

**NHBC submission to the APPG for Excellence in the
Built Environment – November 2015**

Inquiry into the Quality of New Build Housing in England

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1. Executive summary

- 1.1 NHBC is pleased to submit a response to the All Party Parliamentary Group's (APPG) inquiry into the quality of new build housing in England. NHBC is the UK's leading standard-setting body and provider of warranty and insurance for new homes. Its role is to support the house-building industry to raise the standards of new homes and provide consumer protection for homeowners.
- 1.2 This response to the APPG inquiry provides information about NHBC's history and current role within the UK house-building industry, including its 'Virtuous Circle' business model of working with the industry throughout the process of designing and building new homes, in order to achieve high standards and protect homeowners. NHBC is also the largest Building Control service provider to the industry. NHBC's supervision of building work for Building Control purposes complements this business model. They both aim to ensure that homes are built to a high standard and minimise the likelihood of a homeowner having to claim under the Buildmark warranty.
- 1.3 To support the APPG's inquiry, this response also provides data on the quality of new build homes. Customer satisfaction, defects and claims data suggests that on the whole high quality homes are being built, although more can be done. On the customer side, the 2015 National New Home Customer Satisfaction Survey finds that 92% of homebuyers would buy a new build home again. 86% were pleased with the overall quality of their new home, up from 76% in 2005, and the same number would recommend their builder to a friend.
- 1.4 With regards to defects, NHBC's data shows that just 0.7% of Buildmark warranty holders per annum experience problems with their homes that stem from latent defects in the design or construction of the home that constitute a valid claim. In general, out of all the homeowners covered by NHBC, less than 5% contact NHBC with issues that result in a valid claim under the warranty period. Furthermore, the UK has not experienced the kind of systemic failures that have occurred recently in other developed countries such as Canada and New Zealand.
- 1.5 Despite the strong record of new build quality, some problems still arise and NHBC believes there is room for improvement in the industry. NHBC recommends and will help deliver:
 - Continual development of NHBC Standards
 - New innovations such as Construction Quality Audits
 - Focused research through the NHBC Foundation which, for example, presents recommendations to help deliver more skilled workers
 - New smarter communications with homeowners, for example, through NHBC's Home User Guide
 - Greater exchange of information and intelligence from other countries to support the UK's standards and the quality of new homes
 - The industry, Government and all stakeholders working together, to communicate the benefits of new homes to potential homebuyers
- 1.6 To summarise, although more can and is being done, the evidence suggests high quality homes are built by the industry in the UK. NHBC's contribution, through its standard setting system and consumer protection developed over 80 years, is world leading and NHBC remains committed to supporting the industry build high quality new homes.

2. Overview of NHBC

- 2.1 NHBC is an independent and non-profit distributing company. With no shareholders, it is able to invest in its purpose to support the house-building industry to raise the standards of new homes and provide consumer protection for homeowners.
- 2.2 NHBC is an insurance company authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority. It does not represent the housing industry and the quality of new homes is ultimately the responsibility of house-builders.
- 2.3 By quality, NHBC is referring to major issues associated with the construction quality of new homes, not design issues such as room sizes or amenity, or planning issues such as parking provision or development density. Every year, over 80% of new homes built benefit from NHBC's Buildmark cover and registered builders agree to build in accordance with NHBC Standards. Today, over 1.6 million homes benefit from the protection of NHBC's 10-year Buildmark warranty.
- 2.4 NHBC was established in 1936 to tackle sub-standard building practices when the UK embarked on a large-scale house-building programme and when homeownership more than doubled from 10% in 1914 to 25% in 1939. In the mid-1960s, with the support of the Government, industry and the Building Societies Association, NHBC introduced a 10-year warranty to protect new homeowners. By the early 1970s, around 90% of all new homes for sale were covered by NHBC's warranty.
- 2.5 Over 1,200 people work for NHBC, including inspection staff, engineers, building surveyors and other technical and professional staff in consultancy services and claims handling. NHBC welcomed 244 new colleagues last year, the vast majority of whom will be supporting NHBC's front-line inspection and NHBC Building Control Services as the industry continues to grow.
- 2.6 The ultimate governing body is the NHBC Council, which comprises the stakeholder bodies as listed in [Appendix A](#). More information on NHBC can be found in the latest Annual Report published online.¹

Virtuous Circle business model

- 2.7 The APPG asks for evidence of practical strategies for improving the quality of new homes. NHBC's purpose - to work with builders to support them in improving the construction quality of new homes - is underpinned by its Virtuous Circle business model (see figure 1). The core of this model, which has driven change for decades, involves actively managing construction risks, rather than simply segmenting and pricing them. NHBC's supervision of building work for Building Control purposes complements this model. They both aim to ensure that homes are built to a high standard and minimise the likelihood of a homeowner having to claim under the Buildmark warranty.

¹ NHBC Annual Report 2014/15

http://www.nhbc.co.uk/cms/publish/consumer/aboutnhbc/annualreport20142015/Annual_Report_2014_15.pdf

Figure 1: The Virtuous Circle business model



2.8 Further information on how NHBC's register² operates is available in [Appendix B](#).

Buildmark warranty

2.9 Buying a home is generally the largest investment people make. The 10-year NHBC Buildmark warranty, or 'Buildmark', has been designed to protect this investment from major defects where the property has not met NHBC Standards. The Buildmark warranty on new homes (including social housing and mixed tenure housing) has the following features:

- Insurance protection for the homebuyer's deposit if, for example, the builder becomes insolvent (from exchange of contracts to completion).
- Initial two-year guarantee: if it becomes apparent there has been a failure to build to NHBC Standards, the builder must put it right when this is reported to them. If they do not, NHBC provides an independent resolution service and guarantees to put things right if the builder still does not do so after NHBC has provided this service.
- A further eight years cover is provided against major defects such as foundation problems, defects affecting the fabric of the building and its weather tightness. [Appendix C](#) provides an illustration of what is covered by NHBC after the initial two-year guarantee and a copy of the policy document is available online.³

² NHBC Rules of Registration

http://www.nhbc.co.uk/NHBCPublications/LiteratureLibrary/RegistrationandCustomerServices/filedownload_15856.en.pdf

³ NHBC Buildmark policy documents

<http://www.nhbc.co.uk/Warrantiesandcover/Homeowners/Findyourpolicydocument>

- In addition, protection against specified imminent risks to health and safety of the occupants is also included where NHBC has provided its Building Control Services (see section 2.11).

2.10 Like any insurance policy there are exclusions, such as wear and tear or failure to carry out suitable repair and maintenance.

Building Control

2.11 The APPG asks about effective control and implementation of regulations impacting on the construction of new homes. NHBC Building Control Services Ltd (BCS) is the largest Building Control body in England and Wales and celebrates its 30th anniversary this year. BCS provides Building Control, the process of helping builders to ensure that Government-set Building Regulations are met on residential, mixed-use and commercial projects of all sizes and complexities. In the 2014/15 financial year, BCS carried out Building Control on over 80,000 new homes across the private and affordable housing sectors.

2.12 NHBC's supervision of building work for Building Control purposes complements its Virtuous Circle business model (see section 2.7). They both aim to ensure that homes are built to a high standard and minimise the likelihood of a homeowner having to claim under the Buildmark warranty. Furthermore, with technical experts to call on in-house, BCS is well-placed to help ensure the health, safety and welfare of all building users by providing a consistent interpretation of Building Regulations throughout England and Wales.

3. Driving construction quality

- 3.1 The APPG asks for practical measures to ensure better quality workmanship. NHBC registered builders must comply with NHBC Standards, which provides the technical benchmark for all newly built and converted homes covered by the NHBC warranty. The NHBC Standards are published as a manual and provides guidance on design, materials and site work for each part of the build process. The NHBC Standards manual is at the core of NHBC's purpose to improve the construction quality of new homes, and its content is regularly updated in order to keep pace with changing regulation and technical innovation.

History in driving construction quality

- 3.2 NHBC's history is one of continuing development as a standards setter, inspection body, insurer and provider of consultancy services – all to the ultimate benefit of homeowners. [Appendix D](#) provides more background with a case study demonstrating how NHBC steps in to support Government, homeowners and industry when issues do arise. NHBC Standards are constantly evolving along with changes in the industry. Examples of Standards introduced by NHBC include the following:
- In 1992, Chapter 4.2 on 'Building near trees' was introduced as a result of extensive foundation failures on dry soils following an unprecedented dry summer
 - In 1999, Chapter 4.1 on 'Land quality – managing ground conditions' was introduced as a result of increased use of brownfield land for residential development
 - In 2005, Chapter 6.9 on 'Curtain walling and cladding' was introduced as a result of an increasing use of Modern Methods of Construction (MMC)
 - In 2007, Chapter 7.1 on 'Flat roofs' was introduced in response to the industry embracing and normalising innovation in roofing, balconies and access
- 3.3 Today, NHBC is the UK's leading standard-setting body and provider of warranty and insurance for new homes. NHBC Standards 2016 is available online and is free for all.⁴
- 3.4 In 2013, NHBC launched 'NHBC Standards Plus'. This is a fully interactive online version of the NHBC Standards and includes a range of supplementary technical information such as links to Technical Guidance, relevant Technical Extra articles and videos available free to registered builders, developers and subscribers.
- 3.5 NHBC also publishes 'Technical Extra' to 30,000 people in the industry. This provides a comprehensive update on the very latest information to support builders in the design and the construction of new homes.
- 3.6 A timeline outlining some key points in the evolution of NHBC's Standards from the 1930s to the present is in figure 2 and a case study relating to standards for floor slabs is in [Appendix E](#).⁵

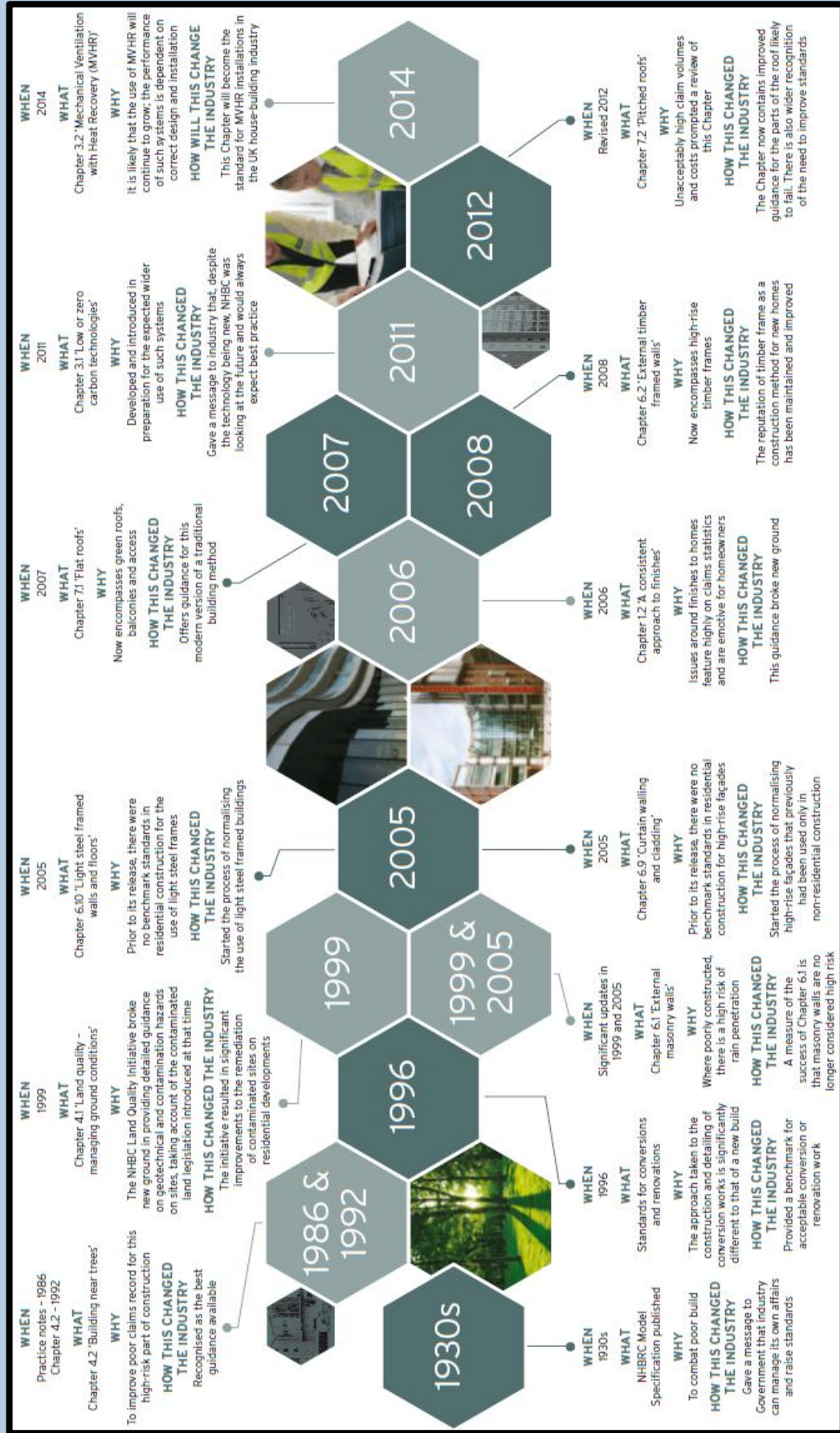
⁴ 2016 edition of NHBC Standards

<http://www.nhbc.co.uk/Builders/ProductsandServices/TechnicalStandards/Standards2016>

⁵ NHBC Annual Review 2012/13

http://www.nhbccampaigns.co.uk/LandingPages/AboutUs/pdf/G203_Annual_Report_2012-13_V16.pdf

Figure 2: NHBC Standards evolution: 1930s - 2000s



Incentivising and rewarding best practice

- 3.7 The APPG is looking for measures to increase construction quality and will be interested in NHBC's annual awards campaign, Pride in the Job (PIJ)⁶, now in its 35th year. It aims to serve homebuyers and builders alike by incentivising and rewarding best building practice in new home construction throughout the UK. Site managers are key to maintaining high levels of construction quality in new homes and PIJ encourages and rewards commitment to this objective by recognising and rewarding top quality site manager work. Competition for the awards is intense and there are approximately 15,000 eligible site managers across the country. Any site manager working on NHBC registered sites is automatically eligible for inclusion.
- 3.8 Similarly, NHBC's Health and Safety Awards⁷ are primarily designed to recognise and reward best practice in health and safety and, in doing so, help to drive up safety standards in the industry. Now in its 7th year, it is the UK's only health and safety awards scheme exclusively for house-builders.

Inspecting construction during build

- 3.9 In the 2014/15 financial year, NHBC carried out 750,000 inspections across the UK. Inspections are focused on specified key stages for each plot, ensuring NHBC inspectors are on site at the times when their independent risk management function can be most effective.
- 3.10 A summary of the NHBC process involves:
- Site Notification and Initial Notice - the process of reviewing non-conventional or higher risk items
 - Landmark Data check - reviewing site geology and history
 - Pre-construction process - including design check, ground conditions and land quality assessments
 - Inspection process - notification and inspection at key stages and unannounced visits based on the technical complexity and quality of the work. For apartment blocks and non-standard construction, a bespoke inspection regime is carried out
 - Reportable Item process - recording defects, tracking them (including feedback to builders' senior management) and ensuring they are resolved
 - Re-inspection process - of critical safety issues and other serious issues
 - Building Control check - to ensure compliance with Building Regulations if NHBC has provided its Building Control Service (see section 2.11)
 - Pre-handover inspection - to ensure that all new homes are suitable for warranty cover
- 3.11 In addition to Key Stage and Frequency Inspections, NHBC inspectors make an initial assessment of the site based on criteria including ground conditions, site exposure, the complexity of the design and specification, and the past performance of the builder. NHBC then judges the level of risk the site is likely to pose and the likelihood of there being any problems as the building work progresses. Those sites with a higher level of risk are targeted for extra inspections and the risk assessment is adjusted during construction depending on the standards of work being produced.

⁶ NHBC Pride in the Job <http://www.nhbc.co.uk/NewsandComment/PrideintheJob>

⁷ NHBC Health and Safety Awards <http://www.nhbc.co.uk/hsawards>

- 3.12 A brief overview of the Key Stage Inspection process for a typical family home is noted below:
- Excavation complete - excavations are inspected before foundations are laid
 - Superstructure - the structure of the property above the damp proof course is inspected, focusing on structural integrity, weather tightness, thermal and sound insulation
 - Pre-plaster - the inspector carries out a visual inspection of the internal structure and the services, such as cables and pipes, that will be concealed later
 - Pre-handover - inspectors focus on the suitability of the home to receive Buildmark cover, including external access, commissioning certificates for services, etc
 - Drains - where NHBC is providing the Building Control Service, a test of drainage is witnessed. Visual checks of drains before they are covered over are also carried out

Data analysis and feedback

- 3.13 Further measures of interest to the APPG will be NHBC's data analysis and feedback process, which drives targeted campaigns to improve standards. During the inspection process, any non-compliance with NHBC Standards or Building Regulations that is noted by NHBC inspectors is recorded on NHBC systems as a 'Reportable Item' and reported to the builder for remedial action. In addition, reports are provided to major builder customers on a quarterly basis, which detail each and every Reportable Item identified on their sites across the UK. Analysis of this data is undertaken by NHBC in order to, for example, identify trends and comparative performance against peer groups. These reports provide valuable management information to builders and are extensively used by them to measure performance of site teams and to identify opportunities for improvement.
- 3.14 On an annual basis, NHBC undertakes an in depth analysis of all available NHBC data including claims data, Reportable Items and Homeowner Customer satisfaction. In addition, a forward view of emerging risks to construction quality and homeowner satisfaction is undertaken. This review process is portrayed in figure 3 and is used to focus on areas for further support and innovation by NHBC, in order to help the industry address key issues identified.

Figure 3: Continuous improvement – data analysis and industry research drives targeted campaigns to improve standards



3.15 Case study - Focused Area Campaign on External Walls

The unprecedented weather conditions in the winter of 2013/14, and the House-building Standards Report on External Walls, highlighted the need to assist the industry in reducing the number of defects and potential claims in this area. As a result, NHBC developed a multi-strand campaign that included improved guidance, training for site managers and technical articles aimed at the industry.

Feedback shows that the External Walls Seminars have been well-received by the industry and will assist in raising construction quality. Nine training events were held for site managers across the UK with over a thousand delegates registering for the events. Furthermore, a number of articles have been released in Technical Extra and four Risk Guides have been published linked to these issues.

Improving customer experience

- 3.16 The APPG also asks for practical strategies to improve customer experience. In 2000, NHBC introduced a voluntary Code of Conduct for Builders to encourage and assist builders in improving the service they provide to their customers. Due to the increasing expectations of consumers, and the necessity to provide higher standards of customer service, NHBC carried out a review of the Code and a new edition was published in April 2006. The Code provided examples of good practice across a number of areas including customer charters, ability and knowledge of staff, delivery of services, and communication with customers. The Code was adopted by many builders who have, as a result, published their own customer charters with a view to providing a reliable service and peace of mind for their customers.
- 3.17 Following the Barker Review in 2004, the Home Builders Federation also used the NHBC Code as a basis for their own voluntary code for their members.
- 3.18 Strongly supported by the industry, and with the crucial backing of NHBC and other warranty providers, an industry-led code was developed over an 18-month period

following the Office of Fair Trading's 'Market Study' in October 2008. The Consumer Code for Home Builders⁸, which came into effect in April 2010, applies to all house-builders registered with the UK's main new home warranty providers, including NHBC. It contains 19 requirements and principles that builders must meet in their marketing and selling of homes, as well as their after-sales customer service.

- 3.19 To ensure the industry was ready for the 2010 launch of the Code, NHBC arranged a series of training seminars by its Training Services, covering how to adopt the Code into customer charters, how to properly train staff to deliver the requirements of the Code, and how to make sure all information (pre and post contract) is Code compliant. Advice was also provided on how to deal with after-sales service and the handling of complaints.
- 3.20 The APPG is interested in practical strategies being taken within the industry to improve the new homeowner experience and also asks about the provision of smarter information to new homeowners. To add value for homeowners protected by the Buildmark warranty, NHBC has recently launched an innovative and free online service designed to take some of the stress out of buying, moving into and running a new home. NHBC's Home User Guide⁹ (also known as NHBC HUG) provides useful information to the homeowner on their new home such as detailed floor plans, the materials used in the build and all the operating manuals for the new appliances included with the new home. NHBC HUG is available from plot reservation and is accessible from a computer or tablet, providing a secure place for homeowners to access all the information needed about a new home.
- 3.21 **Case study - Improving the quality of new homes at handover**

In the late 1990s, a source of customer dissatisfaction was identified as homes were being offered as 'complete' by builders although important (but often quite small) items were not finished. As a result, in 2002 NHBC changed its inspection system. All homes were required to have a final inspection before a notice of insurance cover could be issued.

The Council of Mortgage Lenders (CML) supported this inspection system by requiring that all new homes had a satisfactory pre-handover inspection before they would release mortgage funds. This requirement was introduced in England and Wales in 2003, in Scotland in 2004, and in Northern Ireland in 2006. NHBC led the industry in implementing this initiative.

This initiative had a significant effect on the house-building industry and was seen by house-builders as having made a critical contribution to improving customer satisfaction. A key lesson to be drawn from this initiative is that the partnership between CML and NHBC, working with house-builders and their trade associations, is a powerful driver for improvements in customer satisfaction.

⁸ Consumer Code for Home Builders <http://consumercodeforhomebuilders.com>

⁹ NHBC Home User Guide <http://www.nhbc.co.uk/Productsandservices/HomeUserGuide>

International perspective

- 3.22 The International Housing and Home Warranty Association (IHHWA) hosts fact-finding visits for countries around the world to learn about the UK system of managing house-building quality and the construction process. It also facilitates a forum for sharing best practice, current issues and potential risks in new home construction and homeowner protection through warranty provision.
- 3.23 When comparing the UK to other countries around the world, it is clear that many developed countries have suffered severe problems with their new homes that should not happen in the UK due to NHBC processes outlined in this section. [Appendix F](#) provides international case studies on the following:
- Use of improper aggregate (pyrrhotite) in Québec, Canada
 - “Leaky condo crisis” in British Columbia, Canada
 - Weather tightness issues in New Zealand
- 3.24 As a result of the environmental scanning activities outlined in section 3.13, NHBC regularly commissions research and risk assessments. For example, as a result of the systemic failures experienced in Québec, caused by the use of pyrrhotite (a close mineral relative of pyrite), NHBC engaged with the UK industry and commissioned research and a risk assessment of the likelihood of the pyrite problem occurring in new homes in the UK. The research concluded there is a low risk in the UK, but it prompted changes to NHBC Standards and authoritative national guidance from NHBC to support the industry.¹⁰
- 3.25 NHBC therefore recommends to the APPG that more can be done to support the exchange of intelligence between countries on construction and quality issues through, for example, an online portal.

¹⁰ Technical Extra, October 2011 (p12)

<http://www.nhbc.co.uk/NHBCPublications/LiteratureLibrary/Technical/TechnicalExtra/filedownload,44936.en.pdf>

4. Assessment of the quality of new homes

- 4.1 As part of the APPG's inquiry into the quality of new build housing, it is seeking evidence on homeowner experience and satisfaction. NHBC has collated the latest data it holds on the quality of new homes and customer experience to help support the APPG's work.

Are UK homes suffering from defects?

- 4.2 A claim involves damage to the home arising from a defect – a defect being non-compliance with NHBC Standards – and is therefore less than acceptable construction quality. NHBC's data shows that just 0.7% of Buildmark warranty holders per annum experience problems with their home that stem from latent defects in the design or construction of the home that constitute a valid claim.

0.7% OF BUILDMARK WARRANTY HOLDERS EXPERIENCE PROBLEMS WITH THEIR HOME THAT STEM FROM LATENT DEFECTS THAT CONSTITUTE A VALID CLAIM

- 4.3 Of those that did experience problems during the Buildmark warranty period, 76% of the necessary remedial works cost less than £5,000 and 90% cost less than £10,000. This suggests an effective process is being delivered, but that more could still be done to support the delivery of quality new homes.

Are homebuyers pleased with their new home?

- 4.4 NHBC, working with the Home Builders Federation, conducts a large annual consumer satisfaction survey. In the latest survey, covering the twelve months from October 2013 to September 2014, 67,710 questionnaires were sent out and 38,074 were completed - an outstanding response rate of 56%.¹¹
- 4.5 The latest data shows that in recent years, the percentage of homeowners who would recommend their builder to a friend has risen from 75% in 2005 to 86% in 2014.¹² The same number was pleased with the overall quality of their new home, up from 76% in 2005. The latest survey also finds that, of the 38,074 new homeowners surveyed, 92% would buy a newly built or newly converted home again.

86% OF NEW BUILD HOMEOWNERS WOULD RECOMMEND THEIR BUILDER

- 4.6 The Consumer Satisfaction Survey was launched in 2005 and the statistical methodology used in the analysis of this survey has been approved by the Statistical Services Centre at the University of Reading. The methodology is principally the same as in the first survey, published in 2006, for which Ipsos MORI acted as a consultant. Industry results are weighted by builder to take account of the number of

¹¹ HBF National New Home Customer Satisfaction tenth survey (March 2015 results)

http://www.hbf.co.uk/fileadmin/documents/Customer_Satisfaction/HBF_CSS_MARCH15_WEB.PDF

¹² HBF National New Home Customer Satisfaction Survey Results (February 2006 results)

<http://www.hbf.co.uk/policy-activities/customer-satisfaction-survey/previous-years-results>

eligible homes they have built in the year. Individual company results are not weighted.

How many homeowners contact NHBC to make a claim?

- 4.7 NHBC’s claims experience also demonstrates that in general, out of all the homeowners covered by NHBC, less than 5% contact NHBC with issues that result in a valid claim under the warranty period.

LESS THAN 5% CONTACT NHBC WITH ISSUES THAT RESULT IN A VALID CLAIM UNDER THE WARRANTY PERIOD

Room for further improvement

- 4.8 Despite the strong record in the UK, NHBC believes more can be done to improve the quality of new homes and to assist the industry in keeping quality high during the current period of volume growth. Growth in the number of homes being built inevitably adds pressure to the quality of new homes (see figure 4).¹³



- 4.9 The next section focuses on innovative and step change initiatives that NHBC is pursuing to support the industry during this period of growth.

¹³ HBF National New Home Customer Satisfaction tenth survey (2006-2015 results)
<http://www.hbf.co.uk/policy-activities/customer-satisfaction-survey/previous-years-results>

5. Investing to improve the quality of new homes

5.1 The APPG is seeking potential solutions and innovations that will provide practical strategies to raise the quality of new homes. NHBC believes more can be done to help support the delivery of quality homes and therefore actively seeks opportunities to support and help the house-building industry drive up construction quality still further during this period of growth in house-building. Underpinned by its Virtuous Circle business model (as detailed in section 2.7 and figure 1), NHBC believes it is fundamental to understand the underlying causations that lead to, or permit, construction quality that does not meet expectations. This section outlines how NHBC is implementing a new package of measures to help ensure the quality of new homes remains high.

Innovation

5.2 NHBC is implementing a Raising Standards Roadmap, which seeks to support the house-building industry raise standards itself through the provision of data, information, guidance and support. This is founded in the research undertaken by NHBC and encapsulates a package of initiatives based around a number of propositions outlined in figure 5.



Construction Quality Audits

5.3 In 2016, NHBC will introduce Construction Quality Audits (CQAs) of sites under construction and registered for Buildmark warranty. These audits will involve NHBC's Inspection Managers undertaking structured detailed audits of construction quality throughout all construction stages. CQAs will include photographic evidence of construction quality being produced and will assign a 'score' to each element audited and, in addition, the underlying causation behind the level of quality being achieved will be recorded. The macro level data collected will be analysed and used to provide consultative feedback at industry and builder-specific levels in order to assist the industry in identifying opportunities for improvement and importantly, how this may be achieved. Key objectives of the CQAs include:

- A quality audit process guided by a Driving Standards app
- The provision of a new 'quality' data platform, rich in technology and live factual (quality) data to aid builder senior management and NHBC

- Informing the NHBC Raising Standards Strategy, Quality Index, NHBC Standards and highlighting potential industry/business training requirements

Construction Quality Indicator

5.4 Data collected during CQAs will also be harnessed to produce an evidenced based Construction Quality Indicator. NHBC is currently working on the development of such an indicator in conjunction with the Statistical Services Centre at the University of Reading. Over time, such an indicator could be utilised to focus and drive builder behaviour.

Register of Site Managers

5.5 Recognising the pivotal role that site managers play in delivering high quality new homes, and the fact that their development is a key factor in the on-going success of the industry, a new Register of Site Managers will be a confidential online register aimed at capturing key information that reflects site manager experience, qualifications and capability in relation to construction quality. The register is currently in development and will be launched in 2016. Key objectives include:

- Incentivising and facilitating site manager development and consequential impact on construction quality
- Creating a more effective communications channel
- Providing site managers with access to a resource of useful information and initiatives
- Providing site managers with an opportunity to differentiate themselves via key attributes
- Providing a referral point as part of the recruitment process via a time limited unique identifier

House-building Standards Reports

5.6 As part of this innovative package, the *House-building Standards Reports* utilise NHBC's extensive data sets on claims experience and also include national comparative analysis. The reports analyse 'generations' of homes by grouping together claims by the year that homes were completed. Various factors may have influenced when and how many claims have occurred, for example climatic events, build volumes, stage in the economic cycle, changes in materials, company acquisitions, new regulations, changes in build type etc. By comparing generations, it may be possible to establish what the root cause (or contributory factors) behind any significant areas of claims may have been. In this way, the reports may be used to inform future practice both to drive out defects and drive down cost. These reports are not designed to look in detail at specific claims, but to identify overarching trends, pose questions and stimulate change.

Modern Methods of Construction

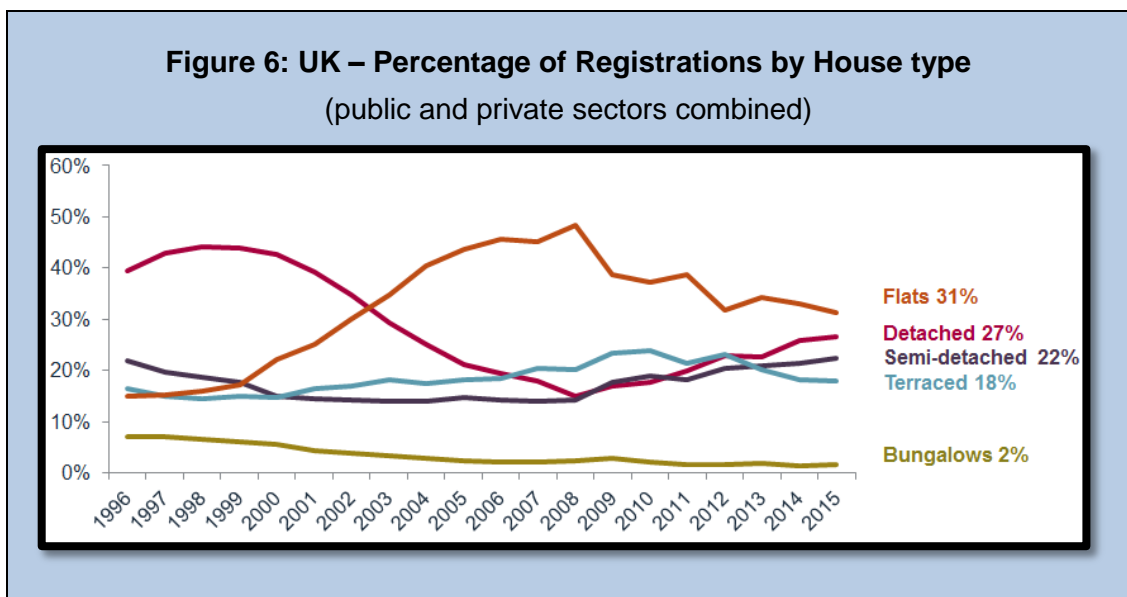
5.7 There are a number of market pressures, which could encourage those engaged in house-building to consider using Modern Methods of Construction (MMC). Off-site and MMC are innovations that could provide longer-term solutions. NHBC is open to innovation but believes such systems must be thoroughly tried and tested to understand both the potential advantages and risks of innovation. The demand for more homes than the market is building, combined with the skills shortage, point to

alternative approaches such as volumetric units and framing methods. NHBC has commissioned, through the NHBC Foundation, research aimed at gaining a better understanding of the issues at hand such as:

- Which problems, being experienced with conventional construction, are stimulating interest in MMC?
- To what extent are companies already embracing MMC and why?
- To what extent do companies have plans to embrace MMC in the near future, or are exploring the possibility to, and why?
- What are the reasons for not wishing to embrace MMC; what would it take for them to do so?
- What are the experiences of those who are using MMC; what works well; what works less well? What issues have been encountered to date and what other barriers are there to use?
- Are there any future drivers or developments that would be likely to encourage use or not of MMC?
- Would quality be improved by making greater use of MMC?
- Costs of MMC - what is the evidence; what are the perceptions?
- Why does timber frame have a greater market share in Scotland than in the rest of the UK?

Major Project Developments

5.8 NHBC has a strong track record in responding to changes in the housing market. The following chart (figure 6) illustrates the significant change in the type of new housing being built, from detached houses to flats in the 2000s.¹⁴ With London in particular having a greater proportion of flats than the national average, NHBC has responded by setting up a dedicated new team to manage the growing number of large and complex projects in London.



¹⁴ NHBC press briefing, July 2015

http://www.nhbc.co.uk/cms/publish/consumer/NewsandComment/Stats/Q2_2015.pdf

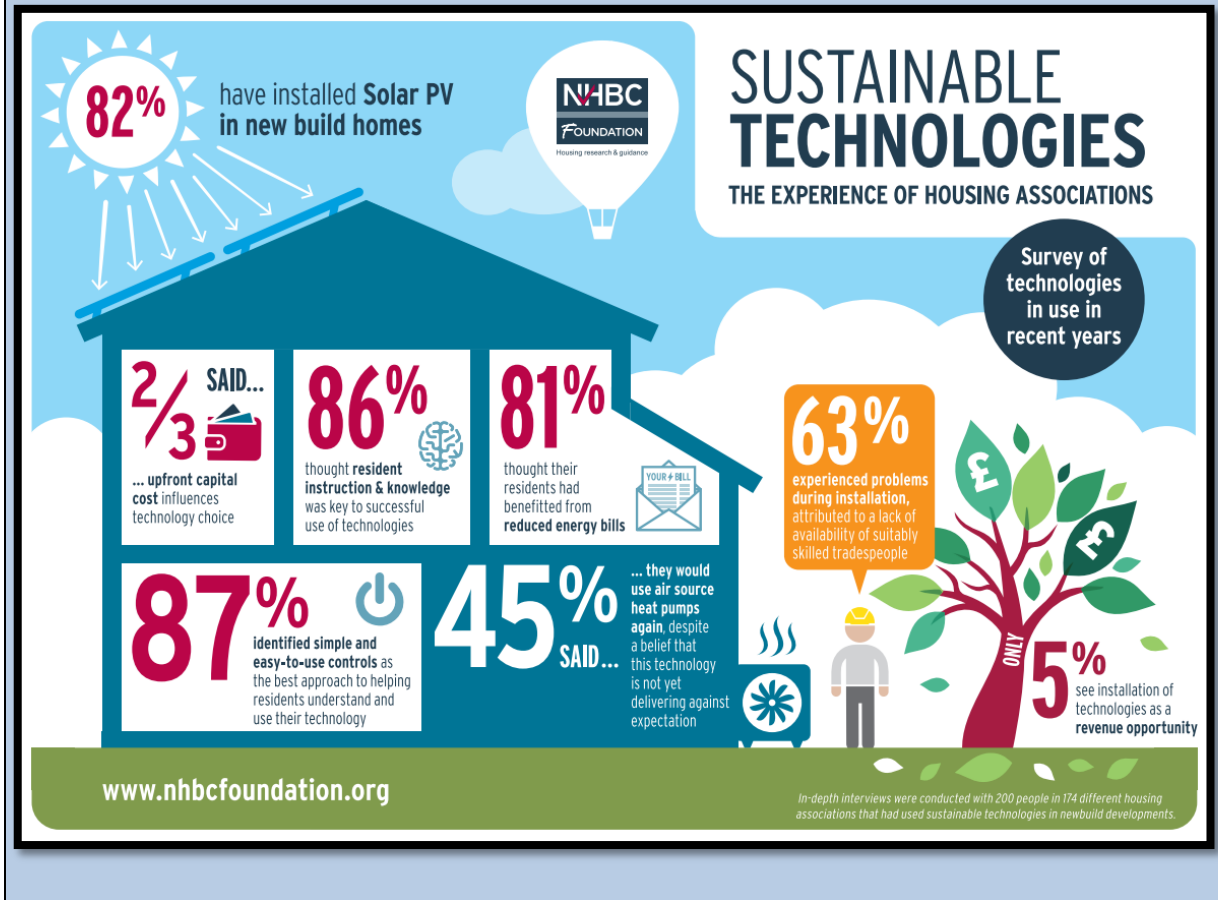
Research

- 5.9 The APPG asks about research and new technology. NHBC believes investment in good quality research is vitally important to raising standards. The NHBC Foundation¹⁵, or the 'Foundation', is funded by NHBC and is recognised by the industry for its high quality research reports, as well as the practical guidance it provides. Established in 2006, its research programme supports the house-building industry in meeting the challenges of delivering 21st century homes. The programme has delivered a significant portfolio of research reports and guidance on sustainable homes, risk management and consumer issues. In addition to these topic areas, the Foundation gives high priority to research, which has a bearing on the supply of new homes, and work that aims to deliver improved technical guidance for designers and house-builders.
- 5.10 The Foundation research projects are designed to meet one or more of the following objectives, which link closely to the areas the APPG is interested in:
- An improved understanding of the performance of new homes and their systems
 - More effective advice for homeowners and occupants on the operation of their homes
 - Clarification of robust, technical options and solutions available to designers and house-builders
 - More informed debate and action to address issues impacting on national housing supply
- 5.11 An example for the APPG of the practical support provided by Foundation research in raising the quality of new homes is outlined in a publication from May 2015. The housing association sector has been at the forefront in the adoption of sustainable technologies, and Foundation research focused on their experiences of the variety of energy-efficient and water saving features. Surveying over 200 housing associations, the *Sustainable technologies: the experience of housing associations*¹⁶ report found that solar PV is the most popular choice, with around three quarters saying that they would use PV products again in the future.
- 5.12 Notably, the research found that 63% of respondents from the sector experienced problems during the installation of sustainable technologies (see figure 7). This was largely attributed to a lack of availability of suitably skilled tradespeople. The research recommends the housing association sector should develop a centralised resource to support further learning and development around the use of these technologies.

¹⁵ NHBC Foundation reports and information <http://www.nhbcfoundation.org>

¹⁶ NHBC Foundation, 19 May 2015 <http://www.nhbcfoundation.org/Publications/Primary-Research/Sustainable-technologies-NF6>

Figure 7: Sustainable technologies: the experience of housing associations



- 5.13 The APPG seeks information about smarter homes. The Foundation report, *Homes through the decades*¹⁷, released in March 2015, charts the making of the modern home from the 19th century. It provides an in-depth guide that demonstrates how Britain’s homes have changed over the past two centuries and the interaction that society, politics, technology and culture have played in the making of the modern home. It further notes how people living in modern homes today have greater protection than their predecessors through the introduction of Building Regulations, comprehensive building standards and warranties. As the UK seeks to establish a new generation of new homes, the research suggests that it is crucial to continue to promote the high quality standards of the modern home.
- 5.14 NHBC also funds the Zero Carbon Hub (ZCH)¹⁸, which had operational responsibility for achieving the Coalition Government’s target of delivering zero carbon homes in England from 2016. Despite the decision by the Government to pause the zero carbon homes policy, the ZCH is continuing its focus to improve industry skills and knowledge of low energy building, at a time when previous changes to Building Regulations are continuing to bed in.

¹⁷ NHBC Foundation, 26 March 2015 <http://www.nhbcfoundation.org/Publications/Guide/Homes-through-the-decades-NF62>

¹⁸ For full information about the Zero Carbon Hub’s publications and events <http://www.zerocarbonhub.org>

6. Challenges and solutions: skills and promoting new homes

Skills

- 6.1 As pointed out by the APPG, the industry faces a number of challenges to support the Government in delivering increased levels of homeownership. Perhaps the biggest challenge facing the industry is the availability of a highly skilled workforce, which during a period of growth in housing supply, is adding further pressure on quality. This shortage is primarily due to the fact that experience is lost during a recession and the industry struggles to recruit enough of the right people, with the right skills, as demand rises again.

The challenge

- 6.2 The *Home Building Skills 2020* report, published in 2010 and led by NHBC, the Zero Carbon Hub, the Construction Industry Training Board and the Home Builders Federation, suggests that the impact of the skills shortage is more significant for house-building than for construction in general.¹⁹ Part of the reason for this is that the range of career opportunities in house-building is yet to be differentiated from construction in a way that is understandable to young people and their advisers. The lack of information about careers in house-building appears to be a major obstacle to improved recruitment of the enthusiastic and talented young people that the industry needs.

Practical solutions

- 6.3 From NHBC's perspective, following a surge in new homes in 2012, it launched its largest recruitment campaign for over a decade with almost fifty new inspectors joining the company by the end of 2013. Engineers and building surveyors were also recruited to support the increased growth in house-building.
- 6.4 In 2013, and to support its recruitment campaign, NHBC was delighted to also reopen the doors of its training academy to new recruits for the first time since the economic downturn in 2007. NHBC's Operations Academy designs and delivers technical training and assessment for all Operations staff within NHBC. It also manages the new starter training within NHBC Operations and all the NHBC Technical Trainees.
- 6.5 To support the house-building industry, NHBC provides a range of training courses, qualifications and e-learning programmes. In the 2014/15 financial year, NHBC delivered 4,800 delegate days of training for the industry, including health and safety management and technical courses.
- 6.6 Furthermore, the Foundation commissioned research to establish a better understanding of how young people view house-building as a career of choice. NHBC hopes this research will provide insights to improve the recruitment of young people, and to resolve the generational issues of the skills shortage.
- 6.7 To help ensure the challenges of the industry are overcome - one of the areas of interest to the APPG - it is essential the skills issues are addressed. Therefore, below

¹⁹ Zero Carbon Hub, 1 October 2010

http://www.zerocarbonhub.org/sites/default/files/resources/reports/Home_Building_Skills_2020_Report_and_Recommendations_October_2010.pdf

is a summary of the key findings of a Foundation report, *A career of choice*²⁰, published in March 2014:

- 6.7.1 Young people's interest in careers in the building and construction sector was compared with that for other sectors. For boys and young men, interest in building and construction was broadly on a par with other sectors, for example exceeding the level of interest shown for banking and financial services. For girls and young women, building and construction was the sector of lowest interest.
- 6.7.2 For house-building, young people could often identify jobs in the trades but, apart from architecture, were largely unable to identify professional job areas.
- 6.7.3 Boys and young men showed a good level of interest in careers in a range of practical, technical and managerial job areas in house-building. Girls and young women were overall less interested than boys and young men, but nevertheless showed more interest in house-building career options than they had shown for careers in construction in general.
- 6.7.4 For the young people surveyed, interest in house-building careers was highest for those at school aged between 14 and 15. Overall levels of interest were only slightly lower among students in sixth form, sixth form college or college. In comparison, those at university had a lower interest in careers in house-building though, notably, their level of interest was generally higher than that for construction in general.
- 6.7.5 The research explored the use of positive language about house-building. A series of statements, designed to appeal to different emotions, ambitions and outlooks, made many young people more positive about careers in house-building.
- 6.7.6 The research also highlighted how young people currently obtain information on possible careers. It emphasised the importance young people place on visits to employers and presentations received at their place of study by visiting advocates and role models.
- 6.7.7 Young people are found to rely heavily on their parents as a source of guidance and advice on careers. 57% of young people saw their family as the first port of call for a discussion on careers. Furthermore, a third regarded their family (who typically have a limited understanding of house-building) as their most valued advisor on careers.
- 6.7.8 The majority of career development professionals (55%) surveyed in this research felt they would not be confident in explaining the difference between jobs in house-building and those in the wider construction sector.
- 6.7.9 The lack of clear information on professional careers in house-building was seen as a major barrier to recruitment by many stakeholders who contributed to this research.

²⁰ NHBC Foundation, 9 March 2014 <http://www.nhbcfoundation.org/Publications/Informing-the-debate/A-career-of-choice-NF61>

Promoting new high quality homes

The challenge

- 6.8 NHBC recommends that, although more can and is being done, Government, industry and all stakeholders work together to promote consumer awareness of the high quality homes built in the UK.

INDUSTRY, GOVERNMENT AND ALL STAKEHOLDERS MUST UNITE TO COMMUNICATE TO CONSUMERS THAT NEW HOMES IN THE UK ARE AN EXCELLENT PRODUCT

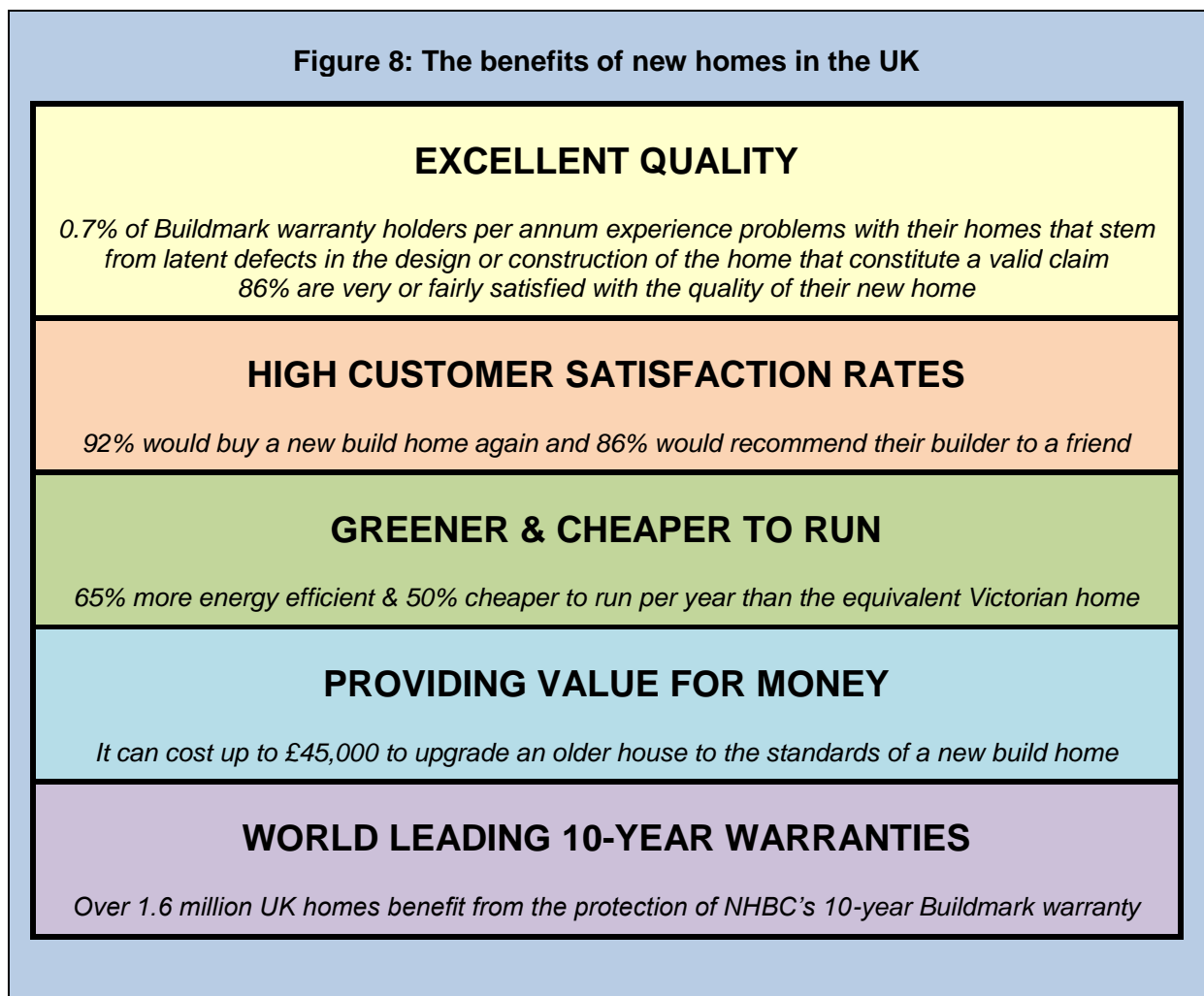
Practical solutions

- 6.9 There is a real opportunity to promote the desirability of new homes and bring together organisations that have a part to play in every aspect of improving the quality of new-build housing – from architects, designers, technologists and construction teams – as the Government, and all political parties, seek to boost house-building in the UK.
- 6.10 Some of the benefits for new homebuyers are outlined in the annual Customer Satisfaction Survey.²¹ Within the context of the APPG's interest in the customer experience, it is important to ensure new homebuyers are aware of the benefits of living in a newly built home, which are summarised below:
- 6.10.1 Lots of ways to buy: Buying a house can seem like an impossible dream but people looking to buy new have a range of options, such as Help to Buy or part exchange schemes. These can help make the ultimate goal of homeownership more affordable and completely achievable.
- 6.10.2 High build quality: New homes are built to a higher standard than ever before and the industry Customer Satisfaction Survey results reflect this. From state of the art kitchens to modern double and triple glazing, the quality of a new home compared to old is evident in many ways.
- 6.10.3 Designed for modern living: New homes are designed for modern living, and utilise a range of modern designs and technologies to provide for the needs of today's homeowner. To upgrade an older house to the standards of a new build home could cost around £45,000.²²
- 6.10.4 Cheaper to run: New homes built in the UK are roughly 50% cheaper to run per year than the equivalent Victorian house. That could mean an annual saving of £440 for a 1-bed ground floor flat, and £1,410 for a 4-bed detached house.

²¹ HBF National New Home Customer Satisfaction Survey (March 2015) <http://www.hbf.co.uk/policy-activities/customer-satisfaction-survey>

²² HBF National New Home Customer Satisfaction Survey (March 2015) <http://www.hbf.co.uk/policy-activities/customer-satisfaction-survey>

- 6.10.5 High customer satisfaction rates: The overall level of customer satisfaction has improved over the last ten years from 76% in 2005 to 86% in 2014 (see figure 4).
- 6.10.6 Environmentally friendly: Energy efficiency standards and CO2 emissions in new homes are some of the best in the world. On average, this equates to them being roughly 65% more energy efficient than an equivalent Victorian house.
- 6.10.7 Peace of mind: Peace of mind is more than just knowing you are buying quality and getting great value for money. It is also about being confident in the product you are buying and knowing that you are protected should anything happen. New homebuyers are protected by their builder's guarantee as well as an independent 10-year warranty - most likely NHBC Buildmark. Customers are also covered by the Consumer Code (see section 3.18).
- 6.11 The following chart (figure 8) could be a tool to communicate the high standards of new homes in the UK, and the significant benefits for new homebuyers. NHBC would be pleased to proactively work with the APPG and the housing industry to help promote new high quality homes, and the range of benefits offered by new homes, to potential homebuyers across the country.



7. Conclusion

- 7.1 As the UK's leading standard-setting body and provider of warranty and insurance for new homes, NHBC is an independent organisation and a non-profit distributing company. It does not represent the housing industry and, while ultimate responsibility for the quality of new homes falls with house-builders, NHBC works to support the industry to deliver high quality homes and provides consumer protection for homeowners.
- 7.2 This response concludes that although more can be done:
- As a whole, the industry is building high quality homes in the UK and furthermore, the UK has not experienced the kind of systemic failures that have occurred recently in other developed countries such as Canada and New Zealand
 - The 2015 National New Home Customer Satisfaction Survey finds that 92% of homebuyers surveyed would buy a new build home again, and 86% were pleased with the overall quality of their new home, up from 76% in 2005
 - With regards to defects, NHBC's data shows that just 0.7% of Buildmark warranty holders per annum experience problems with their homes that stem from latent defects in the design or construction of the home that constitute a valid claim
 - In general, out of all the homeowners covered by NHBC, less than 5% contact NHBC with issues that result in a valid claim under the warranty period
- 7.3 Despite the strong record of new build in the UK, problems still arise and NHBC believes there is room for improvement in the industry. NHBC recommends and will help deliver:
- Continual development of NHBC Standards
 - New innovations such as Construction Quality Audits and a Construction Quality Indicator
 - Focused research through the NHBC Foundation which, for example, presents recommendations to help deliver more skilled workers
 - New smarter communications with homeowners, for example, through NHBC's Home User Guide
 - Greater exchange of information and intelligence from other countries to support the UK's standards and the quality of new homes through, for example, an online portal
 - The industry, Government and all stakeholders working together, to communicate the benefits of new homes to potential homebuyers
- 7.4 To summarise, although more can and is being done, the evidence suggests high quality homes are built by the industry in the UK. NHBC's contribution, through its standard setting system and consumer protection, is world leading and has been developed over 80 years. NHBC believes all stakeholders should work together to promote the benefits of new homes to potential homebuyers and is fully committed to delivering its purpose of raising standards and protecting homeowners.

Appendix A: The NHBC Council

The following organisations are represented on the NHBC Council

NHBC Warranty Holders	The Housing Forum
British Board of Agrément	Institution of Civil Engineers (ICE)
Institute of Consumer Affairs (ICA)	Joseph Rowntree Trust
British Property Federation (BPF)	Law Society
British Standard Institute	National Association of Estate Agents (NAEA)
Building Research Establishment (BRE)	National Housing Federation (NHF)
Chartered Institute of Housing (CIH)	Royal Institute of British Architects (RIBA)
Construction Products Association (CPA)	Royal Institution of Chartered Surveyors (RICS)
Council of Mortgage Lenders (CML)	Trading Standards Institute (TSI)
Design for Homes	Members of the NHBC Board
Energy Saving Trust	
Federation of Master Builders (FMB)	
Home Builders Federation (HBF)	

Appendix B: The Rules of Registration

How NHBC's Register works

All builders and developers registered with NHBC agree to comply with our Rules of Registration and to ensure that all new homes are constructed in accordance with the NHBC Standards.

Before NHBC agrees to accept a builder or developer onto its register, NHBC carries out commercial and technical assessments. As part of the commercial assessment, NHBC takes up financial and other references for all applicant builders, and may carry out company and/or personal searches via licensed credit reference agencies. If there are any adverse financial reports, NHBC may reject the application.

The technical assessment requires the applicant builder to satisfy NHBC that they have adequate and proven technical and management capabilities, and adequate procedures for managing health and safety. Past and current work, together with any previous or current association with an NHBC registered builder/developer, will be taken into account. They will also be required to attend a presentation about NHBC, its rules and procedures.

Only when a builder or developer has received written confirmation that they are registered with NHBC, can they advertise themselves as being registered or confirm that cover for any home will be provided.

By vetting builders in this way and with NHBC's ongoing review of registered builders' performance (i.e. taking into account claims experience, etc.), NHBC is able to provide further protection for consumers.

Appendix C: NHBC Buildmark overview

What is covered by NHBC (3-10 years)

Physical damage to the parts illustrated because they were not built to NHBC requirements.

Walls, external cladding, curtain walling, external render and external vertical tile hanging

Foundations and below ground drainage

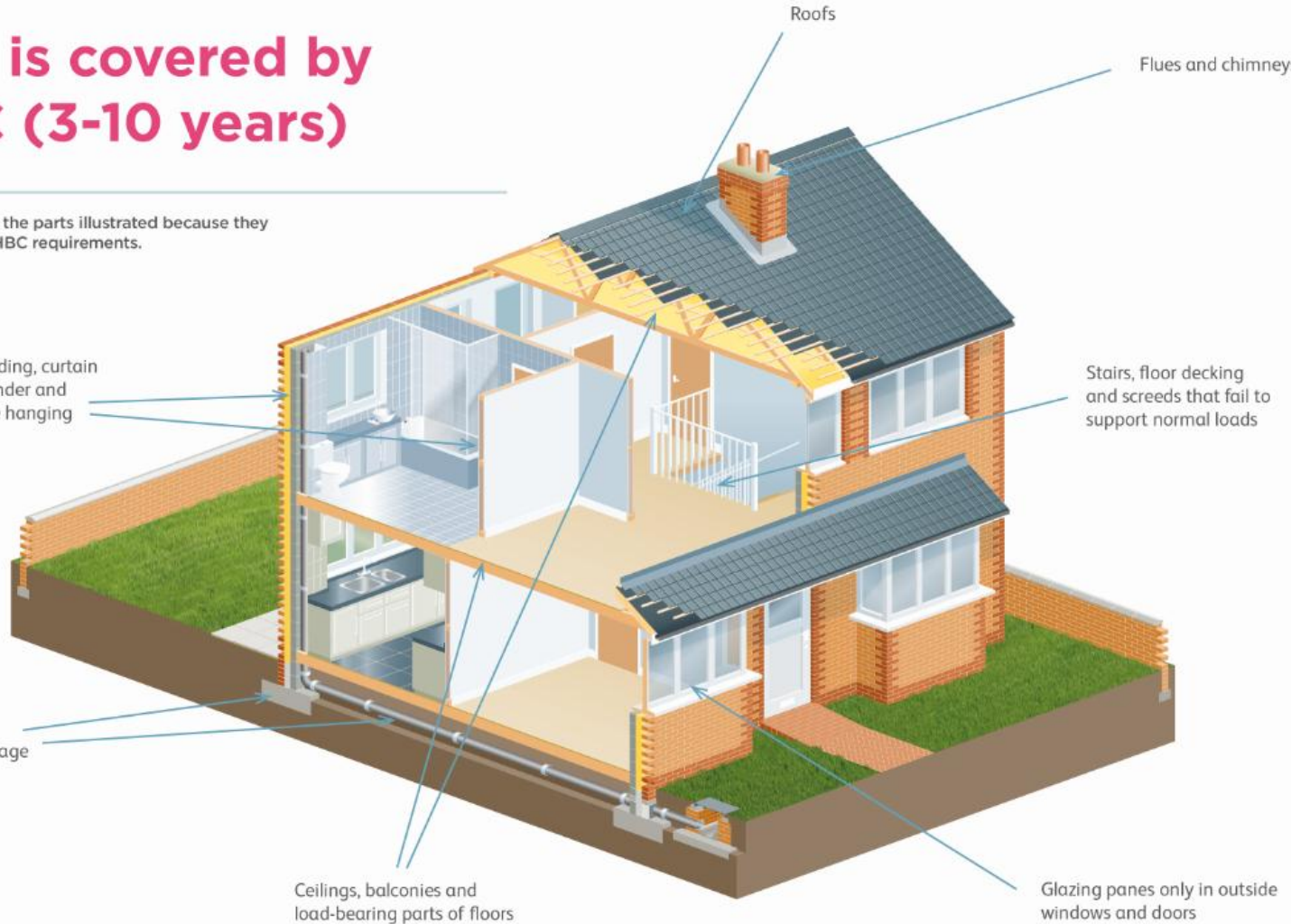
Ceilings, balconies and load-bearing parts of floors

Roofs

Flues and chimneys

Stairs, floor decking and screeds that fail to support normal loads

Glazing panes only in outside windows and doors



Appendix D: Case study - PRC Homes

In the post-war period, a variety of precast reinforced concrete (PRC) house-building systems were developed for the council house-building programme and, following the introduction of the Right to Buy legislation, many of these homes were sold to the tenants. In 1981, a fire in an Airey-type PRC house in Bradford exposed its structural elements, which were found to be in poor condition as a result of carbonation due to inadequate cover to the reinforcement. After a survey undertaken by the Building Research Establishment (BRE), more than twenty types of PRC home were designated defective and immediately became unmortgageable. To restore public confidence and mortgageability, the Government set up a grant scheme, which provided a 90% contribution towards the cost of repairs.

To ensure that the homes were repaired properly and public money was spent appropriately, the Government approached NHBC to set up and administer a repair scheme, which it did through a subsidiary called PRC Homes Ltd.

With representation from Government, lenders, local authority associations, NHBC and BRE, a PRC Assessment Committee was set up. Its first task was to establish the criteria for repairs that would achieve 'general mortgageability' (that is, with most lenders lending, and on normal terms). Key amongst these was that the repaired homes should have a life expectancy of 60 years, comparable to 'traditional' houses; and that all structural elements should be removed and replaced or made structurally redundant, rather than patch repaired, to remove doubts about whether their condition had been properly assessed and whether they may deteriorate subsequently.

Designers (mostly engineering practices and builders) were invited to develop repair systems for individual PRC house types, and each system was documented. The proposals were then submitted to the Assessment Committee for consideration, the Committee raising detailed technical queries on each.

A PRC Assessor (an engineering firm approved by the Committee) was then appointed to work with the designer, at that designer's expense, to resolve any queries and report back; and once the Committee was satisfied that all issues had been resolved, the repair system would be licensed.

NHBC then:

- Established a register of licensed PRC Repairers, with all firms joining the register subjected to technical and financial vetting, and then able to use a licensed repair system to undertake repairs registered with PRC Homes Ltd*
- Established a network of licensed PRC Inspectors (mostly consulting engineers) who were required to undertake inspections at key stages and issue a PRC Certificate of Completion upon satisfactory completion*
- Issued a 10-year warranty on satisfactory completion, similar to the Buildmark warranty for new homes available at the time*

Through this scheme, more than 13,000 homes were repaired, with grant assistance. Repair systems were developed for most of the defective PRC house types and many building firms entered the market, providing a reasonable degree of competition.

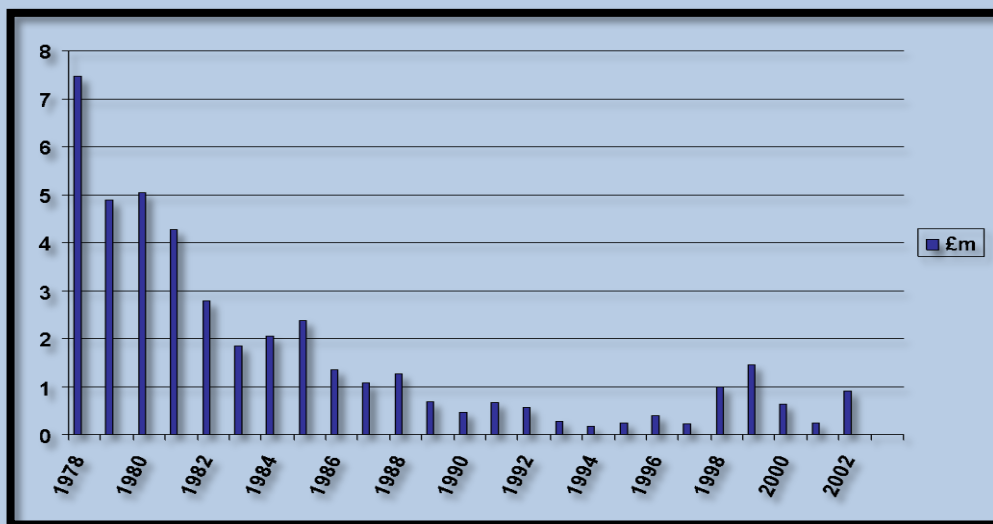
The PRC Scheme was generally successful in restoring general mortgageability, save on very poor estates; the level of customer satisfaction with repairs was generally good; and the level of claims against the warranty has been very low.

Appendix E: Case study - Raising standards

In the past, settlement or heave of ground bearing floor slabs was a major problem in public and private sector housing. Concrete slabs built off deep infill had replaced the use of traditional timber floors. The infill was often poorly graded and contained waste material such as slag and shale. Where deep layers of infill were used, compaction was often poor.

The result was that unsuitable fill materials swelled and caused ground floor slabs to heave, damaging walls that were built off them. The opposite effect happened with the use of deep infill when slabs settled. Such was the extent of damage caused that in 1978 alone, NHBC spent over £7 million in repairing damaged homes. New NHBC Standards were introduced that year to prevent the use of unsuitable material and limit infill to no more than 600mm in depth. The effect was dramatic, as shown in this chart of claims paid for floor damage.

Reduction in claims paid for floor slab damage following the introduction of 1978 standards for floor slabs



Appendix F: International case studies

Case study - Improper aggregate (pyrrhotite) in Québec, Canada

La Garantie des maisons neuves de l'APCHQ (GMN) is a warranty administrator, approved in 1999 by the Régie du bâtiment du Québec, the government body charged with supervising warranty administrators.

In late 2009, GMN was faced with a rapidly mounting number of claims relating to concrete basement failures. Pyrrhotite, contained in the aggregate, first caused the concrete elements to show star shaped cracks and later the expansion of the concrete due to the presence of sulfurs, and ultimately the concrete failed.

Repair involves lifting the home off the foundations, demolishing the concrete basement, including footings and slabs, putting in place new concrete foundations, insulation and connecting back services.

To date, over one thousand properties have been affected, with the total repair cost approaching \$100 million CAD. According to different sources, the total cost of all repair work affected by pyrrhotite is undetermined, but could very well lie between \$375 million and \$750 million CAD. It is estimated there may be as many as 4,000 to 5,000 homes affected by pyrrhotite in Québec.

The causes: *It was found that the improper aggregate was introduced into concrete elements between 2004 and 2008. This aggregate is believed to have come from a single source via quarrying natural stone.*

The problems were caused by the presence of deleterious material in the aggregate, in the form of pyrrhotite, a close mineral relative of pyrite. The aggregate used for the concrete also included pyrite and chalcopyrite, but in lesser amounts. In the presence of humidity and oxygen, pyrrhotite aggregate swells, causing the concrete to crack and ultimately fail as it loses its structural integrity.

Responses: *Once the source was identified, a Modification to BNQ (Québec Standards Board) Standard 2611-905 (Béton de masse volumétrique normale et constituants – protocole de certification) was introduced in April 2010 to prohibit the use of aggregate from the Anorthosite gabbroïque rock formations in the Saint-Boniface area in the production of concrete.*

Improved construction guidelines were introduced requiring the monitoring of aggregate sources, as well as an audit trail via concrete delivery slips to indicate the source of the aggregates, the percentage of sulphur in the cement, and the source of the cement paste.

Case study - “Leaky Condo Crisis” in British Columbia, Canada

Between 1993 and 2000, the Lower Mainland of British Columbia’s (BC) West Coast faced a rash of water infiltration problems in multi-family, wood-frame buildings. The situation has come to be known as the “Leaky Condo Crisis”, and the value of the damage is estimated to be over \$4 billion Canadian Dollars (CAD).

It is estimated that 160,000 new homes in 10,350 individual buildings were built during this period and up to 71,600 homes will suffer serious water infiltration and damage, largely due to a systemic failure of the construction. Although repairs have been ongoing, reports estimate that a further 24,000 homes will suffer serious effects post 2012. Further cases of damage from water infiltration are evident today.

The crisis in residential construction led to demands for better public protection and at the height of the crisis in April 1999, the New Home Warranty of British Columbia & Yukon (the main source of warranties against construction defects for British Columbia homebuyers) collapsed. It was a voluntary warranty program created by the provincial residential construction industry in 1975 and had a monopoly in BC until the National Home Warranty of Alberta entered the market in the late 1990s.

The causes: *Common features of the failure include water penetration, damage to cladding systems, and severe and widespread rotting and decay of timber components. Early media attention was galvanised by dramatic photographs of severely degraded buildings that were less than five years old and stories of developers and contractors having disappeared behind numbered and/or project specific companies. Homeowners became vocal in their frustration when burdened with huge repair bills, often in the range of \$25,000 to \$35,000 CAD per unit or more, without a clear understanding of the cause of the problem and with no one to turn to for compensation.*

Responses: *In response to the developing crisis, the City of Vancouver mandated that a certified Building Envelope Specialist firm must be involved in all new residential developments. This requirement was adopted by many of the municipalities in this region. In 1999, a Joint Committee of the Architectural Institute of British Columbia and the Association of Professional Engineers and Geoscientists of BC took over the process of managing a list of Building Envelope Professionals. This is composed of firms that the City deemed qualified to provide independent inspection and review of building envelope components.*

In 1998, when about 60% of all new housing units were carrying warranty protection, BC implemented the Homeowners Protection Act. It was designed to protect homebuyers and improve the quality of residential construction.

Case study - Weather tightness issues in New Zealand

From the late 1990s, moisture problems have become the single most common reason for unsatisfactory building performance in New Zealand. It appears to be a systemic problem, in that compliance with individual procedures and standards may have been achieved, while the overall result is a building that is not weather tight.

In the preceding decade leading up to 2002, over 220,000 building consents had been issued, with 42% of them in the Auckland region. It was estimated that 6,000 to 12,000 apartments could be expected to suffer from moisture problems. Cost estimates for the repair of these affected apartments ranged from \$120 million to \$240 million New Zealand Dollars (NZD).

Further analysis, taking into account all dwelling types using the same construction method, estimated that 75,000 to 90,000 homes could be affected, with an upper estimate of repair costs at \$1.8 billion NZD. The problem is ongoing, and owners of the 93-unit Summerfield Villas in Auckland have been faced with an \$18 million NZD repair bill. Likely to be partially funded by government, it still leaves each owner with a bill of \$100,000 NZD.

The causes: *The statutory and regulatory environment for the building industry changed in 1991 with the passing of the New Zealand Building Act, which allowed a less prescriptive set of regulations for the issuing of building consents. Furthermore, consumer preference for more complex building forms and newer construction methods have resulted in buildings, which have a reduced tolerance for the effects of wind and rain.*

The nature of the weather tightness problem is the apparent inability of monolithic cladding panels to prevent external water entering the framework where it is unable to dry. There are issues of the performance of rigid cladding panel systems fixed in particular to flexible timber framing, relating to the differential movements between materials from creeping (due to drying out) and thermal conductivity, loading conditions and movement caused by wind and earthquake action. The integrity of the joints is reduced by these circumstances and is lost over time, sometimes surprisingly quickly. Areas where jointing is particularly vulnerable include inter-storey joints, joints at opening/cladding interfaces, vertical joints in panels, and joints at penetrations through panels.

Water had been migrating through the construction, saturating the framework elements including the timber framing. There is evidence of substantial portions of the timber framing being rotted away within two years of construction. The process appeared to be accelerated where untreated timber was used in framing. In some cases, the decay threatened the structural integrity of the building, creating the risk of failure and collapse.

Responses: *Responses to the problem have included a major report to the Building Industry Authority (BIA), local government conferences, and several initiatives by central government, including an adjudication process for affected homeowners. The BIA produced a weather tightness report issuing twenty recommendations aimed at improving the building industry overall.*

In 2002, the New Zealand Government also launched a Select Committee inquiry into the leaky buildings problem. Its terms of reference covered the level of detail to

be provided with building consent applications, the inspection regime as part of the code compliance certification process, the decline in the level of skills in the building industry, and the divisions of responsibility with respect to building consents, inspection, and code compliance certification.

A Ministerial Committee was formed to co-ordinate the response to the matters raised and a disputes resolution process, a website, and a toll-free phone line for homeowners affected by 'leaky building syndrome' have since been established.