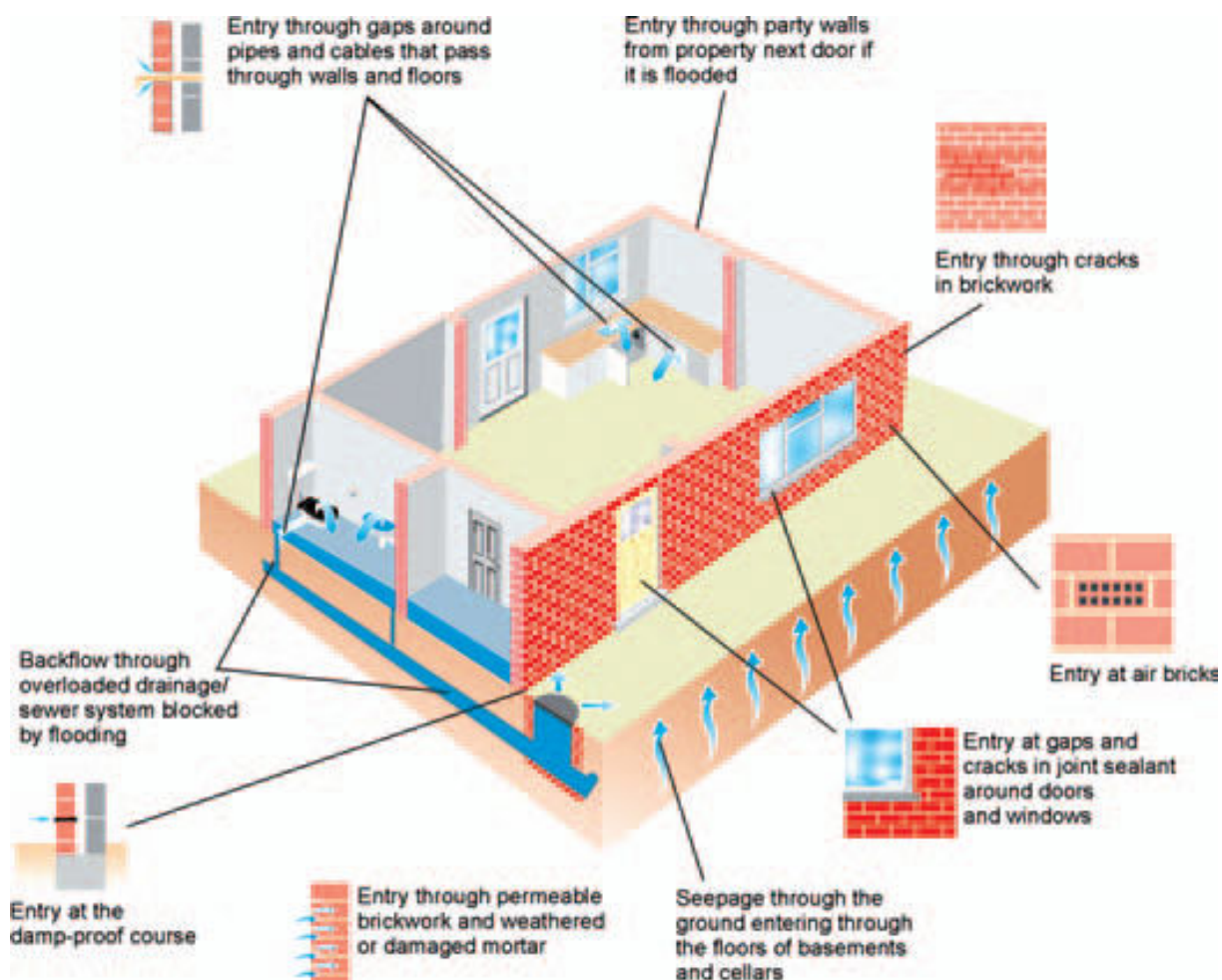


Resistance and Resilience Version 3.0

A report by Morpeth Flood Action Group

This report looks into the importance of resistance and resilience in the context of future flood insurance.



Where floodwater can potentially enter a building, courtesy of CIRIA

This report looks into the importance of resistance and resilience in the context of future flood insurance. It addresses three issues and is split into sections on each of them

- The current state of affairs
- The viability of incentive if the insurance market moves to more risk based premiums
- How the Morpeth Model for the future of insurance can incorporate the need to improve existing and new properties to alleviate the effects of flooding

The government is currently looking into the future of flood insurance after the Statement of Principles comes to an end in 2013. Three working groups have been set up to look at different aspects and are to report to the minister.

Working group 1: The financial risk from flooding

Working group 2: Data provision and transparency

Working group 3: Customer experience and perspectives towards property level and resistance and resilience

Author: Alan Bell, Morpeth Flood Action Group
The author of this report has run his own architectural practice for over thirty years, his home in Morpeth was flooded on 6th September 2008. Since that event he has devoted a lot of his time researching methods of protecting properties, for professional as well as personal reasons. In a professional capacity he has become well versed in resilient construction and resistant products. On a personal level he is fully aware of the problems and hurdles that someone who has been flooded comes across.

Introduction

Resistant and resilient measures built into properties can play an important role in alleviating the extent of damage to a property.

Resistance

Resistance prevents or minimises the ingress of flood water, this reduces the extent of damage and so is welcome on cost saving benefits as well as reducing the trauma of those whose properties flooding has affected.

At individual property level resistant measures can be put into one of three categories:

- 1.Measures to prevent flood water reaching the property (avoidance)
- 2.Passive protection products built into the building or its services
- 3.Temporary demountables

Walls and barriers can be built to surround a property; these can be regarded as reducing the risk of flooding, it is termed flood avoidance. This method is usually only available for individual detached properties or ones with a reasonable amount of land around them. There is little in this respect that can help typical town houses unless whole streets can be protected. These measures could be either permanent or demountable, or a combination of the two. Demountable measures have the same deployment problems as mentioned below for temporary products. Other measures, passive and temporary, must be deployed in conjunction with these walls and barriers for them to be an effective method of flood protection.

Passive protection measures include non-return valves to drainage, special airbricks and floodproof doors. These are built into the structure of the building and apart from routine maintenance do not require erection or fitting in the event of a flood. Sumps with pumps fall into this category but it must be stressed that any pump would require an independent power supply as mains electricity is very likely to be switched off if flood water is expected to be deep. The external walls of a building will often leak, standard brick cavity walling can have a leakage rate of 400l/hr for 1m of wall with a 1m head of flood. External rendering can reduce this rate dramatically, or the use of engineering brickwork for the outer leaf in new build. There will always be the risk of cracks in joints due to settlement reducing the effectiveness of the wall.

Temporary demountable products include door barriers and airbrick covers. They require positive actions by the property owner on receiving warning of likely flooding. Because there is no guarantee that a temporary demountable will be deployed in time few insurers will give discounts on premiums. Many demountable products tend to degrade over time, seals perish and fixings can break, effectiveness cannot be guaranteed at the time they are most needed. Anecdotal evidence suggests that these products are not as effective as is claimed by their manufacturers.

Resistance measures, at best, afford additional time for an owner to protect the building's contents. If the flooding is likely to be prolonged, water will always get in. It is virtually impossible to fully waterproof an existing property at reasonable cost. There is also the problem that if flood waters reach a certain depth then it is necessary to let the water in. Attempting to prevent deep floods affecting the property could cause structural damage, the cost of which to repair would be far greater than the cost of reinstatement after a flood. There is also a danger of complacency, a resident may feel safe behind such protection but if there is sudden failure or waters have to be let in because of depth the consequences to safety could be far greater.

Resilience

Resilience is a measure that can be built into the fabric of the property. By using materials that are resistant to water and construction techniques that alleviate damage, much can be saved in reinstatement costs. It is bad enough for a homeowner to see their contents, carpets, furniture and prized possessions destroyed by flood water but then to see their home gutted in the course of reinstatement can be a very traumatic event. Minimising this trauma should be of the utmost importance.

Currently there is no requirement under the Building Regulations in England and Wales to use resilient materials and techniques in construction in areas likely to flood. Scottish regulations address this and it can be argued that England and Wales would do well to follow their example. In May this year the government announced that there would be no change in the English Building Regulations to take resilience into account for new build, conversions and extensions. Planning conditions can be used to ensure resilience in construction, but conditions are open to interpretation and a guaranteed standard would be difficult to enforce. It would be far more effective to incorporate standards in the Building Regulations themselves as compliance would be overseen by a qualified professional.

Resilient construction to existing properties is most cost effectively done after a flood. The cost and disruption that it entails makes it prohibitive to the average homeowner to install it before a possible first flooding. On reinstatement insurance companies are reluctant to employ resilience as it can increase costs and is considered betterment. They will only consider it if it is likely to be effective in reducing lifetime costs in relation to expected frequency of flooding.

1. The current state of affairs

The general public is in a state of confusion about resistance and resilience; many of them don't even know what they are. Those who have been flooded are frustrated that any measures that they have now taken are not reflected in insurance premiums. Many are also frustrated that insurance companies consider introducing resilience to their property as betterment and they will have to pay for it themselves. Most who are in high risk areas that have not been flooded recently are totally unaware of measures they can take to alleviate the trauma of being flooded.

Resilience is only done on reinstatement if there is a cost benefit to the insurance company. Insurance companies are able to do this because the policy holder is unlikely to be able to change companies so it is considered an investment. If the market moves towards risk based premiums and is opened up to competition, the insurance companies are less likely to invest in resilience.

Resistant products are only considered for discounted premiums if they are of the passive type and even then the mainstream insurers tend not to take them into account.

Advice on products and construction is limited. Those who have suffered are inundated with sales leaflets promoting products and cheap deals. For all the information and advice available, little of it is getting to those who most need it. There is a procedure to Kitemark reliable flood resistant products; this is an attempt to guarantee standards. Unfortunately the standards to be achieved are too low; many small manufacturers are reluctant to pay the expensive fees to obtain a Kitemark. These problems must be addressed. Those who have been flooded are at their most vulnerable when decisions have to be made on the future of their property's ability to sustain possible future damage due to flooding. They expect clear advice and reassurance from the professionals dealing with their claim, this is not happening.

There are no legal standards that reinstatement work must comply with. Standards are driven by the insurance industry and many Loss Adjustors receive commission for the amount of payout they save the insurance company. This precept can only have a detrimental effect on quality of reinstatement. The insurance industry has led the way in fire safety requirements, demanding measures over and above those that are legally required for Building Regulations and Fire Certificates; they currently do not do it for safety and resilience from floods.

In a survey of Morpeth residents by Morpeth Flood Action Group, two years after the flood, it was found that only 18% of respondents had installed resilient or resistant measures to their property (see Appendix A). 13% of these were because it was a condition of cover; they had all been refused cover by a mainstream insurer and used a specialist broker who had insisted that no policy

could be obtained without these measures. 13% claimed that it had reduced their premium or excess, further investigation found that only one of over thirty who had installed products may have received a discount.

There is currently little financial incentive to employ resistant or resilient measures. Insurance companies explain that this is because of cross subsidy of premiums. The Morpeth survey shows they are moving towards risk based premiums in areas that have been flooded and are still not taking these measures into account. The only incentive is the satisfaction that the householder obtains in reducing damage and trauma.

It is not the remit of insurer companies to prevent damage but they have a duty to reward their policy holders, either in the form of reduced premiums or a share of the savings on reinstatement, for limiting it.

There is a grant scheme being offered, in England and Wales, by the Environment Agency to assist householders in the purchase of resistant protection. The amount available is only £2m and is targeted at properties that have little or no chance of having an alleviation scheme built in their area. Whilst this may help a few hundred properties, it does nothing for the other five million at risk of flooding. In Scotland Local Authorities are taking a lead in advising on, and sometimes providing, resistant products.

2. The viability of incentive if the insurance market moves to more risk based premiums

Working Groups, 1 and 3, are looking into ways of incorporating incentives for householders to install resistance and resilience measures into any future insurance model. Most of the emphasis is on this model involving risk based premiums in one form or other. It is one of the keystones for the summit that premiums should reflect flood risk.

It is the opinion of the Morpeth Flood Action Group, and many others, that there is an overemphasis on resistant products. Insurance companies do not recognise them now, and we can see no reason why they should in the future. Because of the expense of resilience measures the financial incentives available through premium reduction will be insufficient to convince people to introduce them in existing properties which have not already been flooded. For an explanation of the technical rate see Appendix B.

Risk based premiums are likely to marginalise the most vulnerable members of society. Who make up a high proportion of residents in high risk flood areas. If premiums are to reflect flood risk it is highly unlikely that those people will be able to afford insurance let alone have the capital available to purchase resistance and resilience for their properties.

The Morpeth Flood Action Group conducted its own survey of properties flooded in Morpeth in September 2008 and found that the average cost of flood protection was in excess of £3000 per household. That is a substantial capital outlay and householders would expect to receive a short term return for such an investment. Discounted premiums could not cover the cost and it is debatable whether improvements would add enough value to a property to cover the cost of installation. There would have to be some form of government subsidy to make undertaking the work installing resistance and resilience measures a viable proposition.

As mentioned previously, insurance companies are reluctant to take into account measures taken by householders to reduce flood risk. One of the reasons is that there is no process in place for monitoring or establishing the likely effectiveness of the measures. Setting up a structure that could do this to the insurance industry's satisfaction would require a large investment in training and data collection. This would further decrease the attractiveness of products as the cost would eventually have to be borne by the consumer.

There are very good reasons for insurance companies currently not recognising temporary demountable flood resistant products in assessing premiums and excesses. These reasons will apply to any new insurance model.

- **Deployment:** There is no guarantee that temporary products can be deployed in time. Many may not be deployed correctly.
- **Effectiveness:** Although products can obtain a Kitemark to show they are up to a certain standard of protection, the standards themselves are not very exacting. The costs of obtaining a Kitemark are putting off small manufacturers. Many products deteriorate over time, seals perish and fixings can break, robustness cannot be guaranteed.
- **The householder's duty to prevent or minimise damage:** Most insurance policies include a clause that requires the holder to prevent or minimise damage. Failure to do so can affect the claim. If insurance companies allowed a discount for use of demountables then it would be the policy holder's responsibility to deploy them. There is no guarantee that such action can be taken in time. Nor should the deployment of flood resistant measures expose a householder to the dangers of rising flood water. It is not the remit of insurance companies to prevent damage and they should not encourage their policy holders to risk life and limb for financial reward.

For insurance companies to be able to reduce premiums, resistance measures would have to be of the passive type. They would increase the cost to the householder, and yet that investment would be totally wasted if the adjoining property owner had not installed the same or similar measures. Furthermore, it is clear that some specialist brokers operating in the market currently will only obtain flooding insurance policies for householders if they purchase resistant products from an approved list. Those brokers undertake no appraisal of the likely effectiveness of the products or the householder's ability to deploy them when obtaining cover for their client. This approach to selling insurance must be stopped.

Resilience measures should be considered in assessing premiums. They reduce reinstatement costs and the length of time before a family can return home following a flood. Introducing resilience measures to existing properties is very expensive and disruptive. They are most effectively installed after a property has been flooded. However, insurance companies are reluctant to pay for higher standards of reinstatement, because in a competitive market they could lose their investment to a rival. The burden for payment will therefore continue to fall on the homeowner until standards of reinstatement are improved by regulation.

It is very unlikely that moving to risk based premiums is going to provide enough incentive for householders to improve their properties. Only considerable funding from the government can resolve this issue.

- An associated reduction in premium produces no significant financial benefit to the consumer.
- Introducing high excesses into the policies of householders who do not install flood resistant measures is likely to bring insurance companies into conflict with the Council of Mortgage Lenders, whose policy it is to use insurance policies as a guarantee when granting mortgages. A high excess could lead to the refusal of a mortgage request and, if that were replicated across a wide section of the market, the market itself could begin to decline. At the time of writing an excess of more than £1000 other than for subsidence contravenes the guidelines set down by the Council of Mortgage Lenders.
- As there are no regulations covering standards of resilience, it will be the responsibility of government to lay them down. The cost of policing those standards would fall on the public purse, as would maintaining a database of property level protection.
- In the worst case insurance companies may decide to refuse to provide insurance as a means of coercing householders into introducing flood prevention measures.
- The high cost of insurance cover could place it out of the reach of the most vulnerable members of society.
- FSA guidelines require flood insurance to be part of the bundled package of household cover. Those householders who could not meet the cost of installing flood prevention measures could find that their insurers remove the flood element from their household cover. This would place the most vulnerable members of society at a considerable disadvantage. It would also lead to community blight and the eventual emergence of a two-tier society.

3. How the Morpeth Model for the future of insurance can incorporate the need to improve existing and new properties to alleviate the effects of flooding

The Morpeth Model, because of its concept of pooling, does not afford the ability to provide incentive for owners to install resistance and resilience in their properties by a reduction in premiums. The model is based on the need to prevent community blight by making flood insurance affordable to everyone no matter how high the likely risk of flooding.

It is important that resistance and resilience are encouraged as they will improve the quality of the housing stock and will go some way to minimising the trauma and disruption caused by floods.

The model by itself is not a solution for insurance post 2013; it must embrace other concepts for it to be a robust and sustainable future for the insurance market. The building in of resilience, in new build and existing properties, is a requirement that must be addressed.

It is inevitable that new properties will be built in areas that are prone to flooding; currently there are no standards of construction that are enforceable in England and Wales. Scotland has addressed this problem with its Building Regulations. As recently as May 2011 there was an announcement by government that there would be no future requirement in the English and Welsh Building Regulations for property level flood resilience. Standards of resilience must be incorporated in new build; the easiest and most cost effective way of doing this is by introducing new requirements into the Building Regulations. This standard must be consistent across the country; the government cannot expect "Localism" to provide the solution. DCLG, Defra and others produced a guidance document "Improving the flood performance of new buildings" in May 2007. It remains just a guidance document, further action could be taken by government to make the principles binding on new developments.

As mentioned previously, building resilience into existing properties is most cost effectively achieved on reinstatement after a flood. For this reason reinstatement work to flooded properties will need to require Building Regulations Approval to ensure it is up to a minimum standard.

Whilst setting a higher standard of reinstatement will initially have cost implications on the proposed levy, over time it will reduce the exposure of the fund and so cost will also reduce.

Effectiveness of resistance varies depending on type of flood and depth of it. Where levels are likely to be over 0.6m then all it affords is extra time to move possessions out of harm's way before the inevitable happens. There have to be safety concerns as once this depth is reached there could be a sudden rush of water into the property. If external flooding is likely to be prolonged then water will always get in. There are relatively few occasions when the cost of resistance justifies the potential saving on reinstatement. This does not mean there is no place for resistance in the Morpeth Model.

In the Morpeth Flood Action Group insurance survey 16% of owner occupier respondents installed products without the incentive of premium reduction or other financial reward. Most of these did it for piece of mind. More would probably have done so if they could have afforded to at the time. It is important for householders to feel that they are protecting their property into the future. Better advice and targeted financial assistance in the aftermath of a flood is essential.

Improving resistance to a property should also require Building Regulations Approval. Clear independent advice on effectiveness and suitability could then be given at the point of contact with the advantage that standard of workmanship would be monitored. Certification would help guarantee the value of a property which in turn would act as a financial incentive.

For the revised Morpeth Model to be successful in the long term a number of other measures would have to be introduced.

- Resilience and resistance measures need to be built into new properties.
- Resilience measures need to be incorporated in reinstatement work in existing properties where there is a cost benefit.
- Flood repairs, resilience measures and resistance measures need to be subject to Building Regulations.
- Awareness of the effects of flooding needs to be raised, as does awareness of the trauma it brings to all households at risk, and awareness of how these effects can be alleviated through the installation of resistance and resilience measures.
- There needs to be greater awareness on the part of professionals in the construction industry of the effects of flooding and how some of them can be alleviated by good and robust design.
- Housing associations and private landlords should be obliged to look after the wellbeing of their tenants and encouraged to introduce resistance and resilience measures in their properties.
- A database should be established of all properties that are of a recognised standard of flood resistance and resilience. This could be included in Building Regulations data and would be accessible to Loss Adjusters, Insurance Companies and Building Surveyors so that unnecessary work in reinstatement is avoided.
- A system should be set up for collecting data on the effectiveness of different methods of resilience and resistant products after a flood to enable more informed advice in the future.

A financial incentive of reward for saving reinstatement costs has been discussed by the group but without further research into the implications of this it cannot be considered as part of the model.

Appendix A

Analysis of the Morpeth Flood Action Group Survey and the possible effects of installation of resistance

Morpeth flooded on 6th September 2008, the probable return of the event was 137yr by volume and 115yr by flow. Over 800 households were inundated with flood water.

In October 2010 Morpeth Flood Action Group conducted a survey to determine what effects the flood had on insurance premiums and excesses. One of the questions asked was "How deep was the flood water?".

From the returns we can establish whether individual houses would have been saved from inundation if they had had resistance measures installed prior to the event.

Using expected flood depths for different flood probabilities we can also establish which properties would be protected for each likely event.

For the purposes of this analysis there were useable returns from 214 households. Returns from business premises have not been included.

Key findings

- 47% of affected properties would still have been inundated with flood water even if they had had resistance measures installed
- 96% of households that could have benefited from resistance measures would only have done so if the adjoining property, or properties, had also installed similar measures
- 60% of those households that have installed resistance products since the 2008 flood would not have benefited had they installed them before
- Approximately 60% of properties had external flood levels higher than ground floor level for a period of 8hrs or more so rising ground water and penetration through brickwork would have caused internal flooding even if they had been protected with standard resistance measures
- An estimated 50% of properties that were flooded "below floor" made no claim on their insurance

Properties that would still have been inundated with flood water even if they had installed resistance measures.

As part of the survey householders were asked what depth their property flooded to. Whilst resistance measures can prevent water entering, if external flood levels are above 2ft structural damage can occur and it is necessary to let the water in to avoid it.

Chart 1

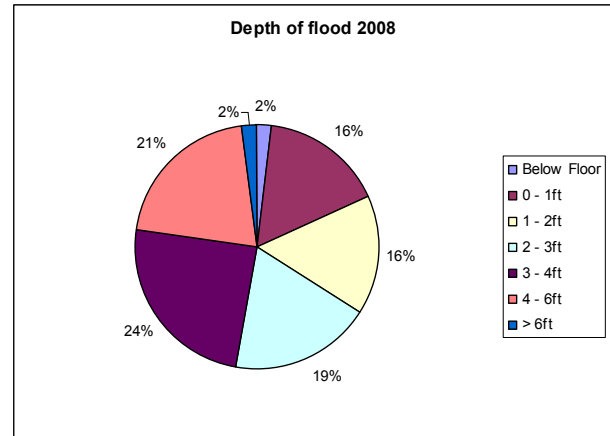
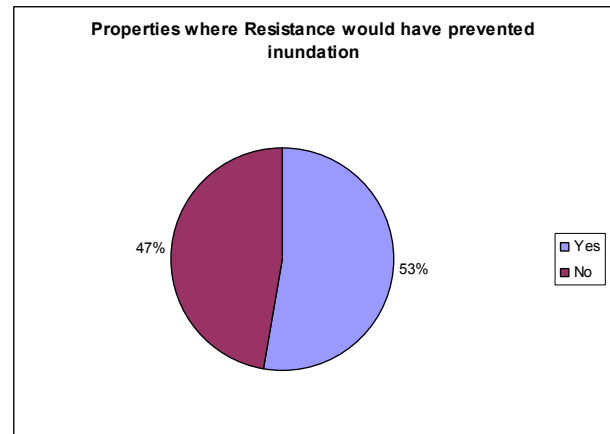


Chart 2



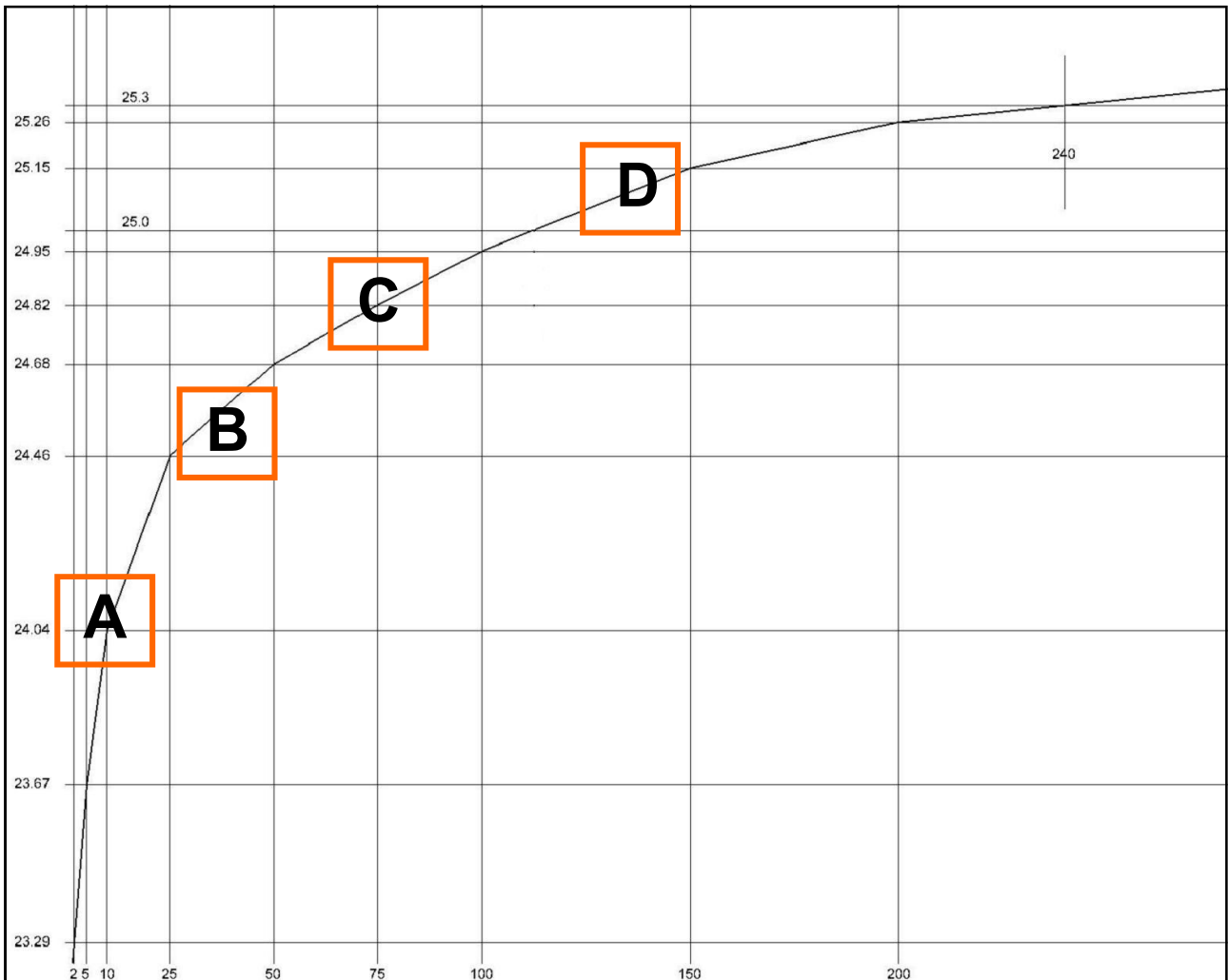
As can be seen from the above charts 1&2, 47% of properties would have been inundated even if they had had resistance measures installed.

96% of those that could have been protected were terraced, semi-detached or flats and so would have required adjoining owners to have similar protection.

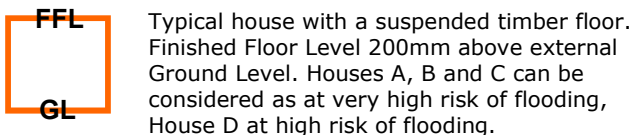
A recent ABI survey of flood claims indicated that only 5% of homes would likely have benefited from resistant products due to them being detached.

Appendix B How the Technical Rate Works

The technical rate is the level an insurance premium should be if it is to reflect risk



Graph showing possible river levels for a typical flood event



Typical house with a suspended timber floor. Finished Floor Level 200mm above external Ground Level. Houses A, B and C can be considered as at very high risk of flooding, House D at high risk of flooding.

Cost of claim

- a. = not flooded £0
- b. = below floor £9000
- c. = 0<150mm £23000
- d. = >150mm £38000

Flood	Depth A	Depth B	Depth C	Depth D
10yr	b	a	a	a
25yr	d	b	a	a
50yr	d	c	a	a
75yr	d	d	b	a
100yr	d	d	c	a
150yr	d	d	d	b
200yr	d	d	d	c

200yr period

Over a period of 200 years there will be 20 floods of at least a 10yr severity:

10yr floods	12
25yr floods	4
50yr floods	1
75yr floods	1
100yr floods	1
200yr floods	1

This spread of events is not necessarily that which would actually occur but is used for demonstrating how the technical rate works

The Technical Rate over a 200yr period

Annual Premiums (£200 added for other risks covered in the standard policy and a 65% loss ratio)

House A	£3370
House B	£1320
House C	£740
House D	£380

Claims costs will vary considerably and are dependant on house size and construction. Figures used are indicative but do reflect likely actual claims.

The Technical Rate over a 200yr period if passive resistance measures have been installed (inundation occurs when external flood levels exceed 750mm)

Flood	Depth A	Depth B	Depth C	Depth D
10yr	b	a	a	a
25yr	b	b	a	a
50yr	b	b	a	a
75yr	d	b	b	a
100yr	d	b	b	a
150yr	d	b	b	b
200yr	d	d	b	b

200yr period

Over a period of 200 years there will be 20 floods of at least a 10yr severity:

10yr floods	12
25yr floods	4
50yr floods	1
75yr floods	1
100yr floods	1
200yr floods	1

a.	= not flooded	£0
b.	= below floor	£5000
c.	= 0<150mm	n/a
d.	= >750mm	£38000

If resistance measures have been built in and they work at each event

	Premium	saving
House A	£1730	£1640
House B	£760	£560
House C	£320	£420
House D	£240	£140

Significant savings in reinstatement costs can be achieved for houses in areas at very high risk of flooding, for houses at high risk the possible savings are unlikely to provide an incentive to purchase products. These savings would only be available to 5% of homes unless resistance could be encouraged at a community level. Possible savings would only apply to properties that experienced flash flooding, where external flood levels remain high for more than 5-8hrs there will inevitably be an ingress of water above floor level.

The Technical Rate over a 200yr period if resilience measures have been incorporated

- A. If resilience is to be built in at the appropriate level after the next flood**
B. If resilience has already been built in

Depth	to build in resilience	reinstatement already resilient*
a. = not flooded	£0	£0
b. = below floor	£10000	£4000
c. = 0<150mm	£26000	£12000
d. = >150mm	£46000	£25000

A. If resilience is to be built in

	Premium
House A	£3770
House B	£1590
House C	£950
House D	£490

B. If resilience has already been built in

	Premium
House A	£2100
House B	£990
House C	£515
House D	£290

It is doubtful that the incentive of premium reduction to install resilience after a flood is adequate in all but homes at the very highest risk of flooding ie. 1 in 25 year return. If premiums were to reflect the cost of resilient reinstatement the next time a property floods then they would become unaffordable.

* While reinstatement construction costs can be reduced by as much as 80% if resilient construction is employed other costs such as alternative accommodation and contents claims may only be minimally reduced.