RDE

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Llanteg Park

The Park was built in the 1970's as a set of holiday homes for people to enjoy with great views across the forest and sea, however despite being built with a common design and structure the past 40 years have meant that each home is now different from the next.

The differences that are now manifest between the houses means that the following advice and comments will not perfectly match each and every home, however the commonalities are such that we hope that you find it useful.

Structure

The basic structure of the buildings is a cavity wall made from concrete blocks formed into a terrace. Each home is designed to face south with a first floor flat roof terrace with parapet walls and a north facing pitched roof with tiles.

The flat roofs were either not insulated or have a minimal amount of insulation in them. The covering of the roofs varies now as they have been replaced / improved over time, but most appear to be glassfibre. Similarly, the sloping pitched roofs would have had minimal insulation at ceiling level, but any internal sloping ceilings may not have benefited from this at all.

The cavity walls were not insulated when built, although I am sure that many on the end of terrace homes will have been filled since. The cavity was there to keep the inner walls dry. Filling the cavity with insulation can cause water to cross over into the inner leaf.

All the houses were built with a physical damp proof course (DPC) in place and this should be intact unless there has been some structure movement or bridging over the DPC by additional render applied to the external wall.

The parapet walls are capped with a suitable capping stone although many of these are now cracked.

The floors were mainly solid concrete and these would have had some damp proof membranes under them.

Design

The kitchen was located in the middle of the building with a lounge / diner to the south. This does not seem to have altered much over time. Most bathrooms have remained towards the centre / north of the properties but the locations of bedrooms, offices etc have altered depending on the needs of the occupants.

There appears to have been an odd design process that has meant that access to the roof terrace was not easily achieved. Subsequent changes by occupants and owners has meant that there are now a range of different solutions to this access issue.

Common alterations

Many people have extended over part of the flat roof to create additional living space / bedrooms that benefit from the view to the south.

Due to the odd layout of floors in the building most of the houses have adapted their layouts to facilitate easier access. This may be through the installation of additional floors, the addition of additional stairwells etc.

Quality issues

Builders in the UK are not regulated or necessarily qualified. The level of craftmanship therefore is a bit of a lottery. Unthought through interventions like cavity wall insulation, loft insulation, replacement windows and other capital improvements to the properties can also cause problems via poor installation, inappropriate specification etc.

A lack of knowledge with regard to maintenance and repairs have also caused problems, simple things like blocked gutters, failed window and door seals, cracked renders and cappings have all lead to some of the houses becoming damp.

Poorly specified equipment has also caused problems, for example cooker hoods that do not extract, just circulate, bathroom extractors that are not providing sufficient ventilation, etc.

Typical things that have gone wrong

The biggest issues in the houses are damp and cold.

DAMP:

Given that the houses would have been built with DPCs this means that most of the problems are caused by either: Condensation or Water Penetration.

Condensation:

Condensation is caused by having too much moisture in the air combined with cold surfaces and is associated with black mould.

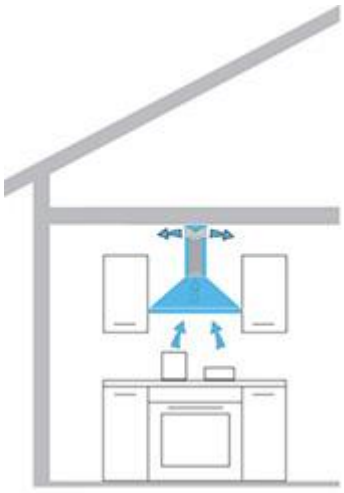
The solution is to take the moisture laden air out of the house (via ventilation and extraction) and / or to keep the internal surfaces warmer (this is commonly done by having better insulation).

The most common areas of high humidity are kitchens, bathrooms and bedrooms. However, warm moist air rises and so the condensation might be found around the top of ceilings or upstairs. With the kitchen and bathrooms typically in the middle of the houses this is a real issue.

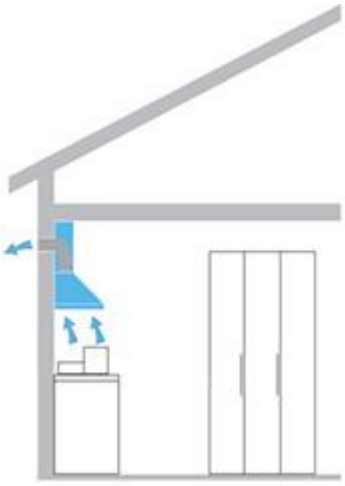
It is really important therefore to ensure that the extractors are fitted, working well and vented to the outside. I would recommend that you check both the efficiency of the extractors (place your hand over the vent to see if there is any air being pulled through – you can hear the difference as well as feeling it). Extractors vary tremendously in their effectiveness and you generally get what you pay for. EnviroVent are a reliable manufacturer.

Also check the ducting between the fan and the external vent. This needs to be sealed otherwise you might be pumping warm moist air into areas that are vulnerable to condensation (i.e. cold areas like roofs). Ideally the external vent should be on a north or east facing wall, or through the roof.

Kitchen hoods are often just recirculatory (i.e they just filter the air above the hob rather than extracting it). This means that the moisture is still in the house. So, don't just assume that because you have a hood that it is solving a condensation problem.



Circulation Hood



Extraction Hood

Whilst extractors are important for bathrooms and kitchens the rest of the house (and especially bedrooms) also needs to have some ventilation. This is typically done by 'trickle vents' in the windows.

Trickle vents need to be open and if they are not fitted they can be installed quite easily. If replacing windows then you will need to specify trickle vents otherwise they will not be fitted as standard.

Sometimes you will not have space in the window frame to retrofit trickle vents. This creates a problem as effectively you may not have sufficient ventilation in the house. This can be rectified by the installation of a Whole House Ventilation system. The easiest and probably most effective system is a Positive Input Ventilation (PIV) system. The best manufacturer here is EnviroVent.

If you have furniture pressed hard against a wall this also reduces ventilation and can lead to moisture laden air being trapped in an area, so keep furniture a couple of centimetres away from any external wall.

The other factor with condensation is that of ‘cold spots’ that attract water vapour to condense on them. Typical cold spots are:

Along the ground floor / external wall junction. This is often confused with ‘rising damp’. There should be no ‘rising damp’ in these houses as they have a DPC.

Along the ceiling junction with an external wall. This is where the insulation tends to be at its thinnest, or missing completely. Care must be taken to ensure that the ventilation in the roof space is not blocked, but this junction does need to have some insulation in order to reduce the risk of mould formation.

In window and door reveals. This is where the wall is thinnest and hence least efficient. You can insulate these reveals, but not with very much insulation due to the thickness of the window / door frames. You will be lucky to get anything more than 10mm of insulation installed. There are ultra efficient products like Aerogel, but they are expensive and you would need to look at the community buying these together due to ordering issues like minimum amounts etc. I think that this is worthwhile investigating if there is demand.

The flat roofs are difficult to treat as they will have minimal amounts of insulation (if any at all). If you wish to improve the insulation in the flat roof then you need to place the insulation above the existing external finish and then place a new platform above that. Ideally though the flat roof is completely replaced with a new ‘warm roof’ structure. This needs to be done by a professional company as this is full of risks.

The walls can also be improved. Traditionally this has been with injected CWI. This can work, but the condition of the external wall is vitally important. If water gets in then water can track over to the inner wall (see above). I would not recommend mineral fibre as a solution as this soaks up water and can make the whole house really damp and cold (wet insulation transmits heat). Polystyrene balls would be a better solution, but talk to a reputable company about the options. Bear in mind that many of these companies now have sister companies that extract CWI! Getting it right first time is now easier as the companies have learnt their lessons.

A more modern fad is to use External Wall Insulation (EWI). Whilst this is on paper a less risky option, it does come with various issues. Care really needs to be taken with specification and design. Insulation needs to be continuous and this means fitting insulation to window reveals as well as the main walls. It also needs to be able to stop any water from getting behind it. This in turn requires a roof extension and a real attention to detail around roof lines, corners, windows, services, doors etc. The EWI will also not be able to be installed on the wall between the houses as it is around 110mm deep and this would interfere with the entrances to next door. This of course then creates a cold spot on this wall, so this then has implications. EWI, is therefore possible, but it needs to be planned and executed well. The other issue with EWI is that most companies only offer EPS (expanded polystyrene) insulation as a system and this cannot be fitted to reveals due to its thickness. They will not guarantee any system that uses another product (like the aerogel for the reveals), so people get left in a difficult place where they can either have: a system with a guarantee that won't work very well, or; a system that works better but without a guarantee. At the end of the day the guarantee is pretty much worthless in the long term, but people do like a crutch.

Water penetration:

The walls that are most at risk are the west facing ones, but also any wall that has a horizontal aspect to it (e.g. the parapet walls).

The cavity wall structure should keep water out of the house walls, however this can be compromised. The main ways that water can bridge between the outer and inner walls are:

Cavity Wall ties – these tie the two walls together, but they can get covered with waste cement during the construction process and then act as a bridge between the walls. If you have damp spots on the inner wall it might be that this is the problem.

Cavity Wall Insulation (CWI) – many homes will have had CWI installed as part of an energy efficiency drive by the Government. Any material can cause water to transfer between the external and internal walls, so the condition of the external wall is really important. Any cracks in the render, any 'blown' render, any holes in it can let water in. If mineral wool was used it can also soak up water and keep the whole area damp for very long periods of time.

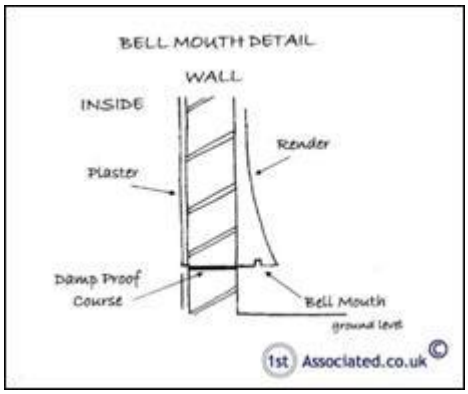
Poor seals around doors and windows. If the windows or doors are set back then they are being supported by the inner wall or by a cavity closer, this means that any gaps around the window can let water into the cavity or onto the inner wall. This is especially important when the gap or crack is at the bottom of the window.

Drip bead on sills being covered. All sills should have a drip along its outer edge (underneath the sill), this stops water from running back under the sill and into the wall. It is quite easy though for these to be filled with paint or render.

Services running through the wall can also act as a way in for water. Waste and water pipes, satellite dishes and telephone connections can all allow water in unless they are installed correctly and sealed up. Most installers don't do a good job, especially if they knock off render.

It must also be remembered that water can accumulate at the bottom of the cavity and so it is really important that the outer wall is in good condition.

The DPC can be compromised (ie made not to work) by covering it over with render. If render goes down over the DPC and to the ground then water can travel up the render, over the DPC and into the main wall. So, it is really important that render is installed correctly and that drip beads (bell drips) are installed at DPC level.



From the diagram above you can see that the render should not be applied to the area underneath the bell mouth (drip bead) otherwise water can travel up the block and then through the render and above the DPC level.

Where render goes all the way down the ground it can bridge the DPC, as shown below:

The MOST obvious issue on the houses, though is the parapet walls and their capping. Cappings can crack and this will let water into the main wall structure. They should be repaired correctly (the crack made bigger and then filled with waterproof cement).

The parapet walls also need to be correctly sealed against the flat roofs. The condition of the lead flashing between the two is really important. This is also true with any extension over the flat roof. The seal between the new rear wall and the roof is key. Any holes / gaps / poorly installed flashing can let water into the walls, so keep an eye on the condition of the walls and seals.

Cold:

The original buildings were not really designed for winter occupation, but given that they were built in the 1970's very little would have been done in terms of energy efficiency. Building regulations were not in place to govern the amount of insulation required in each element, so there would only be minimal amounts of insulation in the roof / flat roof, none in the floor or the walls. Single glazed windows would also have been the standard specification.

As mentioned above there have been many instances where people have tried to improve the efficiency of their homes. Cavity Wall Insulation has been installed in the end terraces, double glazed windows and patio doors are commonplace in the houses. Many lofts will also have been insulated and certainly some of the floors have been upgraded, especially where new floors have been created to make some better sense of the original design / levels.

Improvements to the thermal performance of the buildings is generally a great thing to do, but it can create some 'unintended consequences'.

The most common unintended consequence is linked to the quality of the workmanship. Insulation needs to be continuous and coherent. This means that you need to insulate the entire surface / element and to a similar degree. For example, loft insulation needs to of a similar depth across the whole surface. If it is not, then you can create 'cold spots'. These cold spots can then attract condensation to them, this in turn is associated with black mould.

Common areas that are not insulated properly are: tops of ceilings, especially where the wall meets the roof. This can be a difficult detail to get right, as there needs to be ventilation in the loft space (and this can minimise the amount of insulation that is possible to put in), but you also need a good level of insulation. This can be solved either through installing roof vents (this then allows you to put more insulation in the eaves) or using alternative higher performing insulations at the eaves (i.e. the same level of insulation but with a thinner material).

Summary:

Each house is the same, but different. The main issues are: damp and cold.

The best solutions for penetrating damp are based around regular checks, maintenance and appropriate repairs.
Check for gaps around windows, doors and reseal as necessary (using a low modulus silicon),

Check for cracks or hollow pieces of render and repair / replace, especially if they are on the south or west facing walls,
Check for any unfilled holes around penetrations through the wall (plumbing, wires etc) and fill either with some mortar or silicon sealer,
Check for cracks in parapet walls and capping. Replace / repair ASAP,
Check for structural issues like render bridging DPCs and make good.

Condensation issues (associated with black mould) need to be solved through improving insulation or ventilation.

Check that trickle vents are installed and if not look to have them retrofitted,
Ensure moisture laden air from kitchens and bathrooms is extracted,
Look to install a Positive Input Ventilation system,
Check that the insulation layer is coherent and consistent.

Cold issues are more difficult, but the basics are:

Ensure that there is 250-300mm (around 1 ft) of insulation in the loft space,
When replacing windows look to specify A rated windows (and inc trickle vents),
When replacing doors look for A rated doors,
Install Cavity Wall Insulation (if your external wall is in really good condition), but do not use blown mineral wool.
When replacing any flat roofs install a 'warm roof' that complies to modern building regulations,
If you have a suspended floor then this can be insulated and draught proofed,
If looking to install External Wall Insulation ensure that the reveals on the windows and doors are also included and that any insulation is covered by the building structure (roof etc) rather than just a stick on cover.

I hope that this makes some sense.

If you need any further information please do let me know.

All the very best,

Peter Draper
On behalf of Renew Wales