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Temporary and Demountable Flood Protection Guide

Project: SC080019

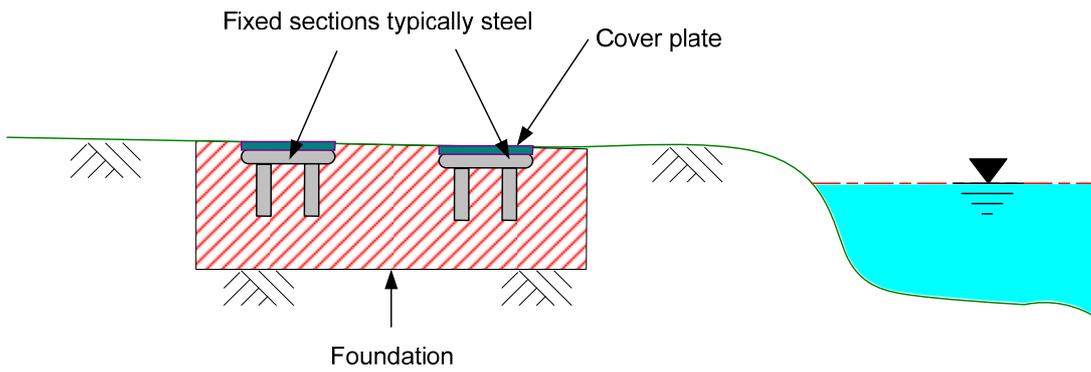


Figure 5.9a Demountable frame barrier - under normal conditions

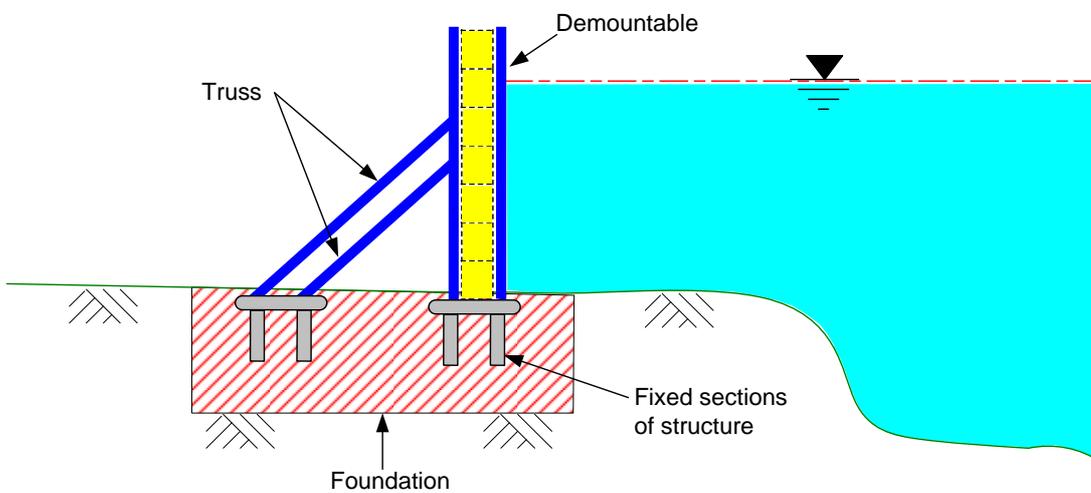


Figure 5.9b Demountable frame barrier - under flood conditions



Figure 5.9c Demountable frame barriers

Advantages:

- Generally robust and well engineered.
- Good resistance to loading and impact.
- Very durable.
- Can be increased in height by adding panels up to the height of the frame.
- Very low seepage through and under the structure.

FRAME BARRIERS - RIGID

DPS 2000 HOCHWASSERSCHUTZ

1. PRODUCT NAME, MANUFACTURER AND SUPPLIER DETAILS

DPS 2000 Hochwasserschutz

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1.1 Product Availability

Buying / Purchase ? Client Assembly ?
Hire / Commission ? Supplier Assembly ?

2. DIAGRAM AND (GENERAL) DESCRIPTION OF PRODUCT



2.1 Type

Demountable (part permanently installed)

2.2 General description

DPS 2000 patented flood protection system is constructed from lightweight aluminium dam beams, which are stacked between aluminium support beams. When the water level rises, the interlocking aluminium profiles fill up with water and therefore increase the stability of the wall. Length of protection wall is unlimited and individual solutions can be designed to adapt to local situations. The new "DPS2000-TDB" is available in addition to the standard-system. It contains bigger dam beams and stronger supports. The system was chosen for installation in Nijmegen, (NL) / length 970m and height up to 3.50 m. It was also placed in Switzerland with a total length of 545m and height up to 1.75m

3. AVAILABLE SIZES / DIMENSIONS

3.1 Length of unit or section

Usually 3.0m however up to 6.0m possible. When only water pressure is considered a 1.0m high barrier can have 4.4m long beams and a 2.0m high barrier can have 3.4m long beams. When additional forces need to be taken into consideration (storm, ice-floes or driftwood), the beams will be shorter in order to make them stronger.

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DPS 2000 HOCHWASSERSCHUTZ

- 3.2 *Maximum number of coupled units*
 No limitation of coupled units, distance between upright supports depends on design requirements of the scheme.
- 3.3 *Product height range*
 Fixed (single unit height)
 Extendable (single unit plus extension)
 Multiple Unit (stackable unit of fixed height)
- 3.4 *Installed unit height(s) (to apex)*
 Standard-beams are 0.2m high, TDB-beams are 0.25m high and Light-beams are 0.15m high.
- 3.5 *Maximum installable height*
 Usually up to 3.0m, but 4.0m and 5.0m have been designed and installed.
- 3.6 *Design for or behaviour around curves/arcs/corners*
 The supports can accommodate angles up to 16° each without changes to the system. For bigger angles "corner"-supports are used which are available in different designs.
- 3.7 *Number of vertical joints/sealings (per unit / unit width)*
 Two
- 3.8 *Number of horizontal joints/sealings (per unit / unit height)*
 Individual panels are 0.2m high with joints between them so dependent upon height of the installed barrier.
- 3.9 *Width of structure at base (installed state)*
 Permanently installed ground connections are the widest elements. Each support requires an anchoring plate which is usually 0.27m wide. (But depending on the project and its requirement larger anchoring plates can be necessary; up to 0.4m). If the aluminium supports need to be strengthened by a back brace of steel this needs approx. 0.5m additional space on the dry side.
- 3.10 *Required storage area per unit (packed dimension)*
 The dam beams and support beams are stored on post pallets. The dimensions of the empty pallets are 1.5m x 0.87m x 0.75m, and the pallets are available in galvanised or painted finish. The dam beams are stored horizontally whereby the individual layers are separated by e.g. thin wooden or PVC battens to prevent galling. The support beams can be stored horizontally or vertically. For vertical storage holes will be incorporated into the base plate of the pallet to accommodate the screw joints of the support beams.

4. STRUCTURAL ASPECTS

- 4.1 *Likely modes of failure*
 Overtopping Rolling Sliding Collapse
 Breach Overturning Seepage
- 4.2 *Maximum design head of water*
 Assumed up to maximum height of barrier (5.0m). A barrier of 4.6m height was installed fourteen years ago which has functioned successfully.
- 4.3 *Behaviour subject to seepage and water tightness*
 Some seepage (less than 40 litres per hour per metre)
- 4.4 *Damage/Tear/Puncture. How does the product behave after damage?*
 Damaged elements can be exchanged separately.
- 4.5 *Does the product progressively worsen following damage/tear/puncture?*
 No

FRAME BARRIERS - RIGID

DPS 2000 HOCHWASSERSCHUTZ

4.6 *Can the defence height of the product be increased during service?*

Yes, it is necessary to build up to the complete protection height immediately. The protection wall can be heightened during rising flood levels by inserting more dam beams.

4.7 *Resistance to damage*

(a) Wind

Each project is designed for the special demands. The statistical calculations determine the section width and support-designs

(b) Waves

Each project is designed for the special demands. The statistical calculations determine the section width and support-designs

(c) Inertia forces

Each project is designed for the special demands. The statistical calculations determine the section width and support-designs

(d) Overtopping (including maximum depth without failure if known)

Each project is designed for the special demands. The statistical calculations determine the section width and support-designs

(e) Floating debris

Each project is designed for the special demands. The statistical calculations determine the section width and support-designs

(f) Water pressure

Each project is designed for the special demands. The statistical calculations determine the section width and support-designs

4.8 *Repair during service conditions*

Depends on the element which is damaged - mobile elements can be changed.

5. OPERATIONAL ASPECTS

5.1 *Time required for installation (100 m long x 1 m high)*

4 people would require two hours if the mobile elements are available. The mobile elements are stored on pallets which need to be transported from storage room to the site, which would add additional time. In June 2009 a wall 300m long and 2.25m high was erected in 2.5 hours with 10 people.

5.2 *Method of installation (including site preparation)*

Manual.

5.3 *Likelihood of incorrect installation*

Low likelihood of incorrect installation. It is easier if all the aluminium beams and supports are of the same size and dimension.

5.4 *Storage requirements*

Elements can be stored on pallets - these can be stored in containers or any storeroom.

5.5 *Are storage solutions supplied with/available for the product e.g. containers/ racking systems/ trailers.*

The dimensions of the empty pallets are 1.5m x 0.87m x 0.75m, and the pallets are available in galvanised or painted finish.

5.6 *Transportation requirements (including mobilisation)*

Elements/ pallets can be moved by a forklift and single elements can be transported by hand, for larger projects trucks would be required for transport.

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5.7 *Access requirements*

Depending of the size of the system, single elements can be transported by hand however this will impact on installation time.

5.8 *Adaptability to terrain conditions (Surface type)*

- Any Surface
- Flat Soil
- Grassed Surface
- Sloping Surface
- 2.5m Wide Banktop
- 4.0m Wide Banktop
- Wall
- Concrete
- Other

5.9 *Provision of fixings / Susceptibility to damage or vandalism*

Permanent elements can be protected/ mobile elements can be locked

5.10 *Possible locations of use*

- Banks - Fluvial watercourse flood bank/levee
- Banks - Up to 400mm waves
- Banks - Reservoir banks
- Banks - Up to 400mm waves
- As second line defences (away from watercourse)
- Enclosures (around property/properties)
- Access locations (permanent breaks in defences (not breaches))
- Other

6. FINANCIAL ASPECTS

6.1 *Installation resource requirements*

A 2.0m high wall which is 100 m long can be erected by 5 persons in three hours. This is for untrained persons and training will reduce this.

6.2 *Installation costs (100 m long x 1 m high – excluding resources)*

Approximately £51,600 (€60,000).

6.3 *Additional installation and removal costs (training/supervision)*

No.

6.4 *Maintenance requirements*

Check the aluminium and the gaskets e.g. annually or after every use.

6.5 *Ease of cleaning (often use in muddy conditions)*

The elements are cleaned with clear water after use. This usually takes place during dismantling the system. The holes in the anchoring plates are filled with grease before putting in the screws.

6.6 *Reuse of the products*

Yes, designed for multiple reuses.

6.7 *Product covered by manufacturer's warranty. (Length, type and limitation of warranty)*

No.

6.8 *Deterioration with time*

The gaskets need to be exchanged over time depending on the storage and the frequency of use

7. OTHERS

7.1 Product trial or test information

Inspected by the American corps of engineers (see www.floodcontrolam.com), checked by the German TÜV, accepted by Austrian civil engineers, accepted by Italian civil defence, European insurances , patented in Europe, USA and Canada, listed in "BWK-Merkblatt 6/BWK".

7.2 Has the product been awarded (BSI) Kitemark for Temporary and Demountable Flood protection products (PAS 1188-2:2003) ?

No.

7.3 Performance under service conditions/ In use

Is currently installed and has been deployed successfully in a wide variety of locations worldwide.

7.4 New products or modifications under development.

Since 2008 new system "DPS2000-TDB" is available in addition to the standard system. It contains bigger dam beams and stronger supports.

7.5 Environmental qualities

Individual special solutions adapt to every local situation.

7.6 Environmental Impact

The DPS 2000 system is removable after use. The system only leaves the demountable supports at the deployment site.

7.7 Details of clients or locations where product is in service

The system is already installed in Germany, Switzerland, Austria, Scotland, GB, Ireland, Luxembourg, USA, Canada, Poland, Czech Republic, Netherlands, Italy, Belgium, and ordered in Russia.

7.8 Additional comments

None