# Flood resilience technology: policy and practice

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Part of the BRE Trust

# Flooding

- Serious flooding in 2007
- Government set up the Pitt review
- Recommendations implemented through the Flood and Water Management Act in 2010
- Further serious flooding throughout 2012, then late 2013 to early 2014

# Context

## Flood Defence

**Traditional Flood Management**

Building and raising dikes and walls

"Levee effect"

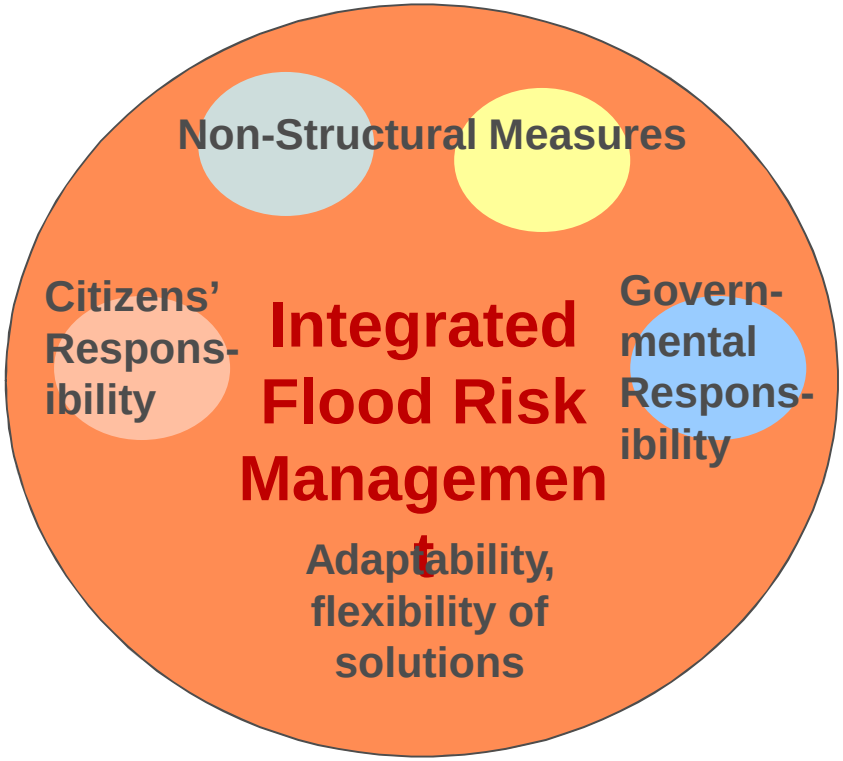
Cost intensive solution

Conflict with spatial & urban planning

**Entrapment effect**

**"Silo thinking"**

## Living with Floods"




**Drivers:**
**Climate change**
**Rapid urbanisation**

# FRe technology

- <u>Defra / EA funded (past 7 years):</u>
- To create demonstration areas that will promote the benefits of property-level flood risk mitigation, encouraging further take-up
- To stimulate the supply of high quality flood risk mitigation surveys by competent and independent surveyors
- To encourage the development of new and innovative flood protection measures


Photo – by Nicholas Delarue

# FRe technology

Source:
Gabalda et al 2012

**Building Aperture Technologies**

These are designed to fit over any potential openings in a building envelope. These can be temporary or permanent.

- Preinstalled Building Aperture Barriers (automatic flood doors, autoatic flood gates)
- Demountable Building Aperture Barriers (temporary flood gates)
- Temporary Building Aperture Barriers (door guards; absorbent sandbags, flood gates, air brick covers; anti-flood air brick replacements.)

**Perimeter Technologies**

These are "systems" designed to help protect an entire structure or groups of buildings

- Demountable barriers
- Self-closing, automatic barriers
- Free standing barriers
- Building skirt systems

**Building Technologies**

These are often necessary and complementary to Building Aperture Technologies

- Non-return valves, back flow valves, toilet bungs
- Wall sealents; rendering (to reduce water penetration and cover cracks)
- Warning systems (e.g. telemetry systems)

Testing a Flood Door and Flood Guard at HR Wallingford

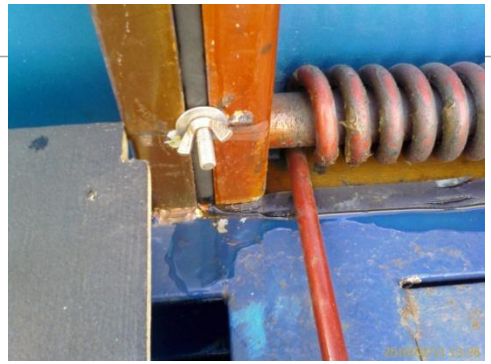
Demonstration of Tilt-Dam®
Image courtesy of Tilt Dam
http://www.tiltdam.co.uk/

Example non-return valve

# Demountable

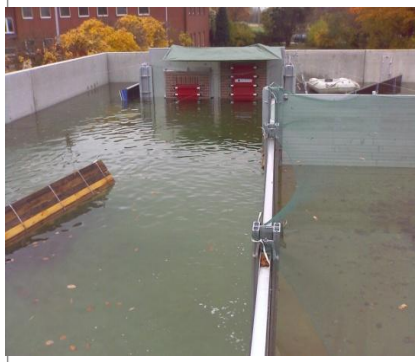

# Perimeter

– Pre-installed



Spring Dam prior to and after deployment: courtesy

# Testing and standards



Impact test

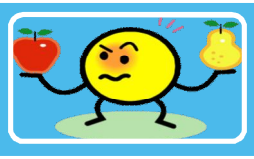
Hydrostatic load test

Impact test

# Guidance: six steps to flood resilience

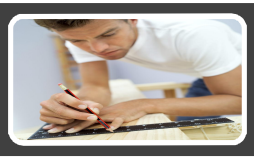
**STEP 1: UNDERSTANDING THE RISK**

- A full flood risk mitigation survey should be performed by an independent surveyor who will recommend the FRe technologies that may be employed .



**STEP 2: PLANNING A SCHEME – FIRST CONSIDERATIONS**

- The pros and cons of various products should be weighed up including ease-of-use, performance specification, cost, and so on.

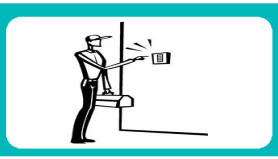


**STEP 3: SURVEY**

- Manufacturer(s) will need access to the site to fully measure it in order to design the products and to undertake an assessment of its current state .

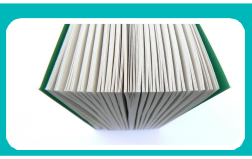
**STEP 4: DESIGN AND SPECIFICATION**

Manufacturer(s) will design the FRe technologies with the end-user in mind. Materials will be cleared with the end-user. The FRe technologies will be clearly specified with an indication of when they will not work.



STEP **5: INSTALLATION**

Manufacturer(s) will provide installers with a clear set of instructions. The installer will need access to the site. All work shall be signed off by the initial surveyor, the site/property owner and the manufacturer.



**STEP 6: OPERATION AND MAINTENANCE**

Manufacturer(s) and/ or installers will train the end-user on how to operate equipment in the event of a flood. A manual with clear maintenance and operation instructions will be presented to the end user. End-user is responsible for maintenance .

# Flood resilient property – new build

- 10,000 properties per annum built in flood risk areas
- Minimum level of resilience built into new buildings, increasing vulnerability
- 1st step: Defra funded design for the FRP
- 2nd step: Development partnership
- 3rd step: Build demonstration on the BRE Innovation Parks Network
- 4th step: testing and demonstration

# Flood resilient property – new build

- What is it:
- A ‘standard’ design that can be used in house-building and small scale commercial buildings
- Risk level: >1 in 1000 to < 1 in 75
- Resistance and resilience approach

- What it is not:
- Amphibious or floating, or raised level buildings
- Undeliverable in the context of current building regulations and standards, and cost

# Centre for Resilience

– "…. experts are calling for planners to adopt a series of measures aimed at tackling the risk of flooding, including exploring how measures like planting trees can hold back water in the upper reaches of rivers"?

– A Centre of Excellence to make the UK a globally recognised centre for expertise and excellence in resilience

# Centre for Resilience

- Research, innovation and knowledge capacity
- Standards for resilience
- Resilience certification
- Good practice demonstration

- Sign up to join and support the Centre

# THANK YOU

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