Introducing the revised Chapter 7.2 'Pitched roofs' effective from January 2012

Technical Extra

November 2011 | Issue 05

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Foreword

Technical Extra 04 (October 2011) included an article that outlined some forthcoming changes to *NHBC Standards Chapter 7.2 'Pitched roofs'*.

Over recent months, NHBC's technical team, with excellent assistance from builder members on our Standards Review Group, from the Scottish and Northern Ireland Technical Committees, and from the Home Builders Federation (HBF) and the National Federation of Roofing Contractors (NFRC), have reviewed the content of Chapter 7.2 and identified a number of changes aimed at improving quality and preventing defects and claims.

The revised Chapter was approved by the NHBC Standards Committee on 11 October 2011 and will come into effect for every NHBC registered home whose foundations are concreted on or after 1 January 2012, although, given the extent of problems currently experienced with pitched roofs, we anticipate that builders would want to adopt the changes with immediate effect.

Should you have any questions about the implementation of the revised Chapter 7.2 or any other comments or feedback on this issue of *Technical Extra*, please email: **technicalextra@nhbc.co.uk**.

Graham Perrior
Group Head of Standards and Technical

NHBC STANDARDS

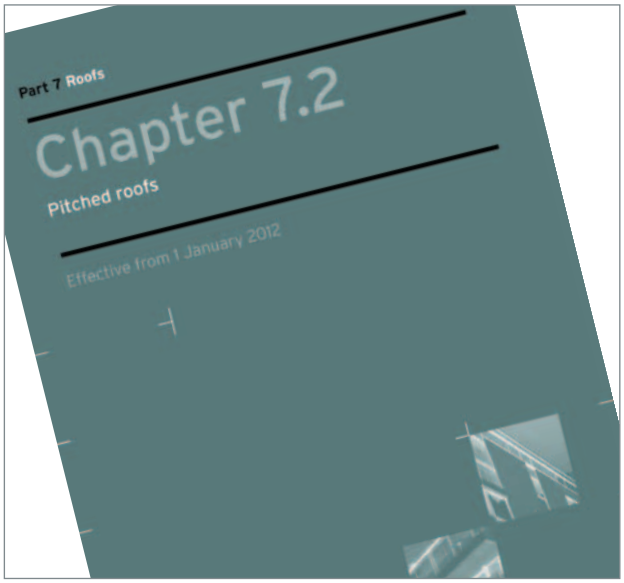
Introducing revised Chapter 7.2 'Pitched roofs'

Who should read this: Technical and construction directors and managers, architects, designers and site managers.

INTRODUCTION

In *Technical Extra 01* (February 2011), we highlighted the increasing number and cost of claims caused by pitched roof defects, and identified many of the real problem areas.

This special edition of *Technical Extra* puts the spotlight back on pitched roofs, focusing on the latest claims data, highlighting the forthcoming changes to Chapter 7.2 and detailing the arrangements for introducing the revised Chapter.



Pitched roofs – a high proportion of claims

REQUIREMENTS

Buildmark warranty cover was extended to include pitched roof coverings in 1997 and, since then, we've seen a steady increase in the proportion of claims for pitched roofs. We regularly review claims experience to identify trends or problem areas, and it was this process that revealed the high volume of claims for pitched roofs.

In fact, the latest figures show the proportion of pitched roof claims continuing to rise, now accounting for almost two-thirds of all claims by number. This accounts for over £11m of NHBC's annual claims spend, but the total cost to industry is probably many times greater.

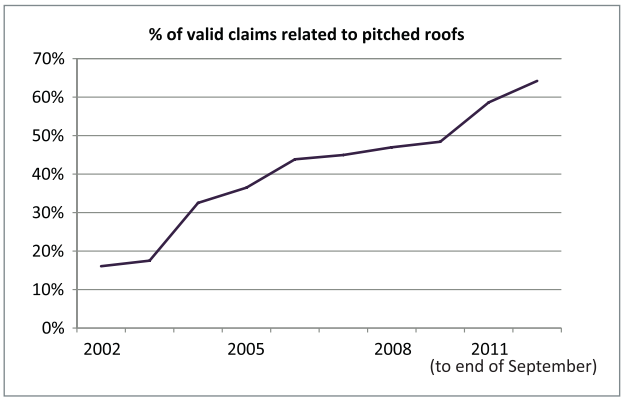
There is no doubt that many of these claims can be avoided by improved design and workmanship, and we are absolutely committed to helping builders and developers achieve better quality, which of course, in turn, will reduce claims. We have also spent considerable time working with, and listening to, industry and know that roofing contractors can play a significant role in reducing the technical risk and achieving better quality.

That's why we've engaged with the NFRC when reviewing *Chapter 7.2 'Pitched roofs'*. We also worked with NFRC in delivering free pitched roof training

Pitched roofs – a high proportion of claims

REQUIREMENTS (CONTINUED)

Figure 1: Claims related to pitched roofs



seminars to more than 1,200 site managers. The initial seminars, held in the spring of 2011, proved so popular that additional venues were added, with four further seminars completed in October 2011. If you missed these, don't worry; free in-company seminars can be delivered for NHBC registered builders using the standard presentation from the seminars. See the information and support section for details of this and other training available, including new e-learning packages.

Whilst we have attempted to highlight these issues directly with roofing contractors, we would encourage all builders to ensure these messages, and the changes summarised in this edition of *Technical Extra* and contained in the revised Chapter, are understood and adopted.

Roof mortar

REQUIREMENTS

Our experience is that over half of all pitched roof claims relate to mortar defects. In *Technical Extra 01,* we reported that the instance of pitched roof claims in Scotland is proportionately lower than in England and Wales. This trend continues, and a more detailed analysis confirms that, although currently still significant, mortar claims are less dominant in Scotland than in England and Wales. With the vast majority of sites in Scotland now reported to be using dry systems, we welcome this trend and hope it will continue.

At the Building for tomorrow seminars held earlier this year, we ran a session on pitched roof coverings. Interestingly, general audience perception was that the number of sites using dry systems was lower than we are in fact finding. A survey undertaken by NHBC inspection staff in the autumn of 2010, indicated that 60% of the sites surveyed were adopting dry ridge systems.

The effect of recent cold winters cannot be overstated and is why one area of the revised Chapter, discussed on page 5, specifically addresses mortar placement to verges, which NHBC has seen to be susceptible to the effects of freeze/thaw action.

Chapter 7.2 'Pitched Roofs' page 12 – S12 (b) includes the following guidance: 'Wet bedded verge tiles or slates should be fully bedded on roofing mortar having a minimum width of 100mm. Verge slates or tiles should be bedded on the undercloak and completed in one operation.' These changes, along with new verge fixing requirements set out on page 5 in the section headed 'Verge arrangements' and in Chapter 7.2, will greatly reduce the risk of claims in these vulnerable areas.

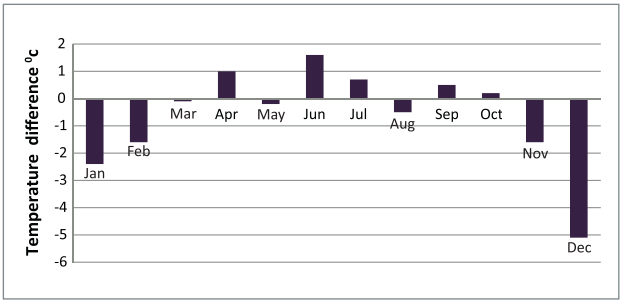


Figure 2: UK temperature difference in 2010 compared with 1971-2000

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REQUIREMENTS (CONTINUED)

These requirements for verges are important, as figures reported by the Met Office show average temperatures in December last year were some 5°C lower than the 30-year average. This explains some of the reasons why defective workmanship may not manifest itself into an issue until sometime after completion of the home.

Inspection requirements

NHBC inspectors will be discussing with builders their specific roofing proposals, NHBC's requirements and the quality checks that need to be made. Remember, we require site managers to contact the NHBC Building Inspector on the first available roof when:

- a wet system of bedding is proposed
- the roof is subject to high exposure
- there is an increased risk due to the complexity of design.

This will enable us to inspect installation of the roof covering and discuss requirements.

Our work with the NFRC has provided a better understanding of what is believed to be the most appropriate roof mortar mix, and this has been set out here and fully detailed in the revised Chapter.

As previously highlighted, dry fixing systems appropriate for the roof may provide an alternative acceptable solution.

History shows us that new systems can be susceptible to failure due to incorrect or inappropriate site installation. It is important, therefore, that detailed manufacturer's instructions are followed.

Mortar mix

Roofing mortar should be 1:3 cement:sand with plasticiser. The mix should be based on sharp sand with soft sand added to achieve good workability. The sand content should not exceed two parts soft sand to one part sharp sand.

Because sands will vary, roofers can make slight adjustments to accommodate regional variations. However, the proportion of sharp sand must not be less than one-third of the total sand content.

This mix is not exclusive, and appropriate bagged mixes could be accepted by NHBC if they are shown to have acceptable performance.

Builders should no longer use adapted mixes (silo mixes with additional cement content) or factory-produced retarded mortars.

Mechanical fixing of ridge and hip tiles

REQUIREMENTS

For many years, it has been traditional to bed ridge and hip tiles in mortar to secure them to the roof. Experience shows that pitched roofs will be subject to some movement during the early life of the property. Mortar is generally not tolerant of that movement and can easily crack or de-bond, making ridge and hip tiles vulnerable when subjected to high winds.

The revised Chapter will require mechanical fixing for all ridge and hip tiles (including tiles to hips on low level bays), which will greatly reduce the risk of tile de-bonding failure.

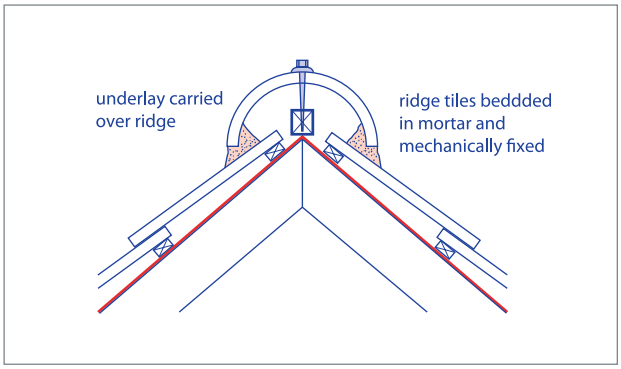

Figure 3: Image from S12 (c)

NHBC STANDARDS

Dentil tiles in ridges and hips

REQUIREMENTS

In addition to mechanical fixing, a further requirement has been added to Chapter 7.2, page 4 – D8 (k) to align with BS 5534 requirements and address failure to deep sections of mortar bedding. Where ridge and hip tiles are bedded on mortar to rolled tiles, concealed or decorative dentil tiles should be fully bedded into all joints in excess of 25mm thick.

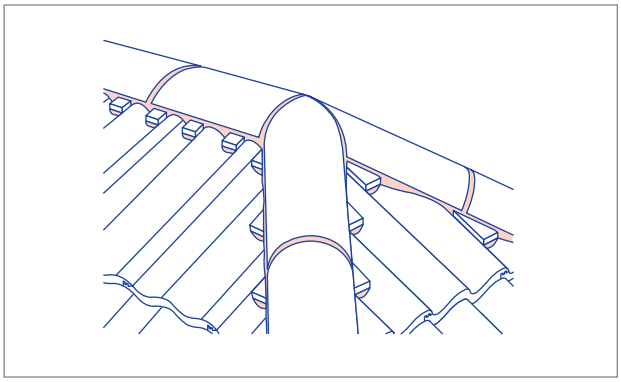

Figure 4: Image from D8 (k)

Interlocking tiles

REQUIREMENTS

Some roofs can be complex in design, with, for example dormers, integral solar panels, rooflights and steps in levels. Traditionally, large interlocking tiles have not had the flexibility to prevent very small or inappropriate cuts to some of these details. To address this problem, manufacturers have introduced ½, ¾ or 1½ tiles within some of their current interlocking tile ranges. The revised Chapter 7.2 highlights the importance the design team/specifiers can play in ensuring that the selected product provides sufficient alternative tile sizes to suit the roof complexity.

Where verge cuts are unavoidable to interlocking tiled roofs, the tile should be at least ½ tile width, mechanically fixed and preferably located on the more secure right-hand verge (where the adjacent tile interlock helps to hold down the cut tile) rather than the weaker left-hand verge.

Figure 5: Failure of small sections of cut tiles

Verge arrangements

REQUIREMENTS

The revised Chapter provides more detailed guidance regarding verge arrangements, including the suitability of tiles and the acceptable overhang, positioning of the undercloak and tile batten, together with revised guidance for tile fixing, including bedding, nailing and clipping.

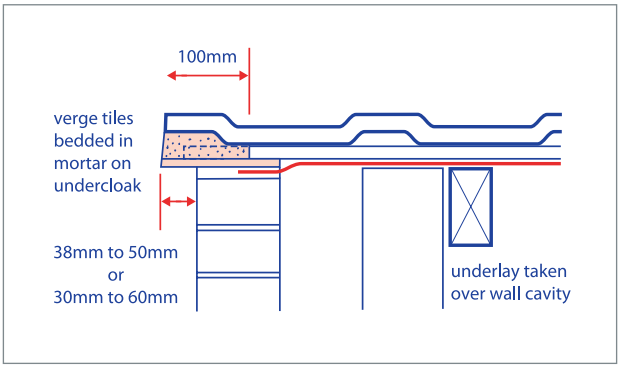

Figure 6: Image from S12 (b)

As highlighted above, the revised Chapter now explicitly requires verge tiles and slates to be bedded on a minimum 100mm width of mortar, placed in one operation. This, coupled with the revised mortar mixes described above and clarification of the tile batten projection length, should greatly reduce the risk of claims where wet systems are used.

The allowable tile overhang at the verge has also been revised for interlocking tiles. Industry feedback highlighted that changing the permitted range could help when setting out the roof, helping roofing contractors set these square, whilst minimising the number of cut tiles.

Finally, where specified, clips need to be installed correctly, taking account of the tile profiles to ensure clips correctly engage with the top of the tile.

Figure 7: Ensure clips are correctly installed – unlike this one

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Summary of changes

REQUIREMENTS

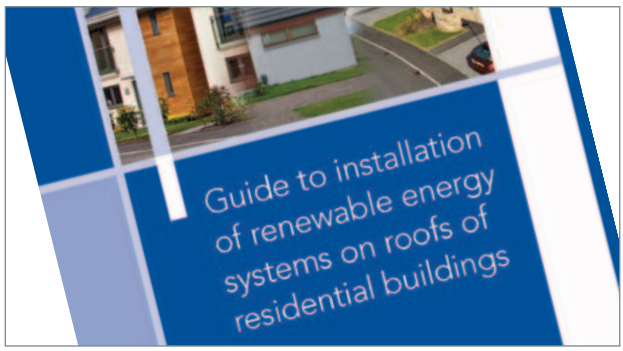
On previous pages, we have highlighted some of the main changes to the revised Chapter and, for ease of reference, the following table sets out some of the other changes.

Clause	Brief description
D8 (b) S11 (b)	The use of small sections of plain and interlocking tiles is discouraged, as they are more likely to become dislodged.
D8 (e) M5 (d) S11 (b)	Guidance for suitable detailing of the underlay at eaves level.
D8 (k) S12 (c)	All ridge and hip tiles now require mechanical fixing. Dentil slips are required at ridge and hips where the mortar joint exceeds 25mm.
D8 (m) S12 (b)	Guidance for suitable detailing at the verge is given. This includes: ■ a greater tolerance for the overhang of interlocking tiles at the verge ■ bedding verge tiles and slates on a minimum 100mm width of mortar placed in one operation ■ appropriate widths of tiles and slates.
D11 (a)	Further guidance for where additional ventilation is required if vapour permeable underlays are used.
D11 (d)	A reminder that the ventilation path at eaves level must be continuous and not blocked by insulation.
D15 (a) S15 (a)	A reminder that the ventilation path at eaves level must be continuous and not blocked by insulation.
M5 (f)	Timber battens should be preservative-treated and marked in accordance with BS 5534. Cut ends that are in contact with mortar should be preservative-treated.
M5 (k) S11 (e)	The guidance given for roof mortar has been revised. Roofing mortar should be 1:3 cement:sand with plasticiser. The mix should be based on sharp sand with soft sand added to achieve workability. The proportion of sharp sand should not be less than one-third of the total sand content. Mortar bedding and jointing should be completed in one operation to form a single piece of mortar.
S3	For buildings over three storeys, lateral restraint straps should be spaced at 1.25m centres.
S10 (b)	Fascia boards should have two fixings into each rafter and be fixed at a height that maintains the correct pitch in accordance with the tile manufacturer's recommendations.
S11 (b)	Guidance on the correct detailing of underlay. This includes: ■ overlaps at ridges and hips ■ cutting the underlay to fit neatly around penetrations ■ detailing at valleys.
S11 (c)	Not more than three joints should be made together in 12 consecutive battens when the gauge is 200mm or less.
S12 (a)	Fascia boards should be fixed at a height that maintains the correct pitch in accordance with the tile manufacturer's recommendations.

REQUIREMENTS (CONTINUED)

This edition of *Technical Extra* has focused on the changes introduced within the revised Chapter 7.2.

There are other issues that impact on the performance of a pitched roof, such as the installation of renewable energy systems. Indications are that solar photovoltaics and solar thermal systems are becoming more widely used, and particular attention is certainly required to ensure long-term satisfactory performance of both the roof and the technology. The impact of renewable technologies will be explored further in *Technical Extra issue 06* (expected February 2012), forming part of an update now that *Chapter 3.1 'Low or zero carbon technologies'* has been operating for a while.



But in the interim, the NHBC Foundation *'NF30 – Guide to installation of renewable energy systems on roofs of residential buildings'* contains some excellent practical guidance on the installation of roof-mounted renewable energy systems and is available as a free download (see **www.nhbcfoundation.org**).

Health and safety issues relating to timber battens

Where slated and tiled roofs are being covered/recovered, timber battens can provide a reasonably secure foothold, provided that the following criteria are adhered to:

- They are fixed to rafters set at centres not more than 600mm apart.
- The battens are a minimum size of 50mm x 25mm and meet the grading requirements specified in *BS 5534 Code of practice for slating and tiling (including shingles)* and as discussed in *Technical Extra 04* – October 2011.
- The battens are at least 1.2m long to ensure they span a minimum of three trusses.
- The battens are only fixed with the recommended nails.
- The safe system of work dictates that the roofers never deliberately walk on the battens mid span between the trusses.
- The safe system of work dictates that the roofers always walk on the rafter line when installing the tiles and slates.

YOU NEED TO...

- Adopt the revised Chapter for all homes whose foundations are concreted on or after 1 January 2012 or earlier if at all possible.
- Ensure your roofing contractor is fully aware of the revised Chapter 7.2 and the reasons behind the changes.
- Adopt the requirements of *NHBC Standards Chapter 3.1 'Low or carbon technologies'* where installing renewable energy systems.

INFORMATION AND SUPPORT

NHBC OFFERS A RANGE OF TRAINING AND DEVELOPMENT OPTIONS

E-LEARNING

New to the Learning Hub is a three-session series on pitched roof coverings aimed at construction staff. The series provides a practical approach to raising standards of pitched roof coverings on site.

- The first session examines the extent of pitched roof claims and identifies what is going wrong on site. It highlights the issues that site supervision needs to focus upon.
- The second session provides guidance on wet mortar work. Essentially, it focuses upon the correct use of mortar on roofs and raises awareness of alternative solutions.
- The third session concentrates on weathering details and fixing requirements. It highlights the fundamental importance of understanding and achieving typical weathering details.

These are free to NHBC registered builders and affiliated companies; £25+VAT per session for others.

To access the e-learning sessions on the Learning Hub, please visit **www.nhbc.co.uk/training** and follow the links to log in or create an account.

IN-COMPANY COURSES FOR SITE MANAGERS AND SUPERVISORS

Free in-company seminars can be delivered for NHBC registered builders using the standard presentation from the free seminars – duration is approximately two hours. Delivered by an inspection manager or a regional director, a free seminar requires a minimum of eight delegates.

Bespoke in-company courses are also available to NHBC registered builders, and include a company-specific claims report on pitched roof coverings, plus a site visit by whoever is delivering the course.

This will be delivered by an inspection manager, regional director or head of inspection, and will use photographs of good and bad practice from the site.

Standard presentations are free to NHBC registered builders and affiliated companies. Bespoke presentations are £950+VAT for NHBC registered builders and affiliated companies. Not currently available for others.

For available dates, please email **training@nhbc.co.uk** with the location of the training, the month you are considering and any days to avoid.

If you have any questions, please call **0844 633 1000** and ask for **'Training'**.

For **technical advice and support**, call **01908 747384** or visit **www.nhbc.co.uk**

TRADE TALK

Delivered by NHBC building inspectors and lasting one hour, our Trade Talks are designed to highlight to trades and site operatives the most common reportable items or defects that the inspectors and claims investigators encounter on residential developments, and give practical guidance on how to prevent these problems occurring. The Trade Talk on pitched roofs looks at:

Mortar, wet verges, valleys, hips and ridges, underlays, condensation control, roofing battens, gutter interface, setting out/fixing, minimum fixing requirements, weathering to abutments, flashing/cavity tray interface, projections/weathering, fire stopping, dry verges, valleys and dry/ventilated ridges.

For further information or to discuss what is likely to work best for you, please contact **training@nhbc.co.uk** or call **0844 633 1000** and ask for **'Training'**.

HEALTH & SAFETY WHEN WORKING AT HEIGHT

Fact: 25% of all major injuries on house-building sites are as a result of 'working at height'.

NHBC's expert consultants can help you manage this risk and others like it with solutions appropriate to your scheme. To discuss any related issues, please contact the Health & Safety team on **0844 633 100** and ask for **'Health & Safety'**.

BUILDING FOR TOMORROW 2012

Now in its 21st year, Building for tomorrow continues to inform the industry on topics that impact directly on today's house builders.

For more information on the 2012 programme and booking form, please visit **www.nhbc.co.uk/bft**.

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NOTES:

Useful contacts for technical information and advice

NHBC technical advice and support

Phone: 01908 747384
Email: technical@nhbc.co.uk
Web: www.nhbc.co.uk/builders/technicaladviceandsupport

NHBC Standards

Buy online at:
www.nhbc.co.uk/nhbcshop/technicalstandards

Building Regulations

For guidance on issues relating to Building Regulations, visit NHBC's TechZone at www.nhbc.co.uk/techzone.

Building Control queries

For Building Control queries, please call 0844 633 1000 and ask for 'Building Control', or email buildingcontroladmin@nhbc.co.uk.

Engineering queries

For Engineering queries, please call 0844 633 1000 and ask for 'Engineering'.

NHBC Foundation research

The NHBC Foundation facilitates research and shares relevant guidance and good practice with the house-building industry.

www.nhbcfoundation.org

Zero Carbon Hub

The UK Government has set out an ambitious plan for all new homes to be zero carbon from 2016. The Zero Carbon Hub helps you understand the challenges, issues and opportunities involved in developing, building and marketing your low and zero carbon homes.

www.zerocarbonhub.org

NHBC Clicks & Mortar e-newsletter

NHBC regularly distributes information on a range of industry topics including new products and services, the building industry market, house-building news and house-building statistics. To receive this industry information, please register at:

www.nhbc.co.uk/newsandcomment/registerfore-news

NHBC Housing Developments e-newsletter

Housing Developments is a new, free resource, developed specifically for the affordable housing sector and designed to report on current industry developments and issues, with expert insights into affordable and social housing.

To receive this e-newsletter, please register at:

www.nhbc.co.uk/housingassociations/affordablehousingnewsletter

General enquiries

For all other enquiries, including ordering products and services, please call 0844 633 1000, and ask for 'Sales'.

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