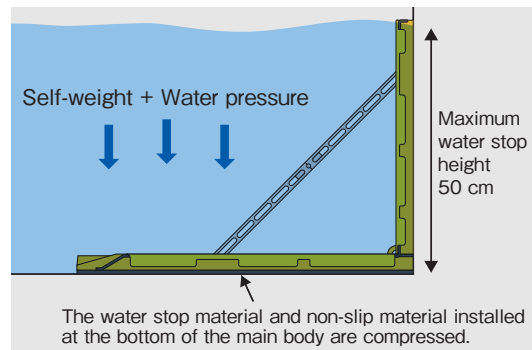


Figure 2 Water stopping mechanism of an F-Shield.



Figure 3 Installation example of F-Shields.

2.2 Long Term Durability

In the case of a general sandbag, it will deteriorate in about three years, and even if it is stored with sand in it, it may not be useable in an emergency. F-shield has a long service life of 10 years or more and can be used repeatedly*. If the water stopping material or non-slip material at the bottom is damaged, it can be replaced.

*Durability is from of our test result, and not a guaranteed value.

2.3 Space-saving storage

F-Shield can be stored on a shelf or in a small space by folding it and standing it sideways (Figure 4). In addition, transportation by ordinary vehicle and delivery by courier service are also possible.



Figure 4 Storage example of F-Shields.

3. SPECIFICATION

Table 1 shows the main product specification of an F-Shield. F-Shield is a simple installation type water-stop product that can be installed without prior construction. Although it is not possible to stop water completely, in our test, the amount of water leakage was 200 l/(hour·m²), which is about 15 times better than sandbags.

Table 1 Main product specification of F-Shield.

Item	Specification
Product dimension	W580 × D680 × H500 mm
Storage dimension	W580 × D680 × H80 mm
Weight	5.8 kg/unit
Material	Body: ABS resin, Metal fittings: Stainless, Packing: EPDM
Width adjustment amount	Maximum 50 mm
Angle adjustment amount	± 5°
Water stop height	500 mm
Water leakage amount	200 l/(hour·m ²)*

* In-house test result based on JIS A 4716. The numerical value is an experimental value when the water level is 500 mm, and not a guaranteed value.

4. INITIATIVES WITH LOCAL GOVERNMENTS

On January 28, 2020, we signed a partnership agreement on an industrial development with Satsumasendai city, Kagoshima Prefecture. As part of this initiative, the Satsumasendai City Fire Department actually used an F-Shield, and checked its performance in an actual usage environment.

In particular, we installed an F-Shield in front of the door of a warehouse to stop water from entering the building, and installed an F-Shield in a river to change the flow of water. In a water stop test, we were able to suppress the intrusion of water into the building, and in a running water test, we were able to change the flow of water without being washed away by the F-Shield. Based on the above results, we confirmed that the F-Shield can demonstrate sufficient performance in the actual usage environment (Figure 5).



Figure 5 Field verification in Satsumasendai City.

5. CONCLUSION

We have developed F-Shield, a foldable water stop plate that is light weight, compact, easy for anyone to use, installed in a short time, and is easy to store and transport. In the near future, we will expand the application of this product by adding a lineup of materials that are compatible with curved parts. By developing flood prevention products with excellent workability and water stoppage properties like this product, we will reduce flood damage and contribute to improving the resilience to natural disasters.

For more information, please contact:

Sales Section 3,
Functional Plastics Engineering & Sales Department,
AT & Functional Plastics Division
TEL: +81-3-6281-8580

Contact form:

<https://www.furukawa.co.jp/srm/form/index.php?id=foam>