



Home Building  
**Skills**  
an action plan to 2020  
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# Home Building Skills Research Report 2013

Preparing to deliver tomorrow's new homes





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# 1. Introduction

In June 2009, NHBC, the Zero Carbon Hub (ZCH), CITB and the Home Builders Federation (HBF) started a major initiative to help the UK home building industry understand the likely future changes to home building and the impacts that these changes could have on the skills and knowledge needed within the industry and its whole supply chain by 2020.

This unique collaboration has united these organisations, all of whom are concerned to see improved home building skills and knowledge as a way to support growth, raise standards, reduce risk and ensure effective consumer protection.

The first report from the Home Building Skills initiative was published in 2010.

Since that time, a great deal of further discussion has taken place and feedback received, including from CITB, the HBF's Careers, Skills and Training Committee, from the Zero Carbon Hub's work streams and from NHBC's involvement in the Harman Review of local standards and viability issues for the delivery of new homes.

The group is now close to launching the Home Building Skills Portal to help people find out about the training and qualifications available for a wide range of jobs in home building.

Adding to this activity, three further phases of research have been carried out since Spring 2012 to identify and benchmark views and concerns about the skills and knowledge challenges faced by the UK home building industry.

## Stage 1

Stage 1 of the research was a qualitative exercise. It involved six face-to-face discussions with an architect's practice, a housebuilder/developer, a housing association, the training division of a product manufacturing company, a head of planning and building control for a local authority and a trade association. In May 2012, three focus groups were held with representation from home builders, housing associations, architects, consultants, planning departments, building control and product manufacturers.

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## Stage 2

Stage 2 was a quantitative study with a telephone survey of 200 industry respondents carried out in August 2012 (including from the organisations listed at the end of this report), to benchmark the training practices currently in place as well as measure the extent to which a wider number of people agreed with the findings of Stage 1 and to assess the severity of any concerns highlighted.

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## Stage 3

Stage 3 involved more in-depth discussions within the organisations that make up the Home Building Skills initiative, using established data to prompt further insights into the major issues.

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This report summarises the key findings of all these recent stages of work. It is, in effect, a synopsis of the most pressing concerns in UK home building today from a skills and training perspective.

These range from a simple lack of human resource in the industry with which to replace the existing ageing workforce, to impacts on the quality of what is built due to the challenges of increased technical complexity of new homes driven by the environmental sustainability agenda. In addition, there is seen to be an increasing regulatory cost threatening site viability and reducing the number of homes the industry can build to address the UK housing crisis.

We hope this report will be read and noted by the Board directors of all home building companies, by planners, architects, building control professionals, professional institutions and every relevant industry lobbying and policy group, so that they are aware of the skills and knowledge issues facing the industry and the actions the industry believes are needed to address those issues. For the same reasons we will also take this report to Government.

As always, your feedback is most welcome. Any comment or enquiry should be directed to Rob Lockety, Training Services Manager, NHBC, at [rlockey@nhbc.co.uk](mailto:rlockey@nhbc.co.uk)

## 2. Key Findings

### The industry's current approach to training and development

It is worth looking at what the research tells us about the UK home building industry's current approach to skills and knowledge development in its staff.

#### Management of staff development

Encouragingly, over two-thirds of organisations described their approach to training as proactive, where individual staff training needs are reviewed and planned in advance. The majority of people interviewed have their training and development needs reviewed annually, especially when they work in larger organisations.

The rest felt their training approach is mostly reacting to market drivers such as new legislation or the needs of the job. This was particularly the case among smaller home building companies, planning officers, sub-contractors and external consultants.

However, only about one in five companies have an HR or Personnel Manager who is responsible for training and personal development. This is usually the responsibility of the MD, other directors or department heads. The majority of managers in the home building industry actively search themselves for an appropriate course for their team members.

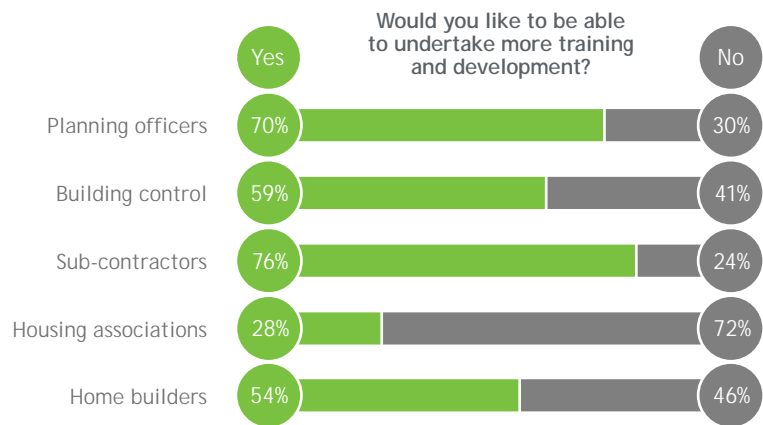
#### Investment in staff development

Although just over one-quarter of organisations are spending more on training per person than five years ago, one-third are spending less, which gives a net figure of -7%.

Small home builders and planning officers appear to have suffered the most over the recession with net figures of 60% and 55% having experienced cut backs on training over the last five years. Product manufacturers and housing association staff have experienced a net increase.

Although a third of all those interviewed plan to increase expenditure over the next 2-3 years on training, 49% do not expect to do so.





## Subjects for staff development

Almost all interviewed have been involved in training events in the last 12 months, most often for one day or less, although 51% had been on longer courses. Almost two-thirds are involved in CPD activities, particularly those in middle management. The subject areas most commonly mentioned can be grouped as keeping abreast of legislation and technical updates.

In most home builders' organisations, training is driven by the need to provide safe working conditions in the workplace (accounting for half of all spending on training) and the need to comply with other legislation. Training for health and safety rises to 61% of spend for smaller home builders.

The HBF is currently leading on the development of a technical apprenticeship programme for sales negotiators.

## Constraints on staff development

About half of all respondents across the different industry groups told us they would like to be able to undertake more training and development. This feeling was highest amongst sub-contractors with 76% responding positively. Planning officers (70%) also appear keen to undertake more training and development. Respondents are most interested in legislation and technical subjects as well as management training.

The constraints which prevent people in the industry participating in more training appear to be time and money, and not the demands of the job or inappropriate course content.

More home builders than any other group were aware that they qualify for CITB training grants with 86% of those aware stating that they benefit from these grants. Only 38% of sub-contractors thought they qualified for those grants, which suggests that awareness among this group is low.

## Preferred types and sources of staff development

There are mixed preferences for the style of courses. One-third of respondents would like to have more trainers available to visit their company while 23% would like courses away from the office.

Just over one quarter prefer to learn online and the same percentage would like to see more online courses. This figure rises to just over half for the external consultants interviewed. A separate piece of research carried out by NHBC in November 2012 suggests that e-learning as a methodology is less popular than face-to-face training, with 55% saying they are less likely to choose an e-learning course than any other type.

The most popular sources of information about new developments in the industry are the BRE, industry magazines, the NHBC and professional institutes. The NHBC is considered the most useful, by 33% overall and 68% of home builders. The NHBC also comes to mind the most for training in the sector, mentioned by 71% of home builders and 38% of all interviewed.

Courses are sourced in a variety of ways, through trade associations or similar bodies, via an in-house training department or manager, through manufacturers and e-mails and web sites. However the cost of the course and time commitment required can act as a deterrent. Identifying quality courses can be a problem, and tools such as the forthcoming Home Building Skills Portal should help to improve signposting to good training providers.

The majority of respondents are fairly satisfied that the information they need to keep updated on changes in the home building industry is available, with one-third very satisfied that this is the case. Home builders and building control officers are more satisfied than other groups.

# Key Findings (continued)

## Perceived barriers to more training

Participants in the research were asked about the factors which are hindering the improvement of skills and knowledge in the UK home building industry.

In the qualitative research interviews, prompted responses included the cost driven nature of the industry, the lack of direct employment of trades, a transient workforce and the appropriateness of qualification programmes for home builders.

Quantifying the extent to which these views are held, it is the cost driven nature of the industry which is considered to be the main barrier to the improvement of skills and knowledge, with almost three-quarters thinking that this is hindering development.

Other perceived barriers are organisational culture, a lack of encouragement to improve, lack of new entrants and the nature of sub-contracting itself, with many smaller companies and a high turnover of staff. A further barrier relates to the format of apprenticeships which favour larger, stable organisations such as the larger home builders which can offer continued work experience and training over the period of the apprenticeship. For smaller builders and sub-contractors it can be difficult to guarantee appropriate work experience.

Direct employment of trade labour by home builders is rare, with only 15% employed directly. This lack of direct employment is seen by home builders to make it harder to control training and personal development. Sub-contractors employ an average of 70% of their labour direct.

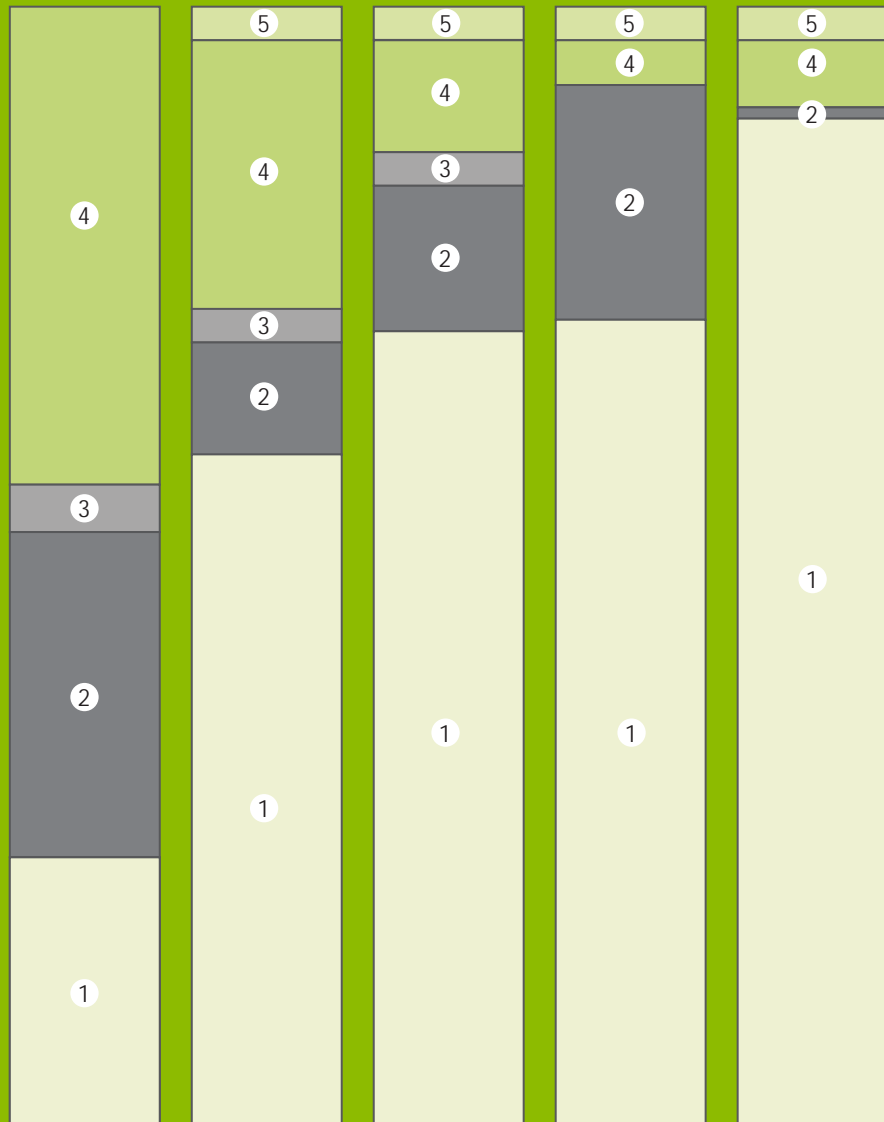
All home builders report that they provide some form of training for sub-contractors on site. 90% say they always provide site inductions, whilst 60% say they always deliver health and safety training. Sub-contractors described a picture of less regular training than the home builders feel they are providing with 62% responding that site inductions always happen and only 29% that they receive health and safety training.

Particularly among larger home builders, there has been a noticeable increase in site audits to check whether people have the correct cards and qualifications through the Qualifying the Workforce initiative. However, elsewhere there is still a lack of requirement and processes to check skill levels of trades on site (except health and safety).



Home builders: Which of these do you normally provide for sub-contractors on site and how frequently?

- 1 Always
- 2 Sometimes
- 3 Rarely
- 4 Never
- 5 Varies



Training in new technologies

H & S Training

Tool box talks

On-going project meetings

Site inductions

- 1 24%
- 2 29%
- 3 4%
- 4 43%
- 5 0%

- 1 60%
- 2 10%
- 3 3%
- 4 24%
- 5 3%

- 1 71%
- 2 13%
- 3 3%
- 4 10%
- 5 3%

- 1 72%
- 2 21%
- 3 0%
- 4 4%
- 5 3%

- 1 90%
- 2 1%
- 3 0%
- 4 6%
- 5 3%

# Key Findings (continued)

## A shortage of skilled people now and in the future - a constraint on growth

*“It’s massive, the amount of people who have left the industry and vowed never to return. This recession has been the hardest I have known...”* Sub-contractor

*“If you turn up production another 10% I think we are all going to be in trouble.”*  
Home builder

We have known for a long time about the perception of an ageing workforce in home building and construction generally, and the severe impact of the recession on retaining skilled workers within the industry.

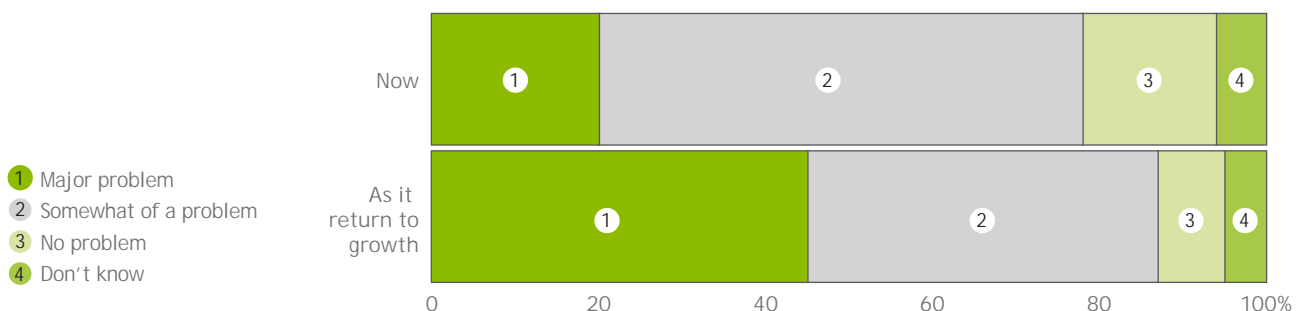
Unsurprisingly, the research shows that there are now serious and widely held concerns about the current shortage of skilled people in UK home building, and increasing alarm about the availability of people with the right level of skills and knowledge when growth returns to the industry.

One in five industry respondents think we have a major problem now. 87% think that the industry will have a problem in the future, and of those 45% think it will have a major problem as UK home building returns to growth. Large home builders are among the most concerned groups, along with architects and product manufacturers.

The research indicates that there are several areas where it is already difficult to find and keep skilled staff:

- Large and medium sized home builders in particular are reporting problems recruiting suitable site managers, quantity surveyors and site operatives, with 57% experiencing this currently. The site manager’s role is seen by many as increasing in importance in the future as more demanding and better integrated home designs have to be successfully delivered on site.
- 43% of sub-contractors say they can’t hire good workers now.
- Product manufacturers are having difficulty finding suitable graduate trainees (60%) and technical advisory staff (47%). It is anticipated that manufacturers’ technical staff will have a key role in the future in informing/training the industry to install their new products correctly, therefore a lack of suitable staff could cause difficulties throughout the supply chain.
- Almost half of all building control officers report difficulties recruiting staff.

Does the industry have a skills and knowledge problem now and will it have a problem when it returns to growth?



Planning skills were mentioned by many respondents as a very pressing need right now (although admittedly mostly by the home builders and consultants, rather than the planning officers themselves). Concerns centred on planners not necessarily understanding the impact of their requirements on the technical aspects of building and also covered their:

- understanding of development economics, site viability and the construction management process
- perceived inconsistent interpretation and application of legislation
- gaps in knowledge of renewable energy /energy efficiency technologies



The industry has expressed concerns relating to planning skills issues. Rate each of the problems out of 10 concerning its severity where 1 is not at all severe and 10 is very severe.

However, a shortage of skilled site labour is expected to be the main problem area in future for all sizes of home builder as the industry returns to growth. 53% of construction managers expect to have difficulty finding suitable sub-contract labour. Sub-contractors also think it will be hard to find labour, with 48% stating this as a probable problem area over the next few years.

*"There's a shortage across all aspects, all skills - brickies, plasterers, plumbers, joiners, electricians. There are no apprentices coming up through the sub-contractor ranks."* Home builder

Respondents predicted a shortage of key trades, particularly plumbers, electricians and carpenters, and a noticeable gap in these workers' understanding of the consequences of poor workmanship and their impact on other trades. This knowledge gap is made worse by the anticipated lack of experienced site managers and a similar shortage of sub-contractor supervisory skills.

*"If and when it picks up, two things will happen. One, the rates for the job will go through the roof because we'll all be competing for the same people, and there won't be enough people to go around."* Home builder

# Key Findings (continued)

## Attracting new entrants into the industry

Clearly, one way to tackle a skills shortage in any industry is to boost the numbers and quality of new entrants.

*“We are not giving young people the opportunity to come into the industry. We are not pushing it from the bottom, all the way up. We’ve been in the industry God knows how many years, most of us started as apprentices and we’ve filtered up the ladder. Where are the young people coming through? We’re not pushing them through.”*

Home builder

However, our research revealed there is a strong belief that the home building industry is not attractive to new entrants meaning good quality young people are not likely to consider it. Attracting good quality people into the industry and retaining them as the seedbed for both future management and skilled trades is the greatest concern of respondents.

The number of apprentices/recent graduates employed in construction overall has fallen considerably since the start of the economic downturn, with CITB survey results suggesting it fell overall by 30% between 2010 and 2012. Indicative of low levels of demand from employers, seven in ten employers (70%) feel there are currently more people wanting to become apprentices or interns than there were positions available across the industry (CITB Employer Panel Wave 12, August 2012).

Perhaps indicative of this over-supply of apprentices and interns, and the ability therefore for employers to have their ‘pick of the bunch’, the skills levels and attitudes to work of those that are employed are very positive. Among the firms that currently employ apprentices or recent graduates, seven in ten felt that their skill levels, attitudes and work readiness, compared to what they would expect from people of this age and experience, was either good (27%) or very good (43%), compared with only 8% that felt they were poor.

Those that thought their skill levels were below what they would expect, cited poor attitude to work and/or a lack of initiative as the principal issues (CITB Employer Panel Wave 11, August 2011).

The solution, says the industry, is to improve marketing of the industry to school leavers, increase its attractiveness and inform young people about the diversity of career options available in the sector.

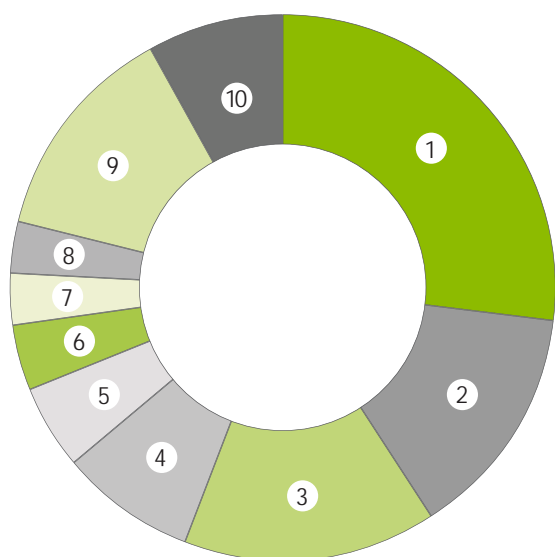
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*“There is a major problem of attitude and work ethic amongst applicants. School leavers are not used to the outdoor life and are not attracted to the prospect of working on cold wet building sites. They have expectations that they will be able to pick and choose their places and times of work and seem unwilling to tolerate the hardship of gaining site experience. Salary expectations are frequently unrealistic and they are commonly attracted to go and work elsewhere, for more money, whilst sacrificing their training regimes. Many candidates attending for interview have no perception of the process and no idea of how to present themselves or what is expected of them. Parental and educational guidance appears to be missing. I’ve had youngsters turn up for interviews for apprenticeships in a T shirt and shorts. I just ask them to leave. If they can’t make the effort to present themselves, then we’re not willing to make that investment in them.”* Home builder.

*“Young people are not interested in established trades because young people’s interests are different to what I was interested in years ago. They’re more interested in computer skills than trades...”*

Product manufacturer

How would you spend a hypothetical £10m to improve the industry's skills and knowledge?



- 1 Apprenticeships—27%
- 2 Promoting the industry—14%
- 3 Training—15%
- 4 Quality benchmarking—8%
- 5 Subsidies/tax breaks for training—5%
- 6 Bridging the gaps in the supply chain—4%
- 7 Bursaries—3%
- 8 Colleges/academies—3%
- 9 Other—13%
- 10 Don't know—8%

*“Nobody’s training the sub-contractors. They learn as they make a mistake.”*

Home builder

Many in the industry believe there should be improved liaison between home builders and colleges, universities and the new construction-based university technical colleges, and improved processes for work experience to be gained so that students gets sufficient scope for practical skills development too. It is recognised that some builders are doing this but it is patchy at best.

When asked how they would spend a hypothetical £10 million to boost the industry for the future, respondents plumped for more apprenticeships and on the job training. Housing associations and large home builders in particular would like to see the money spent in this way.

At present about half of home builders and 80% of housing associations say they are investing in apprentices this year.

The picture is less positive for the sub-contractor sector with only a third of sub-contractors saying that they are investing in apprentices this year. The same proportion anticipates reducing their investment in apprentices over the next two to three years as expect to increase it. Given any growth in new build housing, it appears likely that there will be a lag in sub-contractors’ training of new recruits via apprenticeships.

Respondents believe that, using the CITB training levy, more funds should be redirected to encourage an improved apprenticeship model, including frameworks for site and office-based sales staff. CITB is currently working with HBF to develop a technical apprenticeship programme for sales negotiators.

Some respondents are calling for industry to be involved in a complete overhaul of the apprenticeship scheme - including looking afresh at content, liaison with contractors, the qualifying size of a company, retention, extension of maximum age and other factors.

It is recognised that the Government commissioned the Richard Review of Apprenticeships which reported in November 2012, published its response as a consultation document, and is now analysing the responses to that consultation. Both the Richard review, and the consultation, can be found on the Government website at the following:

<https://www.gov.uk/government/consultations/future-of-apprenticeships-in-england-richard-review-next-steps>



# Key Findings (continued)

## Developing careers

*“People do train continuously through their lives where there is some career progression process that it supports. But what we have got is a highly fragmented industry where actually it is very difficult to train yourself up to the next thing and move on because actually there isn’t a next thing.”* Home Builder

Once within the industry, the challenge is to retain and grow those skills. It is recognised that many large companies do invest in management and career development.

However, our research revealed that the industry perceives a lack of structure for skills development beyond NVO3. Respondents believe that there is a need for a ‘Master Craftsman’ qualification in home building, and also the need to encourage the development of trades personnel into site and other management positions.

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*“From a bricklayer’s point of view, you get up to NVQ3 and you stop there. There is no progression really. I’d like to have some kind of format where the guys can become Master Craftsmen...”* Sub-contractor

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CITB has been working with the heritage sector to develop a Level 4 NVQ Diploma in Senior Crafts (Construction). Pathways are available for brickwork, plastering, carpentry, joinery, stone masonry, painting and decorating and wall and floor tiling. These could form the basis of something suitable, but would need to be reviewed to confirm or otherwise their suitability for home building.

Master Crafts Certificate Schemes are available via the Construction Liveries Group and City & Guilds, but there is no CPD type structure or mechanism yet for trades to make sure they keep up to date, although discussions have taken place within CITB about CCD (Continuing Craft Development) and how it could be managed.

Respondents call for greater manufacturer willingness to train and accredit installers and building inspectors on new technologies, to check the quality of installation, help with the provision of user friendly operating instructions and encourage the provision of maintenance services.

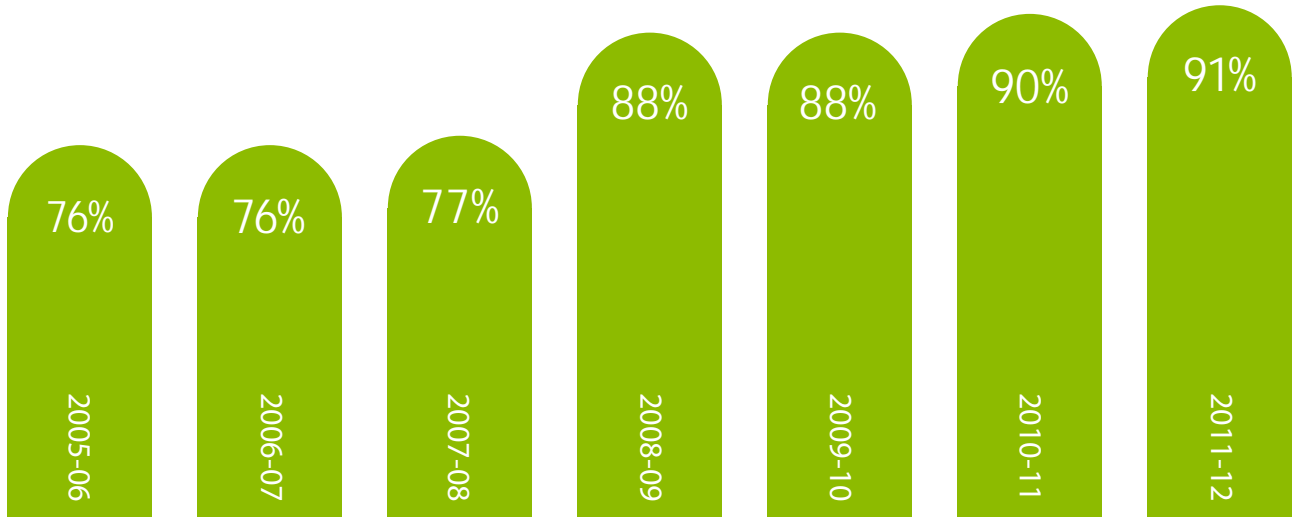
For 60% of planning officers, the main solution to industry skills issues is improving the relationship between private sector home building and public sector planners - developing shared understanding through more collaborative working.

## Pressure on building standards

Customer satisfaction with the standard of new homes has never been higher.

### Home buyer satisfaction with the quality of their new home (%)

Source - NHBC National New Homes Survey (at 8 weeks)



It is inevitable that pressure on standards will result if the industry tries to build more new homes without access to a suitable skilled workforce. Current indications, based on an increase in planning consents in Q4 2012, and increased new home registrations with NHBC in Q1 2013, suggest that there are early signs of growth in home building.

Indeed, the primary concern in the industry highlighted by this research is build quality. 65% of respondents said the build quality of new homes could suffer if the current skills challenges are not resolved.

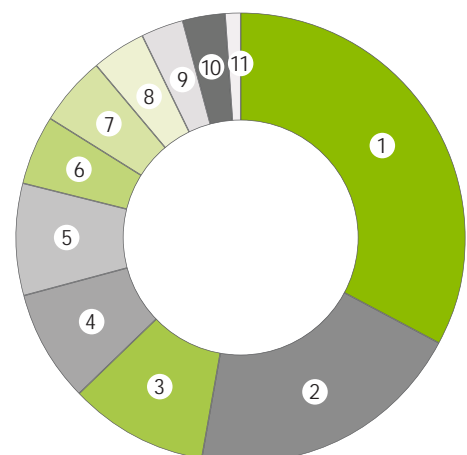
This not only impacts on consumer protection and homebuyer satisfaction, but also on costs, arising from correcting defects, handling warranty claims and maintenance.

### What is your main motivation for wanting to improve skills and knowledge in your business?

- |   |  |
|---|--|
| 1 Improving build quality—33%           | 7 Win more work—5%                           |
| 2 Improving ability to compete—20%      | 8 Reduce CO <sub>2</sub> and energy costs—4% |
| 3 Improving customer satisfaction—10%   | 9 Able to introduce innovative solutions—3%  |
| 4 To stay in business—8%                | 10 Encourage purchase of new homes—3%        |
| 5 Understanding changing regulations—8% | 11 Win "Pride in the Job" awards—1%          |
| 6 Reduce defects and claims—5%          |  |

It also directly impacts on the industry's ability to meet UK policy targets, particularly the Government's carbon and energy-related agendas which are driving the introduction of higher build standards.

Unsurprisingly, one-third of respondents described quality as their primary driver for improving skills and knowledge, including half of all planning officers, 44% of home builders and 41% of building control inspectors. A further 13% of respondents identified quality as a secondary driver for training.





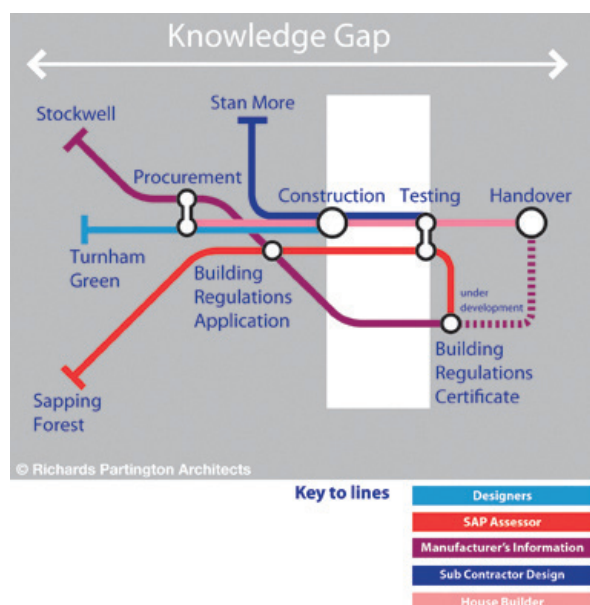
*“Making the most of the opportunities of green construction requires significant change in current practices. All areas will be affected, from the design and planning of new buildings and infrastructure to materials, products and processes through the whole life of the built asset. New practices and technologies require the development of new capacity and skills.”*

Green Construction Board Knowledge and Skills Project bid

The Zero Carbon Hub has recently launched a new project to investigate the performance challenge. The industry-backed project brings together leading housebuilders and industry experts to investigate the actual performance of homes and better understand how this compares to that expected by the original design. The project known as ‘DvAB’ (Designed v As-Built) will consider the construction process as a whole, from design and planning to testing and verification, gathering evidence of areas where an energy use ‘performance gap’ could occur.

### The project has six work streams:

- Cross-cutting group focused on process
- Project concept and planning
- Design and design assessment tools
- Materials, products and procurement
- Construction
- Verification and testing (and end-of-line)



*“Home energy bills are one of the biggest costs that people and families face, especially during a really cold winter such as this one. I want to do everything to cut bills by making homes in this country the most energy efficient possible. From today government and industry will be working hand in hand to ensure new build homes live up to expectations, and drive energy bills down for consumers.”* CLG minister the Rt. Hon Don Foster MP speaking at Ecobuild about the launch of the project.

The results of the Zero Carbon Hub-led research project will clearly provide a better understanding of the performance challenge and the skills and knowledge issues arising.

However, we do believe that the findings of that research are likely to point to a significant need to invest in skills and knowledge about the way that new homes are designed and built to meet future performance requirements.

Before the move towards zero carbon, new homes were a collection of elements: walls, roofs, floors, windows, heating systems, hot water systems. Each was designed, specified and purchased as a separate element that was then assembled by the construction team. If one particular detail for one element didn't work in buildability terms, the skill of the site manager and subcontractors on site was to find a suitable fix. Home builders' site management teams still pride themselves on these problem-solving abilities.

However, in the current regulatory environment, the design and construction of a new home is much more integrated and interrelated and so the home builder's processes, systems and people need to reflect this.

Unfortunately, there is widespread concern that this is not happening. For example, products may often be substituted at construction stage, changing the overall performance of the home, or trades may not appreciate the impact their actions have when the home is considered in the whole.

# Key Findings (continued)

## Multi-skilling

*"I'd rather have someone who is completely competent in what they do and can't get confused in doing someone else's job."* Home builder

Some of the new renewable and energy related technologies required to build low and zero carbon homes suggest the need for a multi-skilled workforce, involving for example plumbing and electrical skills. However in the focus groups which formed part of the research, home builders expressed a preference for single rather than multi-skilled trades. In the wider interview programme, 38% of home builders prefer single skills and 24% multi-skilled.

For volume home builders, multi-skilling is not seen as a key need, and most sub-contractors prefer single skilled trades.

Yet having knowledge of other trades is going to become increasingly important. An understanding of the bigger picture of modern home building and the potential impact of an individual's actions on other parts of the home building process is becoming increasingly important.

Of course there will be areas where multi-skilling is seen as appropriate - for example while the demise of traditional plumbing and electrical skills is not foreseen by our research respondents, what they do predict is the emergence of a qualified, certified multi-skilled workforce able to install complex off-site manufactured components.

*"The industry is well geared up for training people for changes in legislation, but not necessarily so well to respond to the plumber who wants to become more aware of sustainability."*

Housing association

*"It not E, it's not M, it's M&E, multi-skilled!"*

Building and Engineering Services Association

CITB research around multi-skilling does suggest that it may be more appropriate in the retrofit sector. For example, electricians are likely to need to be able to know how to install solar PV on a roof; alternatively the roofer may require these installation skills.

The concept of 'multi-skilling' remains a challenging one for the construction industry as a whole, as it could imply the dilution of minimum standards of competence. But multi-skilling clearly means different things to different people, organisations and/or industries. There needs to be a better understanding of how certain combined skill sets can offer efficiencies to the construction process, and better reflect current needs. There remains a strong view that the starting point for multi-skilling must be competence within a recognised occupation, upon which new areas of understanding and competence can be developed.













# 3. Conclusions

The results of this research raise numerous points, many of which present opportunities for improvement. However, the significant improvement the industry has made over the last few years should not be forgotten. Customer satisfaction with the quality of new homes has steadily improved and the challenge now is to focus our efforts on maintaining that improvement as the business environment changes and as is expected, the scale of home building increases once again.

**Our conclusions fall into three main areas:**

- New entrants
- Up-skilling the existing workforce
- Sustainability and the performance challenge

## New Entrants

This is clearly a key area where the industry needs to take action, including making the industry more attractive and offering more opportunities for new entrants at all levels. This issue will be addressed for construction generally as part of the Industrial Strategy for Construction due to be published this summer. One challenge will be to take its recommendations and to apply these to the home building sector. CITB and Government also have clear roles to play in making sure that the training and education frameworks and funding arrangements are appropriate for UK home building.

## Up-skilling the existing workforce

This research tells us that home builders are responsive to the immediate technical needs and can usually find a way to source training needed to carry out their work.

In an elemental approach to home building, this strategy works pretty well, but is dependent on the quality of learning achieved. Such training will always have its usefulness, and tools like the forthcoming Home Building Skills Portal will help home builders improve their access to information about appropriate training suppliers and the different training resources on offer.

Manufacturers also have a big part to play in supporting skills and knowledge acquisition by their customers.

## Sustainability and the performance challenge

The sustainability agenda and the work needed to close the 'performance gap' adds a whole new level to learning and has implications for both new entrants and the existing workforce.

The industry needs an improved understanding among workers of how homes are designed and built as an integrated unit, where changes to one element of the building may have substantial implications for another. For example, a home builder's site managers may be sent on a course to learn the importance of airtight construction, but this should not then impact on the provision of suitable ventilation.

Future skills and development strategies are going to have to address this problem of 'silo thinking', and home builders will want to find ways to improve the understanding and opportunities for multi-disciplinary training between each part of the supply chain. For the existing workforce in home building, this should be part of the move towards more integrated supply chains and collective learning activities designed to foster a broader appreciation of roles within the whole process.

Of course, as the work of the Zero Carbon Hub and others continues, we will learn more about the causes of the performance challenge and will be able to refine the actions needed to address it.

# 5. Acknowledgements

We would like to thank all participants in the research to date, including:

## Home builders

A R Cartwright Ltd  
Barratt  
Beal Homes  
Beaufield Homes  
Bellway Homes (Stages 1 and 2)  
Bett Homes Ltd (West Scotland)  
Border Construction  
Cala Homes (2 branches) (Stages 1 and 2)  
Cavanna Homes Ltd  
Churchill Retirement  
Construct Reason Ltd  
Countryside Properties Northern  
Crayfern Homes Ltd  
Croudace  
Dandara Homes  
Daniel Gath Homes  
David Lloyd Associates  
David Wilson Homes (Stages 1 and 2)  
Davidsons  
Drew Smith Homes Ltd (Stages 1 and 2)  
F Parham Ltd  
Fairview New Homes plc (Stages 1 and 2)  
Fraser Homes Ltd  
Garden Link Homes  
Gentoo Construction  
Hill Partnership  
Jelson Homes  
Jones Homes  
Jones Homes (North West)  
Kier Homes (Eastern)  
Knight Developments Ltd  
Larkfleet Homes  
Linden Homes  
Lindum Homes  
Lovell Partnership (Scotland)  
Mansell Homes  
McCarthy & Stone  
Miller Homes (3 branches)  
Millgate Homes  
Mizen Properties Ltd  
Morris Homes  
Mount Anvil Plc  
Muir Group  
Mulalley Homes  
Newland Homes Ltd  
P J Livesey Group Ltd  
Parsons & Joyce  
Patton Homes  
Pegasus Retirement Homes  
Persimmon Homes (Stages 1 and 2)  
Redrow Homes (Midlands) Ltd  
Restoration Homes Ltd  
Rippon Homes  
Rowland Home Ltd  
Rowlinson Construction Ltd  
Stewart Milne (2 branches)  
Strongvox Ltd  
Summerfield Homes  
Taylor Lindsay Homes Ltd  
Taylor Wimpey (4 branches, Stages 1 and 2)  
Telford Homes  
Truelove Homes  
Twill Homes  
Wainhomes (SW) Ltd  
Wild Boar Properties Ltd

## **Housing associations**

Arcadia Housing group  
Aylesbury Vale Housing Association  
Broadland Housing Association Ltd  
City West Housing Trust  
Crosskey Homes  
CURO Group  
East Thames Housing Group Ltd  
Gentoo Housing Association  
Glasgow Housing Association Ltd  
Grand Union Housing Group Development  
Great Places Housing Group  
Guinness Hermitage  
Guinness Housing Association  
Hanover Housing  
Harden Housing Association  
Howard Cottage Housing Association  
Knowsley Housing Trust  
Poplar HARCA  
Raglan Housing Association  
Sanctuary Housing Association  
Sovereign Housing Association  
Symphony Housing Group  
Thames Valley Charitable  
Waterloo De Montfort  
Waterloo Housing Association (Stages 1 and 2)  
Willow Park Housing Trust Ltd  
Yorkshire Housing Ltd  
Broadland Housing Association Ltd  
Radian Group

## **Consultants**

2030 Architecture  
3X Architecture  
A C Architects Cambridge Ltd  
A J Energy Ltd  
Absolutely Architecture  
Active Energy  
ADP Architects Ltd  
Armstrong Burton  
Baker Goodchild Architects Ltd  
Britch & Associates Ltd  
Capita Symonds  
Clifton Design Associates  
CO2 Consulting  
Dynamic Energy Assessors  
Ensurv Assessments  
Fairwood Energy  
Focus Consultants  
Forum Energy Consultants

Halsall Lloyd Partnership  
LCC Gecko Ltd  
Marsh Grochowski Architect  
McLean Architects  
MES Energy Services  
Michael Hodgkinson Consultancy  
Michael Warren Associates  
PRC Architects  
Premier Assessors  
R A Fish & Associates  
Robert Allerton Ltd  
Rickaby Thompson  
Terry Holmes Consultants  
Vincent Gorbing Architecture

## **Sub-contractors**

Active Sustainable Energy Systems  
Affordable Renewables  
ARC Electrics  
Arnold James  
Carbon Legacy Ltd  
Castle Energy  
Clarkson Evans  
Gowing and Hunt  
Graham Bell  
Irwine Whitlock  
James Paterson Plumbing & Heating  
Jarvis Heating  
John Flowers Roofing  
MDM Specialist Trades  
Minster Plumbing Ltd  
Roe Ltd  
SF French Electrical Contractors  
Simon Geraghty Electrical Services  
Steve Murphy Brickworks  
Sundial Solar Solution  
Thermotech Heating Services  
UKFM Renewables Technologies

## **Building Control**

Allerdale Borough Council  
Barnsley Metropolitan Council  
Basingstoke & Deane Council  
Hull City Council  
Moray District Council  
Newham Council  
Newcastle under Lyme Borough Council  
South Gloucestershire Council  
South Holland District Council  
Assent Building Control

JHAI Ltd  
MFA Building Control Ltd  
NHBC  
RBC Ltd  
LABC

## **Planning Officers**

Bath Unitary Council  
Carlisle District Council  
Carmarthenshire County Council  
Derwentside District Council  
Dover District Council  
Flintshire County Council  
Forest of Dean  
Orkney Council  
London Borough of Hackney Council  
Milton Keynes Council  
North Warwick Borough Council  
Powys County Council  
Rotherham Borough Council  
Rugby Borough Council  
Solihull Metropolitan Borough Council  
South Ayrshire Local Authority  
South Derbyshire District Council  
Stratford on Avon District Council  
Sunderland City Council  
Teinbridge District Council  
Test Valley Borough Council  
Torbay Council

## **Product manufacturers**

1st Choice Timber Frame Ltd  
Ardenham Energy  
Danfoss Heat Pumps  
Dreadnought Tiles  
Green Heat Ltd  
Jablite Insulation  
Kansa Heat Pumps  
Kingspan Insulation  
Marley Eternit  
Nuair  
Passivent  
Recticel Insulation  
Scotframe Timber Engineering  
Stewart Milne Timber Systems  
Stiebel Eltron UK  
Viridian Solar  
Wagner & Co  
Xtratherm  
Greenworks Academy, part of Saint Gobain



