

# TECHNICAL BULLDINGS BETTER TECHNICAL BULLETIN FOR RESIDENTIAL SURVEYORS

# **CAVITY WALL TIE FAILURE**



RECOMMENDING FURTHER INVESTIGATION

PROFESSIONAL CONSULTANT'S CERTIFICATE

**INDIRECT COLD-WATER SYSTEMS** 



# THE TECHNICAL BULLETIN

FOR RESIDENTIAL SURVEYORS

Welcome to the Technical Bulletin. This Bulletin is designed primarily for residential surveyors who are members of RICS and other professional bodies working across all housing sectors. Other professionals may also find the content useful.

Produced by Sava, you will find technical articles, regulation updates and interpretation and best practice. We hope you find this useful in your day-to-day work and we welcome any feedback you may have and suggestions for future publications.

#### Who we are

We are a team of building physicists and engineers, statisticians, software developers, residential surveyors, gas engineers and business management specialists.

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INDIRECT COLD-WATER SYSTEMS

# IGS BETTER

# CAVITY WALL TIE FAILURE

# A DAY ON THE TOOLS

CHRISTOPHER MORAN, BA (HONS) ASSOC RICS, DIRECTOR, CHRISTOPHER MORAN RESIDENTIAL SURVEYING & SAVA GRADUATE

In this article, recent Sava graduate Chris Moran shares his experience shadowing the award-winning company 'Brick-Tie Ltd'. Chris spent the day with Brick-Tie technicians carrying out cavity wall tie replacement on a 3-bedroom semi-detached house in Sheffield. This article provides a useful overview of cavity wall tie failure, identifying factors, and how professional experts go about replacing failed cavity wall ties. Chris also provides some useful tips for students struggling to find mentoring opportunities during times when it has proven difficult for many students to gain practical shadowing experience.

#### What is cavity wall tie failure?

Cavity wall tie failure is a failure of (or corrosion to) the ties used to hold the internal and external walls making up a cavity wall.

The main cause of failure is the rusting of metal ties; although, there can be other causes, such as failure to properly bed the tie in the mortar joint, poor quality mortar reducing the bond between tie and mortar, or not installing the requisite number of ties.



Figure 1: Rusting cavity wall tie

The following factors play a part:

- Rust leading to disintegration resulting in possible wall collapse.
- Rust expansion (up to 600% the size of the original tie!).
- Cracking (normally horizontal) and structural distortion in the walls.
- Cracking leading to reduced weather resistance of the wall and an increase in corrosion.
- Corrosion of wire ties can cause total failure without the warning tell-tale signs of cracking. This is

associated with thicker section 'fishtail' type ties.

- Generally, wall tie corrosion affects houses between the 1920s (first cavity walls) and 1981 (which was when zinc coating was tripled in thickness).
- However, wall tie problems caused by poor embedment, low tie density and inadequate supervision can be found in all cavity wall buildings, even new ones.

Acceleration can be caused by:

- Aggressive chemicals, e.g. black ash in mortar.
- Chloride salts, e.g. from marine sands or added to mortar as an accelerator.
- Carbonation as the mortar slowly carbonates the protective alkaline layer is destroyed.
- The orientation increased water ingress, often on South-West facing walls.

# Is cavity wall tie failure a national problem or geographically restricted to certain areas?

Cavity wall tie failure is a national problem. It was thought at one time to be localised as it was believed that it occurred mainly in areas where a catalyst, for example, black ash mortar, increased the likelihood of breakdown. It was later appreciated that the problem was more widespread and the causes more complex.

However, the geographical issues of adverse weather and salt in the air can lead to a more rapid breakdown of the wall ties. Likewise, the localised use of wall ties prone to failure could create pockets of increased failure.

## What is the difference between cavity wall tie failure and sulphate attack in brick walls?

Cavity wall tie failure is identified by horizontal cracks that correspond to the mortar courses containing the ties, often at 450mm intervals.

Sulphate attack in brick walls may occur in every joint. Often a white colouring is seen in the mortar as it deteriorates. It is also often accompanied by frost attack as a by-product of the large volume of water involved.



Figure 2: Cracked render above brickwork affected by sulphate attack

The photographs to the right demonstrate some of the classic signs of cavity wall tie failure:

- Horizontal cracking high up on the exposed south westerly elevation.
- The property was built in the 1930s.
- It was made using black ash mortar.
- · Just visible within the cavity (which could be seen

through the cellar door entrance) was a wall tie with visible rusting.



Figure 3: South westerly elevation



Figure 4: Closeup of cracking evident on top floor



Figure 5: Wall tie with visible rusting

When undertaking a level two survey, a surveyor who suspects an issue with the cavity wall ties would make their client aware of their findings and recommend for further investigations. So, what happens when the specialists are called in?

#### A day on the tools with Brick-Tie

Brick-Tie Limited are experts in wall ties and structural repairs

and they are highly regarded members of the Property Care Association (PCA). I asked Bryan Hindle, Managing Director, if I could shadow his team for a day and he kindly agreed. The property requiring repairs was a three-bedroom semidetached house in Sheffield.



Figure 6: Outside the property

#### The process

The first step is to drill a hole into the cavity and use a borescope to identify the wall ties that will require replacement. A borescope is the preferred option, but the prevalence of cavity wall insulation has increased the need to remove bricks or chase-out bed joints so that a technician can clearly see the extent of corrosion (if any).

Following the initial inspection, the technician will produce a report, if required, which will issue a detailed specification, including a quote for remedial work. If appointed, scaffolding will be erected (if necessary) and the technicians can then begin their work.

 A metal detector is used to locate all the ties within the cavity. The technician will mark their position with a builder's crayon (see the yellow line on the following image). Interestingly, some wall ties may be so corroded that the metal detector gives only the faintest of signals. The metal detectors have adjustable sensitivity, and the skill of the technician also helps to locate the ties.



Figure 7: Yellow line identifying location of old wall tie

2. Once all the old tie locations are marked, the technician uses a heavy-duty angle grinder to grind through the mortar and then into the head of the tie itself, chopping the tie down to about two-thirds of its original length. A vacuum attachment removes the debris created by the grinding. This is important as it prevents debris from falling into the bottom of the cavity, potentially causing damp bridging issues in the future. This process leaves a wall with a very pronounced series of horizontal chases in

the outer leaf wall, as can be seen in the next image.



Figure 8: Horizontal chases in outer leaf wall

3. The new remedial wall tie holes are drilled into the mortar where the new ties will be installed (also shown in the image above). The technician drills the holes into both the outer and inner leaf at a slight upward angle, meaning any water that gets onto the new ties will gravitate toward the outer leaf. Brick-Tie used a 'Helifix' remedial tie with a helical twist along its full length. This helix acts as a repeating drip feature and provides an excellent key for the resin. For several reasons, the holes are drilled into the mortar, rather than the centre of each brick (as many textbooks state). By drilling the mortar, the rear of the brick does not shatter which can occur when drilling through brick and blocks. This approach prevents a build-up of debris in the cavity which often results in damp and bridging issues, particularly for properties with existing cavity wall insulation. When the wall is repointed, if repointed well (Brick-Tie technicians use careful colour matching dyes in their mortar) the visual aesthetic of the house is maintained, and the property doesn't have the polka dot appearance that some properties have after wall tie replacement. Finally, the mortar is softer than brick which reduces the amount of vibration exposure produced during drilling, leading to safer long-term health outcomes for Brick-Tie's technicians, helping avoid Hand Arm Vibration (HAV) related injuries, like vibration white finger.

4. The remaining old wall ties are 'isolated' to prevent future issues. This is essential because there may be a small wafer of old tie left in the outer leaf, which will corrode and expand in the future. The chases (horizontal holes left by the angle grinder) need to be re-pointed without re-encapsulating the remaining tie section in mortar, where its continuing corrosion would otherwise cause new cracking. Although the new wall ties would hold the inner and outer walls together, the rusting old ties could still cause issues with expansion and cracking. As such they are 'isolated'. There are many methods of doing this, but a common and efficient method is cutting pieces of plastic DPC and creating an isolator hood that is pushed into the gap to encase the old tie and prevent new mortar from touching the tie. In effect, the remaining section is left in a void - an expansion pocket, into which the slight growth of the thin section can expand, without being constrained. This is then over-pointed. The correct and diligent treatment of the old ties is the most frequently neglected part of wall tie corrosion projects. However, the basic methodology is proven to work and has been used for over 35 years.



Figure 9: Plastic isolator hood

5. Brick-Tie has created its own styrene free, self-mixing resin, which is injected through the new drill holes first into the inner leaf. The new wall ties are then inserted before resin is injected into the outer leaf and left to set.

Tests are carried out to check the strength of the wall ties and resin. To do this, a random selection of the ties are inserted into the resin on the inner leaf and left to set. They are then tension tested to ensure that they are of sufficient strength to hold the two walls together. The test results are recorded, and the work can only be signed-off and guaranteed if the ties have passed all tests.



Figure 10: Helifix remedial wall tie

There are many different types of remedial wall tie, for example mechanical, friction fix, grouted, and chemical fixings. Bryan Hindle explained that most available systems are acceptable, adding "The surveyor or specifying specialist should consider each project on merit and use the most appropriate tie for that situation. There is no such thing as one-size-fitsall. The most important issue is not the wall tie, brand or model – the technician is the crucial element – skill, knowledge, on-site testing and most of all engagement in the success of the work is what makes or breaks any remedial work."

6. The final stage of the process is repointing all the holes and gaps left by the ground-out mortar. A skilled technician brings a variety of mortar dyes and aggregates with them to colour match the mortar between bricks and the pattern of any render that may be on the property. However, this is a challenging process, especially in render - as exampled in the image below - and as such, repainting or repointing is common.



Figure 11: mismatched repointing, credit: www.designingbuildings.co.uk

This explanation is a very simplified version of the process Brick-Tie use, but of course, there are many other methods available. For more information, you can visit Bryan Hindle's blog at <u>http://www.preservationexpert.co.uk/</u>

Another useful resource for information on the different types of wall ties is the Building Research Establishment Digest number 329 Installing wall ties in existing construction.

#### Considerations

It's usually assumed that evidence of drill holes through brick indicate cavity wall tie replacement, and drill holes through mortar indicate cavity wall insulation has been installed. However, as Brick-Tie technicians described, cavity wall ties are now more commonly resin-fixed through the mortar, and not mechanically fixed through the bricks. Therefore, when evidence of drill holes are identified in external walls, although general principles can be followed, assumptions shouldn't be made too soon. Drill holes in mortar, spaced at intervals of approximately 900mm horizontally and 450mm vertically may be evidence of wall ties.

Further research may be required to fully clarify what work has been conducted to the property.



Figure 12: Drill hole evidence through brick



Figure 13: Drill hole evidence through mortar

Textbooks often state wall ties are usually at 450mm/6 brick course vertical intervals; however, this is not always the case. This was demonstrated in this case study with one small section of the wall having wall ties at intervals of 3,4,5,6 and 7 brick course intervals! The original builder of the property may have miscounted, forgotten to add a tie, or maybe even dropped one down the cavity and not been bothered to climb down their ladder to get another!

If you come across horizontal cracking when inspecting a property, don't be fooled into thinking that it cannot be cavity wall tie failure if it doesn't correlate perfectly to 6 brick courses.

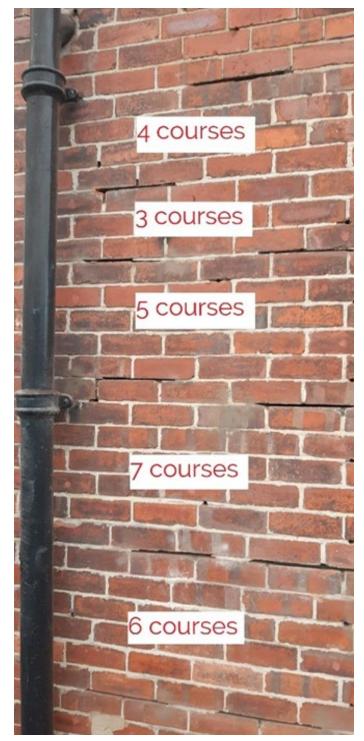


Figure 14: Inconsistent wall tie brick course intervals

Cracking is not always horizontal. Although the wall tie may be the cause, the ensuing cracking pattern may follow lines of weakness. Stepped cracks will often propagate where the stresses associated with tie expansion resisted by returns at corners, placing the masonry in tension. This is especially prevalent near weakly loaded areas such as at eaves level, below low parapet walls and around and under openings. (See figure 4 for reference.)

Having carried out some research in my area, cavity wall tie inspection surveys cost a similar amount to a drainage CCTV survey. The outlay is minimal compared to the potential cost and disruption to the client to replace wall ties throughout a property. However, not all vendors will allow such intrusive inspection and appropriate negotiation with the agent may be required.

Wall tie failure can often be subtle and easily missed. The property focused on in this article had only minor horizontal cracking and slight bowing to the side wall that could be easily missed. It highlighted the importance of considering the other evidence available, such as the age of the property, and therefore the likelihood of it suffering from wall tie issues; the finding of black ash mortar; and any evidence obtained from neighbouring properties that may be suffering from wall tie issues or have had their wall ties replaced.

It also brought to mind the relevance of part 11.3 (2f) of the RICS Valuation - Global Standards 2017: UK national states supplement, which (with reference to valuation inspections) "Where there are locational factors that may impact value, they should be recorded and reported, with some comment where appropriate. Certain problems, such as flooding, mining settlement, subsidence, woodworm, invasive vegetation, radon gas, mundic and other issues are particularly prevalent in certain districts. If appropriate, the valuer should make some reference to these defects. even if the subject property does not appear to be affected at the time of the inspection."

#### **Mentoring Tips**

The coronavirus pandemic has prevented conventional surveyor shadowing and mentoring. The day with Brick-Tie led me to think about alternative methods of gaining experience. I've found some success with the following approaches that students may wish to consider:

 Approach non-conventional mentors or shadowing experiences. Perhaps a day with other professionals who work outside such as a day with a roofer, a builder, or a drainage company.

- If a prospective mentor is unable to meet you due to their health vulnerabilities or their organisational policies, perhaps they might consider online mentoring. An hour a week/fortnight/month on zoom to talk through a pre-arranged topic area (so you can research prior) or discuss issues you have found could be a great benefit.
- It can be quite pressurising for surveyors if a student has approached them asking the surveyor to be a mentor. Surveyors may be reluctant to commit to a longterm arrangement. Therefore, if you are looking for some mentoring, ask if you can shadow the surveyor for a day or two. This way an initial arrangement is more likely. If you both enjoy each other's company, it can easily lead to longer-term mentoring.
- Create a professional LinkedIn account and update your CV. Add the hyperlink to your LinkedIn and attach the CV to your emails. It helps prospective mentors get to know more about you.
- Approach a second-year Sava student! They know what you are going through and should have good knowledge of surveying, construction, and valuation. They may be able to assist you with any areas of weakness you may have. Also, they can answer specific questions you might have about the assessment requirements in the second year. You will often find them on LinkedIn.

Thanks to Bryan Hindle (Brick-Tie Ltd) and Phil Parnham MRICS for reviewing this article prior to publishing.

Chris is a recent graduate of the Sava Diploma in Residential Surveying and Valuation. Chris has set up his own private company called Christopher Moran Residential Surveying, specialising in level 2 surveys and private valuations. He has kindly created a page on his website with useful resources which Sava students may benefit from: https://moransurvey.co.uk/sava-students-area



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# RECOMMENDING FURTHER INVESTIGATION

# IN LIGHT OF *HEART v LARGE* AND THE HOME SURVEY STANDARD

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In this article Hilary Grayson and Nik Carle review section 4.9 of the new RICS Home Survey Standard in light of the judgement of *Hart v Large* and concealed building elements.

The new RICS Home Survey Standard (HSS) came into effect on 1 March 2021. Section 4.9 (Further Investigations) states:

The RICS member's knowledge will, at times, lead to a suspicion that a visible defect may affect other concealed building elements. In these circumstances, an RICS member must recommend that a further investigation is undertaken.

However, the RICS member **must not** recommend a further investigation just because a given building element is inaccessible within the confines of a normal inspection. Examples include where the covering of one roofslope cannot be seen from any reasonable vantage point, but there is no evidence of defect in the roof void. In such cases, RICS members should inform the client of the restriction and advise on the implications. The RICS member should exercise professional judgement and must not call for further investigations only to cover

#### him or herself against future liabilities.

Where a further investigation is recommended, the RICS member should include the following information in the client's report:

- a description of the affected element and why a further investigation is required
- when the further investigation should be carried out and
- a broad indication of who should carry out the further investigation (for example their qualifications, membership of a trade body, competent person scheme).

How comfortably does this now sit following the recent case of *Hart v Large*?

#### The need for new standards

Let us remind ourselves why we have the new Home Survey Standards (which we refer to as HSS in this article). Before the publication of the new standards, it had been identified that there were excessive documents of varying status produced by RICS over time for use by RICS members and regulated firms when delivering condition-based home surveys. Feedback from members, consumers, and industry found that the various guidance and practice statements were often confusing, applied inconsistently, and were out of step with the rapidly changing world and the requirements of consumers in that world.

In January 2018, RICS formed a technical working group to review the entire home survey guidance suite. The working group identified the following risks:

- Standards not being applied consistently.
- Lack of consistency on the service delivered by home survey practitioners to consumers.
- Client complaints/dissatisfaction and consumer needs not being met.
- Lack of consistency in products being developed in the marketplace.
- Lack of clarity on mandatory guidance requirements for delivering home surveys.
- RICS existing guidance not reflecting the evolving role of technology.
- Lack of prominence of professionals' skills and role in the home buying and selling process.
- Consumer confusion on the importance of home surveys; difference between survey and valuation; and the different survey service levels delivered by home survey practitioners.

The review clearly identified the need for a professional statement providing a set of concise mandatory requirements for all RICS members to ensure a consistent approach in serving the changing needs of the market and helping improve the home buying and selling process.

## (Source: <u>Home survey standard; 1st edition, professional</u> statement; Effective from 1 June 2020 - Basis for conclusions)

There was nothing controversial about these conclusions. For years there had been discussion about how out of step with consumer requirements the HomeBuyer Report was, and it was widely acknowledged that there was consumer confusion about the difference between different levels of inspection and report. This has been most notably around lender valuation reports which for years have been erroneously referred to as 'surveys' by many involved in the home-buying sector.

Consequently, stakeholder engagement was sought, a working party convened, and a technical author appointed. The new 'Home Survey Standard' was born.

#### Hart v Large - summary of the key points

Although a lot has been covered in the press and on social media recently, it is also worth revisiting the case of *Hart v Large*. This is a case where a surveyor had carried out a HomeBuyer Report and was subsequently found to be negligent in the execution of that report.

The surveyor, Mr Large, provided a HomeBuyer Report including a valuation for his clients, the Harts. The property

in question was valued at £1.2million. This was in 2011.

The property had some key features:

- It was a clifftop property on an exposed site
- It was originally built in the 1920s
- It had very recently (before the surveyor's visit) been subject to considerable remodelling and refurbishment.

The surveyor recommended and carried out a HomeBuyer Report. (This was queried as being the right level of service for the situation, but the judge found it to be an acceptable product and so the surveyor was not negligent on this point.)

Although this article is looking at Paragraph 4.9 of the new HSS, it is worth noting that Paragraph 2.4 Client Liaison addresses the relationship with the client, and importantly that they understand the differences between the level of service.

2.4 Client liaison - RICS members and RICS regulated firms must take all reasonable steps to ensure that clients:

- understand the differences between the levels of service, including the extent and limitations of each option
- are advised of the range of options the RICS member can offer, together with the key features and benefits of each
- are aware of the fee that will be charged for the service and
- agree the terms of engagement
- agree report format and method of delivery and
- explain the intended future use of the property (for example buy to let).

Clients may not be familiar with the range of choice available and will require advice on which level best suits their needs. The RICS member or regulated firm should confirm the client has access to appropriate information before any contract is formed.

Where instructions have been received from a third party (for example, from a lender or a panel manager), the RICS member or regulated firm should satisfy themselves the instruction is best suited to both the property and the needs of the client. Where the RICS member finds the instruction is not suitable, the client should be given the reasons why and advised on the appropriate level of service.

So, the surveyor was not negligent by offering and carrying out a HomeBuyer Report – it was the execution of that service that was found to be negligent.

But it is worth noting that the judge did make it clear that just because a surveyor agrees on a level of service in advance of conducting the inspection, they are under a continuing obligation to consider if that level is appropriate, up to and including responding to any queries after the completion of the report. The surveyor reported to the client that the drainage and sewerage disposal arrangements required further investigation. However, the surveyor noted that the damp proofing measures could not be seen and did not recommend further investigation as there were no signs of failure of the damp-proof measures at the date of the inspection.

Because this was a refurbishment and remodelling of an existing property, there was no NHBC protection. In such situations, a Professional Consultant's Certificate (PCC) can be used instead. But in this case, there was no PCC, or in other words, no builders and/or architects guarantees. If something were to go wrong, there was no recourse to the builders and/or architects who caused the building defects once the vendor, who had commissioned the refurbishment work, had sold the property on.

The surveyor did recommend that both Building Regulation certification and guarantees should be checked by the solicitors and later, in response to further queries, he advised the claimants that it would be reasonable to request a PCC to certify that the work had been supervised and to provide recourse against the architect in the event of problems.

As we now know, after the claimants had bought the property numerous problems emerged. The claimants pursued claims against their solicitors and the architects who had supervised the work for the vendor, as well as the surveyor, but only the claim against the surveyor went to trial.

PCCs and guarantees were talked about by the surveyor, but the judge found that the service provided by him was not just a valuation, but also to advise the client about the purchase of the property. If the surveyor had clearly reported on investigating the damp further and that a PCC was vital for their protection, then the client would not have purchased the property, or would not have done so without pursuing the PCC. The losses suffered by the client were a direct result of this lack of clear, unambiguous advice from the surveyor. In other words, what the surveyor should have done was to emphasise in the report that a Professional Consultant Certificate (PCC) was essential in this case.

At the trial, the judge also found that the surveyor should have recommended further investigation of the dampproofing provision as it could not be seen (216). There was a specific area by the front door where wind-driven rain ingress had occurred (168) though, as with all other areas of the property, the judge found that there was no evidence of dampness or water ingress at the time of the inspection (162).

There has been a lot of debate on the way the damages were determined, and there is no space to go into that in this article, suffice to say that this was the basis of the appeal. In essence, the judge found that the Harts would have pulled out of the transaction, had the surveyor been specific and unequivocal on recommending further investigation on the damp proofing and that an Architect's Certificate be obtained.

For those who might be in a position to claim against

their surveyor, *Hart v Large* is a boon. The Court of Appeal tried hard to portray the decision as fact-specific:

" ... This was not just a case about a failure to spot, and draw attention to, certain defects that one might expect to be picked up on a HomeBuyers' survey. It was about a failure by the surveyor to convey to the clients (i) the limitations of the protection that the survey afforded them, because there were material risks which he was unable to assess, and (ii) in the light of this, the need for them to take further action in the form of further investigations and, crucially, obtaining a PCC, which was essential ..."

The 'key point', which Lady Justice Andrews underlined at the end of the judgment, was that "... Mr Large failed to say what he should have said to the Harts about matters that were fundamental to whether the transaction should go ahead. If he had said those things, they would not have bought the property ..."

The difficulty is, however, that almost all 'missed defects' claims feature the allegation that the claimant would not have bought the property if they had been properly advised in the first instance. So Lady Justice Andrews' 'key point' is hardly very distinguishing.

Meanwhile, the prohibition in paragraph 4.9 of the HSS could not be clearer: "... The RICS member should exercise professional judgement and must not call for further investigations only to cover him or herself against future liabilities ..."

All of this leaves surveyors in some jeopardy, potentially.

The <u>Terms of Engagement</u> guidance document launched alongside the HSS sets out the minimum requirements to include before appointments are confirmed. There are several important protections touched on here, for example:

**N. Liability:** "... Where possible, a disclaimer should be included in both the terms and conditions and the report, relating to any errors or omissions in the report caused solely by any inability to inspect relevant areas ..."

"... RICS members must take all O. Client liaison: reasonable steps to ensure that clients understand the differences between the levels of service and are advised on the range of options the surveyor can offer. If possible, they should include information on the services offered before any contract is drawn up. Where the RICS member finds the instruction not suitable, reasons should be given and the client should be advised on the appropriate level of service. RICS members should keep under review the level of survey required for the particular property and advise the client if they consider the level of survey should change for any reason. Members should keep clear notes on any advice provided regarding the level of survey and any changes to that advice, and make clear any limitations to the advice given ..."

However, in the wake of *Hart v Large*, surveyors need to be vigilant (and perhaps more selective) about the jobs they take on.

If they are able to develop a keen 'sixth sense' for properties that may be problematic or risky, that will be the signal to increase the fee quote and/or to introduce exclusions, disclaimers and limitations of liability into the engagement materials.

# Defensive reporting and calling for further investigation

Surveyors have often faced criticism from both clients and the legal profession for failing to make the appropriate judgement call and simply call for further investigation without applying any judgement based on the evidence available. It does not take much time to find comments like this on various consumer forums on the internet:

"There is no point in getting a survey. They are full of caveats or recommendations to carry out further investigations."

We have all heard 'horror stories' where the further investigation suggested has been ridiculous. Bryan Hindle of Brick-Tie Ltd recently cited on a Property Care Association training event that he has seen plenty of examples where surveyors have recommended further investigation of cavity wall ties, only for him to turn up to a solid wall property.

Of course, if somebody asked the Harts, they might say that there is no point in getting a survey because they do not contain enough information about further investigations.

Clearly, the correct position is somewhere between the two. And this is the challenge that the new HSS tries to address – where that correct middle ground should be. And there is the nub of the problem – because it is going to vary from customer to customer and property to property.

That said, Paragraph 4.9 of the HSS is quite helpful here:

".... However, the RICS member must not recommend a further investigation just because a given building element is inaccessible within the confines of a normal inspection. Examples include where the covering of one roof slope cannot be seen from any reasonable vantage point, but there is no evidence of defect in the roof void. In such cases, RICS members should inform the client of the restriction and advise on the implications."

Let us unpick this statement.

- Inform the client of the restriction this is a straightforward matter of fact: what I could not see and why I could not see it.
- Advise on the implications this is where surveyors are going to have to rise to the challenge. What the RICS is saying here is just because you cannot see something, that, in itself, is not enough to justify further investigation. The surveyor must have a sound reason to do so.

What follows from this is that no surveyor should be carrying out an inspection and submitting a report on a property without a full understanding of the way that property is likely to have been constructed, the materials used and the way those materials perform over time and in situ.

It also suggests a greater emphasis on desktop research both before and after an inspection. There is now a lot of information on the internet providing historical pictorial evidence of many properties. For instance, Rightmove now contains a lot of historic photographs of properties evidencing changes over time.

#### The importance of desktop research CASE STUDY 1 - VICTORIAN END-TERRACE

The property in question was a newly refurbished, end-terrace, late Victorian brick-built house. It had two bedrooms; a single storey, flat roof rear extension (probably from the 1960s); and a loft conversion. Although the floors would have been suspended timber, the ground floor now had all solid floors.

The client was known to the surveyor socially. She was a single mother with two children on a limited salary. The surveyor was aware that the client was looking for a new home as the family home was being sold, and had suggested that she should consider a more detailed condition survey. The client was getting a small mortgage and she had a large deposit from her share of the equity of the family home. A valuation inspection had been done on the property and the valuation report had raised no concerns.

The survey identified a number of issues, not least of which was significant problems with damp – far more than you would normally expect even for a moderately well-maintained Victorian house.

But this property also had a loft conversion. There was no indication how old the loft conversion was, but the surveyor noted the following issues (in addition to the damp chimney breast mentioned in the summary of dampness):

- 1. Lack of fire doors
- 2. Lack of escape windows
- 3. Inappropriate balustrades

But possibly, the most alarming issue was the roof structure.

The surveyor noted that the gable end wall was leaning out slightly at the top. But even before getting on site the surveyor had done some research on the history of the property and had found photographs showing the inside of the loft conversion. It was clear that the purlin had been removed at some time. This photograph was included in the report for the client's information.

At the time of the inspection the purlin had been replaced - or rather a new beam was visible in the loft room. What was not visible, however, was the detailing showing how the beam was attached to the gable end wall or the party wall. For all the surveyor knew, the 'new beam' could simply have been hanging from the rafters (and the lack of care around the damp issues suggested that the refurbishment was not to a particularly high standard).

The surveyor correctly recorded the roof structure as 'Not Inspected', because it was concealed behind plasterboard and decoration. Specifically, in the report the surveyor did not call for further investigation of the purlin. Although a report was later prepared, the surveyor called the client from site and expressed concern about the roof structure based on what she had seen in photographs on the internet and spelt out, in no uncertain terms, the potential risks posed (making a detailed note later to record the essence of this conversation).

This conversation with the client confirmed that this addition to the roof structure, which had occurred during the seller's occupancy, had not been declared on any paperwork provided to the solicitor.

While the defect at the top of the gable end wall was clearly visible to the naked eye, this illustrates just how important it is to research before going on site. In this case, the surveyor really struck lucky, finding a photograph of the loft room without a purlin, and then reviewed against photographs taken while on-site, which clearly show a replacement timber of some sort.

In this case, the surveyor did not recommend further investigation – instead, stating quite clearly that there was no evidence on site to suggest that a replacement purlin had been installed correctly and reiterating the implications of that.

The purchaser pulled out of the transaction. She did not have the resources or energy to address the defects with the property. It was not the right property for her.

This was a brave thing for the surveyor to do. The client was, in effect, made homeless and the estate agent was incandescent. Although predating the new Home Survey Standard, this was fully in the spirit of paragraph 4.9.

#### CASE STUDY 2 – WESTBURY FARMHOUSE

Westbury Farmhouse is a Grade 2 listed property dating from 1670 (with some parts likely to be older) and with a substantial extension that was built in the 1950s. The roof has multiple pitches. All are visible from ground level except one – the slope to the rear of the roof on the oldest part of the building. Here the pitch joins with the flat roof, also not visible from the ground.

Inspection of the roof void is considerably restricted due to the presence of a known bat roost.

Although formerly a residential property, it is now occupied by an arts charity but is nevertheless a good example of complicated residential property.

The Trustees commissioned a building survey in 2020.

The surveyor did not suggest further investigation of

the area of the pitched roof that could not be seen. He could tell from the rest of the slope that the clay tiles had largely delaminated with the likelihood of the roof needing a significant overhaul in the next 5-10 years.

Also, he could not see the fixings, but his knowledge led him to believe that the nails used to fix the tiles were likely to be iron and therefore subject to corrosion. There was already evidence of some slippage on the slopes that could be seen.

He did not call for further investigation of the unseen roof slopes or to arrange consent for further access to the loft space. He did not need to. He could deduce their likely condition from the other, visible slopes and his construction knowledge.

The flat roof, however, was a different matter. There was no documentary evidence as to the age or material used, but oral evidence from some of the resident artists suggested that it was more than 10 years old. Therefore, knowing that flat roofs have a limited life span, he correctly suggested a drone flight to check the condition of the flat roof and provided an addendum to the report following that inspection.

In our opinion, this would be fully in the spirit of paragraph 4.9 of the HSS.

#### The power of the word 'because'

The powerful word that surveyors are going to have to get used to using in reports to justify further investigation is the word 'because'.

"I recommend further investigation of the hidden flat roof **because** I believe the roof to be at least 10 years old, I am unable to verify the exact construction and condition and roofs of this type usually have a life span of only approximately 15 years."

Such an approach is not a caveat as it informs the purchaser.

#### In summary

We do not believe that *Hart v Large* changes anything in relation to the Home Survey Standard. There are a few summary points to remember:

- It is imperative that even if surveyors agree on a level of service with a client in advance, they should continue to keep this advice under review before, during and after the inspection.
- Surveyors should always be aware of their duty to recommend a full level 3 inspection and report where necessary (and record that they have done so).
- As part of any research, both before and after the inspection, surveyors should remember that the internet has created lots of opportunities to discover things about the property that might not have previously been accessible.
- 'Because' is a powerful word to explain why something was not inspected and to justify further investigation.
- If a repair, improvement, or remedy has not been in place long enough to determine whether or not the detailing is sufficient for the environment, that is a legitimate reason for further investigation.

- Further investigation can relate to documentation from third parties - not just exposing a detail or carrying out another, more disruptive investigation.
- It is acceptable to tell a purchaser not to proceed unless certain issues have been addressed/seen (such as documentation).

#### **Nik Carle FCIArb**

Nik is an experienced professional negligence litigator, acting for and against advisers across the full business spectrum, with a focus on claims involving solicitors, brokers, surveyors, valuers, and estate agents. Nik also advises on complex insurance policy disputes.



Nik is also a qualified arbitrator and is admitted a Fellow of the Chartered Institute of Arbitrators (FCIArb). He is listed on the CEDR Panel for commercial arbitration work, accepting contractual and ad-hoc appointments for business-to-business disputes. As an ADR Official, Nik has adjudicated on over 500 consumer disputes, across CEDR's Aviation, WATRS and CISAS Schemes. But the key thing is to ensure you report anything that has not been inspected with an explanation as to why you were unable to do so.

#### Hilary Grayson BSc EST MAN (Hons)

Hilary is focused on developing new qualifications, as well as Sava's activities within residential surveying. Hilary has a wealth of experience within the built environment, including commercial property, local government and working at RICS. As well



as her work at Sava, she is a Trustee at Westbury Arts Centre, a listed farmhouse dating from the Jacobean period, and has inadvertently become a custodian of a colony of bats.



# CERTIFICAT

## WHAT ARE THEY AND WHEN ARE THEY USED?

CARYS ATKINSON, ASSOC RICS, RESIDENTIAL SURVEYING TECHNICAL LEAD, SAVA HAYLEY BOWKETT, SCHEME AND COMMUNICATIONS COORDINATOR, SAVA

The case of Hart v Large has caused a lot of consternation in the surveying industry in recent months. One aspect of the case was the failure of Mr Large to be crystal clear about obtaining a PCC, which was essential.

In this article, we look at Professional Consultant's Certificates, what they are and why they will be essential for some clients.

A new build warranty is designed to protect a purchaser against any defect or construction deficiency, usually for the first 10 years after the property has been completed. Also, lenders will usually require a new-build warranty as a condition of providing mortgage finance (this is covered in the handbook of UK Finance, previously the Council of Mortgage Lenders.)

The warranty is provided by the developer to cover the purchaser in the event that:

- The developers were to go out of business prior to completion (in which case the buyer's deposit is secure) • Defects and deficiencies in the construction

Probably the most familiar new-build warranty scheme is the National House Building Council's (NHBC), Buildmark. This is in effect a two-year builder's warranty and a further eight years' insurance. It runs from the date of completion. Buildmark covers approximately 80% of the new-build market.

But there are other new-build warranty schemes in place the most well-known being Local Authority Building Control Warranty (LABC) and Premier Guarantee. Zurich also previously provided warranty cover in this market. These schemes all operate under the Consumer Code for Home Builders.

These warranties run for 10 years and because they are taken out by the developer in the first place, the benefits transfer to new owners in the event that the property changes hands during the 10 years.

Of course, not all 'new-builds' are built by larger housebuilders. There are self-builds and much smaller developers. The Federation of Master Builders (FMB) has a warranty scheme operating under a different consumer code to the NHBC, LABC and Premier schemes, and there is also a Checkmate warranty scheme that operates under yet another consumer code: Consumer Code for Builders of Homes for Sale.

All the above cover new homes, but what about where an existing home has been substantially altered? This is where a Professional Consultant's Certificate can come in.

#### What is a Professional Consultant's Certificate?

A Professional Consultant's Certificate (PCC) confirms a property has been built or substantially altered in accordance with drawings and instructions approved under building control, or the building contract.

UK Finance state that the purpose of the PCC is to confirm to the lender or its conveyancer that a professional consultant:

- has visited the property during construction to check its progress, its conformity with drawings approved under building regulations and its conformity with drawings/instructions issued under the building contract;
- will remain liable to the first purchasers and their lender and subsequent purchasers and lenders for the period of 6 years from the date of the certificate;
- has appropriate experience in the design and/or monitoring of the construction and conversion of residential buildings; and
- will keep a certain level of professional indemnity insurance in force to cover their liabilities under the certificate.

A PCC can only be issued by a consultant with the appropriate qualifications listed in the UK Finance lenders' handbook. This is usually the architect associated with the project, but the UK Finance list also includes Chartered Surveyors, Chartered Structural Engineers, Chartered Builder and Chartered Building Engineers. A PCC usually lasts for 6 years and is not an insurance policy – just a statement of confirmation that a house has been built in accordance with the approved

plans. In turn a PCC must be covered under the PI insurance of the party issuing it for there to be any guaranteed protection.

A Structural Warranty is something different again. This is an insurance policy that protects a homeowner against any latent defect in a property and usually runs for 12 years.

A PCC would be needed if a homeowner is selling a property and the purchaser needs a mortgage, a homeowner is re-mortgaging against the property, and if a homeowner wants to rent their property and they need to raise a Buy-to-Let mortgage to release equity.

#### What does a PCC look like?

The UK Finance website includes a link to download a template PCC. This is what you can expect one to look like:

#### APPENDIX 1 - PROFESSIONAL CONSULTANT'S CERTIFICATE

Return to: Name of Applicant(s) Full address of property

I certify that:

 I have visited the site at appropriate periods from the commencement of construction to the current stage to check generally:

(a) progress, and

 (b) conformity with drawings, approved under the building regulations, and
 (c) conformity with drawings/instructions properly issued under the building contract.

2. At the stage of my last inspection on \_\_\_\_\_\_, the property had reached the stage of

\_\_\_\_\_

 So far as could be determined by each periodic visual inspection, the property has been generally constructed:

 (a) to a satisfactory standard, and
 (b) in general compliance with the drawings approved under the building regulations.

4. I was originally retained by

who is the applicant/builder/developer in this case (delete as appropriate).

5. I am aware this certificate is being relied upon by the first purchaser

\_\_\_\_\_\_\_of the property and also by \_\_\_\_\_\_\_ (name of lender) when making a mortgage advance to that purchaser secured on this property.

6. I confirm that I will remain liable for a period of 6 years from the date of this certificate. Such liability shall be to the first purchasers and their lenders and upon each sale of the property the remaining period shall be transferred to the subsequent purchasers and their lenders.

I confirm that I have appropriate experience in the design and/or monitoring of the construction or conversion of residential buildings.

Name of Professional Consultant

Qualifications Address

\_\_\_\_\_

Telephone No. Fax No.

Professional Indemnity Insurer

 The box below shows the minimum amount of professional indemnity insurance the consultant will keep in force to cover his liabilities under this certificate \_\_\_\_\_\_ for any one claim or series of claims arising out of one event.

Signature -----

Date

# INDIRECT COLD-WATER SYSTEMS

## HEALTH AND SAFETY IMPLICATIONS

FIONA KELLY, ASSISTANT SURVEYOR, HANNENT CHARTERED SURVEYORS & SAVA STUDENT

The new RICS Home Survey Standard refers to risks to occupants, specifically in paragraph 4.5 as follows:

"...matters that an RICS member or regulated firm is aware of that present a safety risk to occupants must be described in the report. Member should consider concisely listing the risks in a separate section with appropriate cross-referencing to where they appear in the report."

Appendix E of the report provides a list of typical safety hazards in a dwelling. While lead pipes and Legionnaires' disease are specifically mentioned in Appendix E, there is no other mention of potential hazards associated with cold-water systems (though it is specifically stated in Appendix E that the published list is not intended to be exhaustive).

This article looks at indirect cold-water systems and the potential for harm that they may cause.

#### What is an indirect cold-water system?

Every property should have what is known as a 'wholesome water supply' - this is water fit for drinking, cooking food, or washing without any potential danger to human health by meeting the requirements of regulations made under section 67 of the Water Act 1991. Usually, water is supplied to the property directly from the water service pipe underground. The pipe will run from the road and enter under the house or through the garden or accessway, and it will enter the house via the household stopcock valve which is usually located underneath the kitchen sink. (Note: this is not always the case and if the water supply cannot be located in the kitchen further investigation may be required.)

An indirect cold-water system was the most common type of water system in the UK; although, new systems are now usually direct water systems. At the entry point, the water supply divides, with drinking water supplied to the kitchen sink, and the rest of the water is moved to a cold-water storage tank (usually located in the loft), which supplies the water for the rest of the house.

A direct water system does not have a storage cistern. Instead, the water is supplied directly to all taps and toilets directly from the mains.

An indirect system is more common in older properties where only the kitchen tap will be fed directly from the mains. Other taps will receive water from the cold-water storage tank located in the roof space. Very rarely are all the cold-water taps fed from the tank and there is no coldwater supplied direct from the mains.

If you are unsure of where the water supply is coming from you can test a water appliance by placing your thumb under the tap and testing the pressure. If you can stop the water flow with your thumb it is most likely supplied from the coldwater tank in the loft. A very important point to note is that with this water being indirect, **it is not wholesome and therefore should not be used as drinking water**, though many will use this water to wash or brush their teeth. The condition of the tank is therefore of the utmost importance.

Note: although a direct water system does not have a cold-water storage tank to supply the cold water taps in the property, some direct water systems will have a tank to supply the hot water storage vessel.

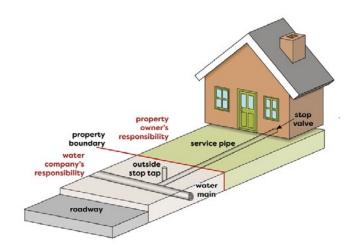


Figure 1: Water pipe running from street level under the property, note where the property owner assumes responsibility

#### Health and safety

There are a range of issues to consider concerning the safety of occupants and cold-water storage tanks:

**Stability of the tank itself** - water is heavy, and a large amount of water storage is usually needed. The tank must

be adequately supported.

**Protection against frost** – there is a greater risk of frost damage to pipework and cisterns in the roof space.

**Damaged ball valve** - the ball valves allow water to enter the tanks through the inlet pipe to refill the tank when water is drawn off. When the water reaches a certain level the ball valve will close the inlet pipe. When it fails, water will continue to enter the tank and will lead to the tank overflowing. This could be slight and simply a drip from the overflow pipe which should be noticed by the property owner or indeed surveyor and resolved or the fault can be more serious resulting in a sizable leak and significant damage.



Figure 2: Dripping overflow pipe

**The internal condition of the tank** – this will have a direct impact on the quality of stored water and conditions may arise that encourage the proliferation of pathogenic bacteria, including Legionella. Tiny, suspended solids and dissolved solids in the mains water settle and collect at the bottom of the tank as sediments which serve as nutrients that encourage bacteria growth.

**The ambient temperature around the tank** – this again can encourage the proliferation of bacteria.

**The 'hardness' of the water supply** – hard water can contain relatively high concentrations of calcium and magnesium that contribute to the formation of scale and provide nutrients for bacteria.

The size of the pipe supplying the tank - the combination of an oversized mains inlet pipe and a relatively small outlet can also lead to water stagnation.

**Coverings missing or damaged** - can lead to contamination from dead animals and birds or decaying vegetation (leaves etc.) Tanks should have a close-fitting lid that will not deteriorate or allow mould or bacteria to grow on it and drip into the stored water and any vents or openings should be covered with a fine mesh.



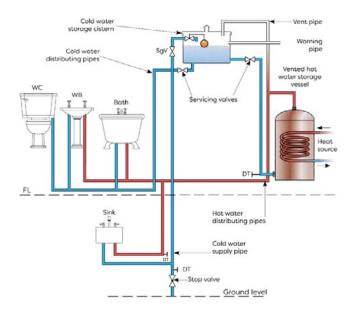


Figure 5: Indirect cold-water system with hot water overflow to the coldwater  $\ensuremath{\mathsf{tank}}$ 

Figure 3: Contaminated water tank

#### Cold-water storage tanks and hot water vents

A modern indirect cold-water system will have an overflow from the hot water storage tank as shown in the diagram below.

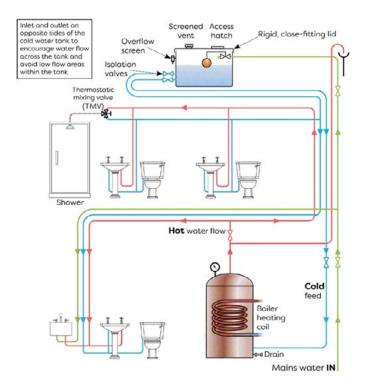


Figure 4: Modern indirect cold-water system with overflow from hot water storage tank

However, some older properties will have a system where the overflow from the hot water tank is to the cold-water storage tank in the loft (see figure 5).

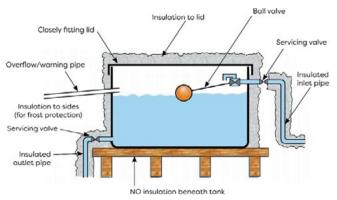


Figure 6: Cold-water storage tank

#### Indirect hot-water system

When using the hot water system, gravity provides pressure allowing water to travel from the cold-water tank via the outlet pipe and indirectly supply the hot water cylinder (see below).

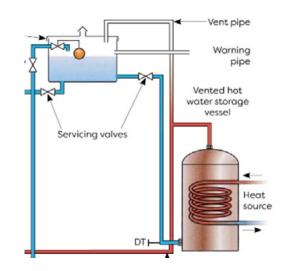


Figure 7: A closer view of the hot water cylinder connected to the cold-water tank, not specifically the vent pipe.

With a system like this, when the water temperature increases within the hot water cylinder, the water will begin to expand. Water at seventy degrees Celsius can expand to two or three per cent of its volume. Therefore, a good working cylinder must have the means for this expansion to take place and the vent pipe offers the solution. If a cylinder does not have a vent pipe or a means for the water to expand it will split and leak.

Under usual circumstances, the hot water will expand up the vent pipe to a level then drop back down to the hot water cylinder. However, if there is a malfunction, the hot water will continue to travel up the vent pipe and into the cold-water tank in the roof. At this point, you would hope to see water discharging from the warning pipe or staining to the ceiling from a leak and will be able to prevent a more serious problem. Unfortunately, if this is not spotted it can lead to disaster.

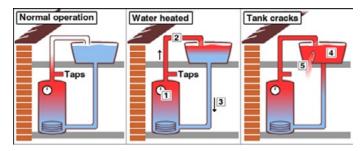


Figure 8: Failing hot water cylinder. The hot water continues up the vent pipe into the cold-water tank

#### CASE STUDY – RHIANNA HARDIE, 2006

In 2006, ten-month-old Rhianna Hardie was killed as a result of scalding water pouring into her cot. Rhianna lived in a house with a hot water tank that vented into the cold-water storage tank. The baby girl was showered with scalding water after the thermostat failed on the immersion heater in the hot water tank, causing the plastic cold-water tank to flood and burst.



Figure 9: Rhianna Hardie

In this case, the thermostat malfunctioned allowing the hot water from the hot water cylinder to travel up to the coldwater tank in the loft. The immersion heating system in this case was a 'fail-go' type, meaning that if the thermostat failed the water would continue heating, unlike modern models which cut out.

The water would have continued to heat and continued to rise through the vent pipe and although there must have been the tell-tale signs of water discharging from the overflow pipe, as this incident happened during the night this warning could not have been spotted. Instead, the coldwater tank continued to fill with the increasingly hot/boiling water until it eventually gave way and poured through the nearest ceiling which happened to be the bedroom of little Rhianna. It is a miracle her sister who was in the same room was not injured.

You do not have to be a parent to feel the pain for this family and what the poor child had to experience during this horrific accident. She was rushed to hospital but sadly died of her injuries.

The coroner, Michael Rose, said the case was among the most tragic he had heard in his 40-year career. He urged anyone with a boiler with an outmoded thermostat to check their heating system and warned that (at the time in 2006) 3.5 million defective boilers of the kind that killed Rhianna were still in use.

#### **Building Regulation response**

Following this disaster (and sadly others that had occurred beforehand), Approved Document Part G - Sanitation, hot water safety and water efficiency was reviewed. Within the current version (2016) it states in section G3:

(2) A hot water system, including any cistern or other vessel that supplies water to or receives expansion water from a hot water system, shall be designed, constructed and installed so as to resist the effects of temperature and pressure that may occur either in normal use or in the event of such malfunctions as may reasonably be anticipated, and must be adequately supported.

(3) A hot water system that has a hot water storage vessel shall incorporate precautions to:

(a) prevent the temperature of the water stored in the vessel at any time exceeding 100°C; and

(b) ensure that any discharge from safety devices is safely conveyed to where it is visible but will not cause a danger to persons in or about the building.

It then goes on to say:

In the Secretary of State's view Requirement G3(3) will be met for a *hot water storage system* that has a vented storage vessel if:

- the storage vessel has a suitable vent pipe connecting the top of the vessel to a point open to the atmosphere above the level of the water in the cold water storage cistern and over it; and,
- b. in addition to any thermostat, either the heat source, or the storage vessel is fitted with a device that will prevent the temperature of the stored water at any time exceeding 100°C; and
- c. the hot water system has pipework that incorporates a provision for the discharge of hot water from the safety devices to an appropriate place open to the atmosphere where it will cause no danger to persons in or about the *building*.

To minimize the danger from excessive pressure, unvented

hot water storage systems should incorporate a minimum of two independent safety devices. These shall be in addition to any thermostat provided to control the desired temperature of the stored water. The selection of safety devices should take account of the physical location of the devices, and the design, configuration, location of components and performance characteristics of the system to which they are attached.

Though the above steps have been taken, it is worth noting that the position of the water tank is still not covered under current Building Regulations. Even though you might suggest that the tank be moved above the hallway, your recommendation cannot be enforced.

#### What can we do as surveyors?

The simple response to this must be to understand and recognise potential hazards to human health and to report on them, as appropriate. We must be able to identify the hazards and then determine the risk associated with the hazards. The HSE has a useful 5 step approach to this:

- Identify the hazard
- Decide who might be harmed and how
- Evaluate the risk (the likelihood or 'chance' of that harm occurring risk will be high, medium, or low) and what precautions would be appropriate
- Record and implement the findings
- Review the assessment and update if necessary (clearly, not possible if you are visiting a property on behalf of a potential purchaser, but much more relevant for a residential property manager)

When evaluating the risk using a 'Risk Matrix' is helpful. An example is given below. (Source Larry Russen)

SEVERITY						
1.	Minor	LIKEL	ELIHOOD			
2.	Treatment required	1.	Very unlikely			
3.	Absence from work $> 3$ days	2.	Unlikely			
J. ⊿	Serious injury	3.	Likely			
 5.	Death	4.	Fairly likely			
5.	Death	5.	Highly likely			

LIKELIHOOD						
5	5	10	15	20	25	
4	4	8	12	16	20	
3	2	6	9	12	15	
2	2	4	6	8	10	
1	1	2	3	4	5	
	1	2	3	4	5	
SEVERITY						
LOW		MED		HIGH		

How such a hazard will be reported to the client will depend on whether the survey is level 2 or 3.

· Level 2 - the surveyor should identify the risk and explain the nature of the hazard

• Level 3 - the surveyor should also explain how to resolve or reduce the risks

But you also have a duty of care to the current occupier, even if they are not your client. Where a cold-water tank is positioned over a bedroom, I would rather be seen as over-cautious and suggest the tank be moved to above the hallway than find there had been a malfunction and boiling water had covered a bedroom where someone (possibly a child) was sleeping. A quick warning to the vendor could be the difference.

Fiona is Assistant Surveyor at Hannent Chartered Surveyors and a student undertaking the Sava Diploma in Residential Surveying and Valuation. Having made the career move last year from Events Management where Fiona managed large scale pharmaceutical meetings, she is now establishing herself within her new role and has a particular interest in planning and development.





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