science summary

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SC040065/SR Field trial of a demountable flood defence system between urban structures

Science Summary SC040065/SS

A demountable flood defence system is a flood barrier that is either fully pre-installed and requires some form of operation during a flood event, or one that is partly installed and requires further installation in advance of a flood.

This report describes a pilot project in which a demountable flood defence system was operational in the city of York, in spring 2008, to protect 14 houses from the flooding of the River Ouse. It was a joint collaboration between the Environment Agency, Aquabarrier Ltd., a manufacturer of flood defence products and City of York Council.

The case study project shows what issues may be faced during the planning and installation of demountable flood defences in urban areas. The results should be of interest to asset managers, flood risk managers and companies commercially developing flood risk management products.

Demountable flood defences can be an important part of a flood risk management system, in places where permanent barriers are too expensive or impractical. They can also be used temporarily, while more permanent defences are being constructed.

At Clementhorpe, in York, a demountable flood defence scheme was chosen, consisting of L-shaped plastic units linked together to form a continuous wall across a street. The defence required a permanent concrete ramp to be constructed across the street. This had the dual purpose of taking the protection up to the required height and also to provide a rigid surface for the units to be bolted against. The units are attached to existing infrastructure either side of the street by means of bespoke metal fixings. There has been little previous assessment of systems such as this that provide a barrier to flood water between buildings.

We single out four stages in the process of implementing demountable flood defences:

- justification
- design
- approvals
- construction, installation and whole life management.

The justification stage includes feasibility, which assesses the costs and benefits of different flood defence options. To justify a demountable flood defence system, the benefits should exceed the costs. The need for environmental impact assessment and an appropriate flood warning system must also be considered at this stage.

The design stage involves consulting those groups with an interest, or a statutory involvement in the project, including local authorities, communities and democratic representatives. The consultees should be given an opportunity to comment on the proposals. In the design of demountables, it is important to consider where the defences meet the existing infrastructure, as these points are potential weak spots where seepage could occur. The design must provide a reliable, watertight defence. The costs of ongoing maintenance, decommissioning and replacement must be included.

Obtaining landowner approvals can be a lengthy process and time delays should be allowed for in the project planning. Consultations with the adjoining property owners alone took two years, partly due to their anxieties about the failure and impact of the system. Good quality communication with those affected is essential throughout the project.

Finally, in planning the construction stage of the project, whole life considerations such as inspection, monitoring and maintenance are vital for ensuring optimum performance. Monitoring how well the defences work in a real flood situation is particularly important.

A good operational plan must be in place, describing when the demountable defences will be deployed, who will collect them, and from where, and how they will be

installed. This operational plan should be tested by dummy deployment, to highlight any unexpected problems. The plan must also be regularly updated, to ensure that key details are correct.

With advances in science, technology and engineering, an increasing range of flood products is available in the UK. A follow up project (SC080019) will identify all the currently available flood products and update the joint Defra/Environment Agency guidance on temporary and demountable flood defences.

The York site is now fully operational and deployment took place in a real life situation for the first time on 6 September 2008. Some minor seepage was experienced as a result of the seals not been correctly seated and this has been logged as a key learning area.

This summary relates to information from Science Project SC040065, reported in detail in the following output(s):

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