

Tan yr Wyddfa Hut Sub-Committee & Hut Custodian 2008 to 2013 - Tony Howard

Over the weekend of 25th October 2008 at a curry meet at Tan yr Wyddfa, we discovered a large fruiting body of dry rot in the corner of the first floor landing window at the front (South) end of the hut.



Photo: Dry rot, landing window 25/10/08

Twenty-two people attended the meet. On Saturday it was raining and most of us went walking. We were all soaked by the time we got back to the hut in the afternoon, and we put our wet clothes in the drying room. On Sunday morning, our clothes were still cold and very wet and there were pools of water on the floor, despite it having been mopped up at least twice on the Saturday.

At this time Simon Pape was Oread President. I was Vice President and running the Winter Lecture Program. The Tan yr Wyddfa Hut Sub-Committee (HSC) consisted of Chuck Hooley (Hut Custodian),

Graham Foster, Keith Gregson, Colin Hobday, Mick Keeling, Tony Smedley, and Pam Storer.

A meeting of the Oread Committee jointly with the Tan yr Wyddfa HSC and the Trustees took place on the 11th of November 2008, at Hulland Ward, where the dry rot infestation and the drying room problems were discussed.

Before the meeting, actions by Chuck Hooley and Pam Storer had resulted in two quotes for the dry rot remedial work, but neither quote seemed sufficiently detailed or thorough. There had been a dry rot outbreak towards the rear west side of the hut in 1994, which had been treated by Peter Cox Ltd. It was agreed that more detailed quotes should be sought, at least one of them from Peter Cox Ltd. They claimed to be market leader in damp proofing, waterproofing and timber preservation in the UK.

Dry rot requires a source of moisture in order to propagate. It was reported to the meeting that there were several possible points of water ingress, including faulty guttering and window seals.

The drying room problems were exacerbated by the fact that operation was intermittent because of a faulty timer and the sliding doors did not stay in place. Although the drying room might cope with wet clothes of three or four HSC members, the minutes of the above meeting recorded that; 'It was considered inadequate to cope with the needs of a full hut over a wet weekend'. A work plan was developed, a program was initiated, and initial timescales were agreed, for both dry rot treatment and building repairs for the drying room and utility room. Plans were circulated for a drying cubicle re-positioned further north and closer to the toilets, thus re-positioning the food storage area well away from the toilets.

Chuck Hooley had been custodian of **both** of our huts for 36 years in total and had done an outstanding job over this time. This, for example included defending the property from designation as a House of Multiple Occupation (HMO). He also project-managed major fire/safety upgrading works and rewiring of the building throughout the years 2004 to 2006. However, he was by now 83 years old and caring for his wife Margaret who had limited mobility and needed special care which Chuck was providing. He found it difficult to get out to Tan yr Wyddfa. Most of the other HSC members had also been in post for many years and were getting on in age.

The Oread Committee decided that it would be prudent to introduce a younger Oread to the HSC to work with Chuck, learn the role of Hut Custodian and eventually succeed him in this post. I agreed to take on this position.

HSC Meetings were scheduled to take place every 3 months, and I attended these initially as a co-opted member. My first meeting on the HSC was the joint one of the 11th of November 2008 where I obviously attended as an Oread Committee member as well.

At my next HSC meeting, probably in February 2009, it was clear that the HSC was not committed to producing minutes of every meeting. Given the importance of the forthcoming work, I felt this was essential.

Simon Pape met with Chuck on Friday the 13th of March 2009 and reported to the Committees a few days later that; *'He had had a long and fruitful discussion with Chuck. The result of which is that he [Chuck] is going to gradually hand over the role of Hut Custodian over the next few months. In the absence of any other volunteers, Tony Howard will be taking over from Chuck [as TyW HC]. All the HSC seem to think he is the right man for the job. Can I take this opportunity to thank Chuck for all his hard work over the decades and wish Tony all the best in trying to fill those shoes.'*

At the Oread AGM on the 28th of March 2009, Simon Pape was re-elected as President. Chuck was re-elected as Hut Custodian & the HSC now included Graham Foster, Keith Gregson, Colin Hobday, Mick Keeling, Tony Smedley, Pam Storer and Tony Howard. It was agreed that the HSC should elect a secretary and he/she should provide minutes of their meetings for the attention of the Oread Committee. It was also agreed that the Oread President and Treasurer had the right to observe HSC meetings if deemed necessary.

At the HSC meeting of 21st April Keith Gregson was elected as Secretary, but it was agreed that in his absence, I would take the minutes of any meeting.

Chuck expressed his intention to hand over the Hut Custodianship to me over the coming year. He wished to continue for the time being liaising with the agent in the village (Rod Williams) and dealing with financial matters & the Club Treasurer. He suggested that I should take over the organization of the HSC's work programmes, with immediate effect. There would be a slow

handover of the remaining HC roles over the coming year. The committee accepted these suggestions. Chuck stated that he had been Hut Custodian since 1977, a period of 32 years and for a period of 4 years previously: 1962 to 1966. The committee expressed their gratitude for this and thanked him for his outstanding efforts.

A year later, at the 2010 AGM Chris Wilson was elected President. I was elected Hut Custodian for Tan yr Wyddfa, a Post I continued in until the AGM of April 2013. During this time Chuck supported me as a member of the HSC. Throughout my time on the HSC from 2008 till the AGM of 2013, the HSC managed the affairs of the hut, minutes were taken and reported to the Oread Committee.

We dealt with the normal business of work meets, wood cutting, routine cleaning, painting and general maintenance. We also dealt with the unusual and extraordinary threats to the hut. The former issues are not described here, but the latter are described in some detail below. After my retirement as Hut Custodian, I continued to support Dave (Snod) Helliwell, the new Custodian for many years as a HSC member, but this is for him to report if he wishes to.

Dry Rot Treatment at South End of Building: October 2008 – April 2009

Three dry rot treatment companies were approached for quotes. Specialists Peter Cox Ltd. were awarded the contract for dry rot treatment along with building contractor Peter Banham to do the building/structural work. Cox's inspection¹ revealed dry rot infestation and damage to skirting boards, floorboards joists and timber stud partitions on the first-floor landing and southeast bedroom. The infection had also spread downwards to the lounge window and front door lintels. Treatment would include replacement of damaged and infected wood and mass flooding of walls with fungicide. Peter Banham's work would include hacking off external rendering and internal plaster. This included both south bedrooms and part of the dining room wall, some of which would also be irrigated with fungicide by Cox's.

¹ Cf Peter Cox's report of 16th of January 2009.



Dry rot hall ceiling November 2008

They commenced work on the 9th of February 2009, and predicted a completion date of the 7th of March. The combined cost would be £9,343 + VAT. Preparatory work was carried out by Tony Smedley, Colin Hobday, Mick Keeling and Graham Foster, before the 9th of February.



Dining room bay repairs March 2009



Lounge bay repairs March 2009

The work was **not** completed in time for our meet on 7/8 March, and the hut was not fit for occupation, though Oreads had gone there for the weekend. On Monday the 16th of March small group of us (Colin Hobday, Tony Smedley, Pam Storer, Nick Evans and Tony Howard) visited Tan yr Wyddfa for a meeting with Peter Banham and a representative of Peter Cox Ltd. The purpose was to discuss timescales and some technical issues identified by Pam and Nick on the previous weekend. This was the HSC's first visit to site during this work.

We were told that extra work beyond the original quote had been approved by Chuck and had now been completed, for example replacement of cracked windowsills. We were provided with satisfactory answers to Nick's concerns and the work appeared to have been done to a very high standard.² We were told that no dry rot had been found in the southwest bedroom³. However, this room had been replastered. We were told that most of the front walls had been found to be saturated, which was partly due to the interior walls being plastered with the wrong material. Nonetheless we were advised to regularly inspect these walls for dampness and regularly clear the guttering. This turned out to be very sound advice (see below).

² See A Howard's notes of this visit.

³ This was designated as the Oread room at the time.



Dining room repair late March 2009



Exterior repairs late March 2009

We noticed that the wooden supports for the front porch were rotten where they met the ground. Mr Banham had not budgeted for their replacement. We asked for a quote to replace these posts with galvanised steel ones, and subsequently accepted his quote for £483.

This work was completed by the 17th of April 2009 and the final cost of the dry rot remediation and associated building work was £12,418⁴.

Back Room Restructuring: November 2008 – September 2010

At the joint meeting on the 11th of November 2008, Graham Foster circulated plans for a new back room (utility room) with a new drying room/cubicle location. The drying cubicle would be re-positioned further north and closer to the toilets, thus providing a new food storage area further south and well away from the toilets. It was agreed that this work would not be undertaken until the dry rot remediation and structural work near the south entrance of the hut had been completed.

Graham's final plans had been completed and approved in July 2009.

Peter Banham's initial quote (of 10th September 2009) was to include fitting a new vanity basin next to the toilet, removing the existing drying cubicle partitioning and building a new one as per Graham's drawing. This was to be fitted with a new hinged door. He was to replaster the cubicle inside and out, remove old electrical circuitry and replace with new circuitry including for the drying room. He would fit a new 6-inch extractor fan, humidistat and 'blow heater', neither of which had a specified performance. The old heater would be re-positioned for continued use. The price was £2,680.

This specification required refinement in several ways, mainly regarding the drying cubicle. This included the internal walls to be lined with white plastic sheeting to deal with the moisture. The old heater was to be discarded.

Also, by this time my drying room heat and mass transfer model had been developed and an extractor fan of at least 360 m³/hr was recommended, along with a separate humidistat to control its operation, plus a thermostatically controlled 3kW electrical fan heater. We gave guidance on the model type of extractor fan required but gave no more specific guidance for the humidistat or heater model required. The specifics of our

⁴ See HSC Mtg 21/4/09.

drying room equipment, its performance testing and optimisation are described in the next section.

We later asked him to include the replacement of the extractor fan in the kitchen. These and other requirements were given to Peter Banham who revised his quote to incorporate the above changes. The new quote, dated the 30th of November 2009 was for £3,350 + VAT. This was accepted by us, and he began work shortly afterwards. The work was completed, and Peter's bill paid by February 2010. The final bill including the kitchen fan and VAT was £4,282.

Other HSC woodwork continued after this. Drying room optimisation continued until September 2010 (See below).

Also new food shelves and racks for boots and rucksacks were designed by Nick Evans and fitted in September 2010. He also fitted a new bench next to the sink, where people could sit to put their boots on.

The Drying Room (or 'Cubicle') Design and Testing October 2008 – December 2010

The drying room, which had been partitioned off from the 'back room' is perhaps better described as a cubicle. (I will use 'drying room' and 'drying cubicle' interchangeably here). The original drying cubicle was fitted with a small 'kitchen' sized extractor fan positioned in the drying room window. These have a throughput of typically 93m³/hr. There was a small wall mounted electrical heater placed about a metre below the extractor fan, its position encouraging a proportion of the heat to rise directly to the extractor fan without being circulated around the wet clothing in the room. These heaters usually have a heat output of 2kW or less.

Early discussions in HSC brought out two options, for a new drying facility:

- A dehumidification system matching the duty requirements for a full hut of 22 people.
- A heater and extractor fan matching the duty requirements for a full hut of 22 people. That is, a system similar to the old one but with a higher performance.

Both these systems would benefit from forced air circulation around the drying room.



Photo: Original 2008 drying room extractor fan and heater

I agreed to lead this study and began by gathering information on the drying rooms in other mountaineering club huts and youth hostels. Opinions varied as to how effective these were. A few Youth Hostels and hotels had excellent drying rooms, but the warden could not tell me what equipment was being used; extractor fan or dehumidifier and I found it impossible to decide by inspection of these facilities because the equipment was boxed in or external to the drying room space. I obtained information on six premises some of it second hand from other Oreads and some by direct inspection. Of these, all had heaters, 5 had an extractor fan and one had dehumidifiers.

Nobody I spoke to, made any reference to the need to quantify the duty requirements of their hut or youth hostel.

A study was begun to quantify our duty requirements for Tan yr Wyddfa. I weighed my own outdoor clothing when dry and when damp after dripping or spin-drying. This gave a figure of 1.18 kg of water for my own clothes and therefore roughly the same for each male adult, that is without allowing for wet boots, ropes, climbing gear or rucksacks. There were 22 beds in the hut, so that we would need to evaporate about 26kg of water from these garments' over-night, an average of 2.2kg/hr over 12 hours. It would be more if the clothing could not be spin-dried to the standard required. This was a substantial duty in terms of heat required, so it was agreed that the facility could not be expected to cope with drying wet ropes, harnesses slings or rucksacks etc. when there was a lot of people were using the drying room. Also, it was recommended that throughout the evening and certainly before 'lights out' the drying room floor should be mopped to remove pools of water. The temperature would be limited to about 30C to avoid overheating the garments.

On investigating dehumidifiers, it was clear that some manufacturers provided an algorithm to help potential purchasers determine how 'big' their dehumidifier would need to be. This was based on the size and other characteristics of the room. But these criteria were all for rooms where water ingress was only through the walls and other surfaces and gave no guidance for a room with 22 sets of damp clothing placed in it. An alternative approach was needed.

As with most pieces of process equipment a performance figure was provided for a specific set of operating conditions. This is known as the

‘design point’. In order to protect their intellectual property and limit their warranties the contractors rarely provide design performance over a range of operating conditions. For the dehumidifiers investigated, the design point was at either 90% relative humidity (RH) or 80% RH and at about 30 degrees centigrade. No other performance data were disclosed.

In a mountaineering club drying room the atmospheric conditions would tend towards an equilibrium where the rate of water evaporation from the clothing would balance the rate at which the water was abstracted by the chosen device, in this case potentially a dehumidifier. These equilibrium or near equilibrium conditions were not known at this stage but would produce an abstraction rate lower than the design point of the dehumidifier if the temperature or the RH were lower than set point conditions. One example of a dehumidifier was the EBAC WM-150 which would abstract only 1.25 kg/hr of water vapour at 30C and 80% RH, and probably a lot less at lower temperatures and RH. It was apparent that our drying room would require two of these. One EBAC WM-150 would cost of £936 including VAT. Two would cost £1,872. This was considered very expensive and besides, two of these would take a lot of space in the drying room.

So, attention was then focussed on the alternative plan of a heater and extractor fan.

We all know intuitively that wet clothes will dry quicker in a warm room than in a cold one. This is because warm air will hold more water vapour before the air becomes saturated. We are all familiar with this process qualitatively but the challenge for us was to quantify our requirements both in terms of heat demand and air extraction rate, so as to remove 26 kg of water vapour over-night. That is an average extraction rate of 2.2kg/hr over 12 hours.

Examination of the Vent Axia website provided some guidelines in terms of recommended air changes per hour (ACH) for a variety of rooms. The volume of our drying cubicle is 13.2 m³. Vent Axia recommended for :

- A domestic bathroom: 10 ACH, that would be 132 m³/hr for us.
- A domestic kitchen: 20 ACH, 264 m³/hr for us.
- A commercial kitchen, a boiler room, or a laundry: 30 ACH i.e. 396 m³/hr.

I spoke to Vent Axia's technical service, and they suggested that their window mounted model TX6WW might suit our needs. It has a maximum air flow of 360 m³/hr.⁵ This was only very rough guidance from Vent Axia of course, because nobody had direct practical experience of our duty requirements. Discussions with Nick Evans, Pam Storer and Peter Banham suggested that for practical reasons we would be better with a wall mounted fan. The nearest equivalent being the TX6WL, which has a slightly higher throughput of 395m³/hr.⁶

Using this design flow rate a range of possible drying room conditions and inlet air conditions were examined. The RH conditions in the drying room itself could not be known in advance, so I began with the same conditions as the design point for the above dehumidifier, thus allowing comparisons in performance. That is 30C and a RH of 80%. With a knowledge of the relative & absolute humidities of atmospheric air in North Wales throughout the year, an assumed hut air temperature of 20C, the chosen design outlet temperature (30C) and outlet humidity of the discharged air (80% RH) described above, the mass flow rates of incoming and discharged air were calculated. This in turn allowed the net water vapour extraction rate and heat requirements to be calculated for a range of air conditions outdoors. The worst-case atmospheric condition would be when it was raining in summer; that is when the absolute humidity of the incoming air was at its highest.

Using a discharge flow rate of 395m³/hr and outdoor air conditions of 4C, 10C and 16C and relative humidities of 100% and 60%, the calculated net discharge flow rates of water vapour from the cubical were in the range 4.5kg/hr to 8.2 kg/hr. The time to extract the required 26kg of water vapour would be within the range 5.8 to 3.2 hours. This suggests that our system would have plenty of fan capacity, at least at a discharge RH of 80% and probably at much lower relative humidities.

However, the heat required to achieve these evaporation and discharge rates were well above the 3kW we had readily available (see below). That is a demand of 4.0 – 6.4 kW. So, assuming we would provide only 3kW our system would be heat limited, and because of this the above performances would not be achievable.

⁵ AVH notes of 18/9/2009.

⁶ Email from AVH dated 19/10/2009.

Approaching the problem the other way round and calculating the air flow necessary to achieve the required average water vapour discharge rate of 2.2 kg/hr, gave an air flow of only 195 m³/hr (still with 30C & 80% RH of the discharge air). The heat required for this was within the range 2.0 – 3.2 kW, suggesting that a 3kW heater would provide enough heat, with a discharge RH of 80% and temperature of 30C. Under most operating conditions it might also provide enough heat even with lower RH values, where more air would be lost and more heat with it.

However, there was no guarantee that we could in practice achieve 30C and 80% RH under operating conditions in the drying room, particularly the RH of 80%.

Nonetheless the fan appeared to have spare capacity to deal with discharge RHs of well below 80%. This gave us confidence to purchase the TX6WL fan, which the contractor then installed.

Tony and Vince Smedley supported the drying room design with advice on the electrical supply available and critically in designing and building a bespoke timer to control the electrical supply to the equipment within the drying room. They advised me that the supply of 3kW for a fan heater would of course be straightforward but that 4kW would be more difficult to provide with the existing electrical circuitry. So, we decided to install (at least initially) a system with a heater of just 3kW.

Vince also helped me by persuading the HSC members that the thermodynamics of my approach were valid.

Tests

The equipment used during these tests included:

- The Vent Axia wall-mounted fan TX6WL described above. That is with a design flow rate of 395 m³/hr, (cost £260.46 + VAT = £312.55).
- This was controlled by a separate humidistat (Vent Axia Humidiswitch (563501D) Humidistat Controller for Extractor Fans) (cost £65.54 + VAT = £78.65)
- A 3kW heater offered by Peter Banham and accepted by us. This was the Dimplex DXC30; a very simple natural convection device with a very crude adjustable but ungraduated thermostatic controller (No price was quoted but it can be estimated to cost about £30 in 2009) (This heater later proved unreliable for controlling the drying cubicle

temperature and sometimes arced when the controller switched the heat off. It was replaced in 2015 – see below).

- A bespoke timer built by Tony & Vince Smedley set to operate for 12 hours. This could be switched off or re-set at any time. Its design and wiring were checked and approved by our contract electrician who installed the rest of our system.

The drying cubicle was built, as described in the previous section and a series of tests were carried out initially in March 2010 and then in August, November & December 2010, using wet clothes, towels, and bedsheets etc. The heater was controlled by its in-built thermostat and the fan controlled by the humidistat.

On the 5th of March 2010 the drying cubicle equipment was examined for the first time, and it was discovered that the extractor fan operated as soon as the system was switched on.⁷ However, it switched off as soon as the atmosphere became humid, suggesting that the humidistat control mechanism had been wired the wrong way round. On the 17th of March a meeting was held at Tan yr Wyddfa with the electrician who rewired it so that it operated when the relative humidity rose above the set point, rather than to trip out at this stage. His rewiring was later confirmed as correct and sufficient by the electrician, who had discussed this with Vent Axia⁸.

However, despite the rewiring, when I started testing again the next morning the fan came on even though there were no damp items in the cubicle. It was a cold damp day outside and the RH in the drying room was above the humidistat set point. This was confirmed by temperature and RH measurements. Once the cubicle started warming up, the fan stopped, as now expected. It did not restart until the cubicle was recharged with damp clothing. The humidistat set point was put at 30%, to ensure early onset of the extractor fan and of course the drying process. The heater thermostat was left at a high setting, to ensure a warm room.

Over the coming months at least one visiting club (the Derwent) confirmed that the facility was drying clothes effectively.

During a visit to Tan yr Wyddfa in early August 2010 two tests were carried out, one using 23kg of damp bedsheets that completely filled the cubicle.

⁷ Notes of this visit.

⁸ Minutes of HSC Meeting 27/04/2010

In both cases 10kg of water was removed from the garments over-night, with most of this being lost in the first 6 hours. The humidistat was still set at 30% RH and the DXC30 heater was set high. Additional air circulation was provided by a Challenge heater model E9907R, with 1kW of heat for the first test and without heat on the second test.⁹ This suggested a good performance of the drying room, though not as demanding a test as with 22 people's wet clothes. Also, the optimum conditions had not been found at this stage.

Performance optimisation was investigated on the 30th of November to the 2nd of December 2010. A wet & dry bulb thermometer and/or a whirling hygrometer were used to measure temperature & humidity in the drying cubicle throughout these tests.

The purpose of the first test was to identify the DXC30 heater thermostat setting required to achieve a cubicle temperature maximum of 30C. Heater was set to 3kW, and the thermostat set to maximum. The drying room was empty. The temperature rose from 6C to over 30C in 1 hour 10 minutes. Overnight the temperature reached a maximum of well over 50C. This was probably too hot for our clothing, so the thermostat position was reduced by a third of its scale.

My intention was to use as high a relative humidity as possible so as to minimise the mass flow of air and therefore heat discharged from the cubical. However, it was discovered that with a high RH set point e.g. 70%, the fan would not start. This was probably because the rate of evaporation from the clothes had also slowed dramatically due to the high moisture content already in the air and 70% RH could not be attained, at least in the time available.

On the final test series, after 2 hours with the RH set point at 60% the fan had still not started. On reducing it to 50% the fan came into service immediately, after which it 'cycled' regularly. The heater thermostat had been set to limit the room temperature to about 30C.

In the final test (1-2/12/10), 6kg of towels and bedsheets containing 9 kg of water were dried overnight. From 18:20 to 23:50, the temperature range was 24C – 34C, relative humidity (RH) 39% - 54% and absolute humidity 10.2g/m³ – 15.7g/m³. The instantaneous mass flow of water discharged

⁹ A Howard, Notes of 13th August.

when the fan was running was estimated to vary within the range 1.9kg/hr – 4.0kg/hr.

The average absolute humidity in the cubicle over the test period was 13.0 g/m³. That of the air entering the cubicle was measured as around 5.5g/m³, the difference being 7.5g/m³. Neglecting the small difference in the volumetric flow of the incoming air to the discharged air, this suggests a net discharge flow of water vapour of 3kg/hr, when the fan is running. This suggests that the 9kg of water vapour to be removed in this test could be discharged in only 3.1 hours of fan running time. Everything was perfectly dry in the morning.

On the same basis, that is with a 3kg/hr discharge flow rate the system should be able to remove the design load of 26kg of water in 8.8 hours of fan running time, an encouraging prediction for the future performance of our drying room.

Subsequent use demonstrated that the drying cubicle could dry 22 people's wet clothing over night at any time of the year, as expected from the instantaneous discharge rates given above.

[Although I retired as Hut Custodian in 2013, I remained in a minor role on the HSC. In 2015 we obtained approval to replace our drying cubicle heater with a much more robust, reliable and controllable one, with a strong fan. That was the Dimplex CFP30 3kW commercial fan heater with a design flow rate of 400m³/hr at a cost of £202.09. This provided a more reliable thermostatic control as well as good air circulation within the drying cubical.

Interestingly the cost of our final design drying room equipment was:

- £312.55 for our wall-mounted extractor fan TX6WL.
- £78.65 for the Humidiswitch (563501D).
- £202.09 for our new commercial grade fan heater Dimplex CFP30.

That is £523.29 (including VAT). (No figure is available for the switch/timer.) This is less than a third of the cost of the above two dehumidifiers.]

Removal of Chimney at North End of Back Room: June – September 2009

In June 2009 it had been discovered that water was leaking in through cracks in the rear chimney. As the chimney was no longer used it was agreed that it should be taken down, roofed over and an air vent fitted. A quote of £1270 + VAT and dated 13th July had been received for this work from Peter Banham and he would be asked to go ahead. The work was completed around September 2009.

Rising Damp in The Front Bays December 2009 – October 2011

In early December 2009 the Sarsons had stayed at Tan yr Wyddfa and reported damp in the lounge front bay window and upstairs where the last dry rot outbreak had started.

In late January 2010 John Green had confirmed the serious ingress of water in the walls, now in **both** front bays & the upstairs landing window. Reuben Dakin reported similar observations on 20th of February. The upstairs walls were found to be dry but with signs of previous water damage around the windows. Downstairs the lounge floor and the carpet were both still wet in the bay window. In the dining room, the bay was dry but there were signs that it had previously been damp.

On the 5th March I visited site and found all areas dry except the floor in the bay of the lounge which was still damp.

It was well known that these old houses in North Wales were not normally fitted with a damp course. It also came to light in discussions that at the front of Tan yr Wyddfa, and only at the front, there was no piped drains to carry away rainwater. The drainpipes carrying water from the roof fed directly into a soak-away or a French drain in the ground in front of the bay windows. If the device was blocked or completely full of water it would be expected to promote rising damp.

This evidence suggested that there was probably more than one source of water ingress, but rising damp was likely to be a major contributor to the wet floors in the bay windows.

Rising damp evidence 21/02/2010 (4 photos see below)



Landing window.

We discussed a new drainage system with Peter Banham and settled on having piped drains from the bottom of each downwards drainpipe and fed into the hut's sewer outlet pipe. We would embed this in a trench also containing a French drain (with solids trap) to draw away any groundwater which might accumulate under the front of the hut.

Peter was invited to quote for this work and on the 4th April 2011 he quoted £1,100 + VAT to install the above drains. We accepted his quote on the 25th of May. He began work on the 5th of September 2011, and finished a week later. His invoice for £1,320 including VAT was received in October, and we paid shortly afterwards. This reduced the dampness in the floors and lower walls, but we were still left with damp around the window frames, which was still unresolved when I retired as Hut Custodian at the 2013 AGM on 27th April.



Dining room bay.



Lounge bay.



Lounge bay exterior.



New drain, ground water solids trap, and access branch in SW corner of hut. September 2011.



Access branch and ground water perforated pipe at SW corner. September 2011.

New food storage shelving in the corridor: 2010 - 2011

In July 2010 it was decided that the old cupboard in the corridor should be replaced by additional shelving for food boxes and a small cupboard for spares such as light bulbs. These would back onto the lounge wall and would replace the existing food storage shelves - which backed onto the kitchen wall opposite.

Graham Foster and Nick Evans designed these big enough to take cold boxes and they were built and installed by Nick Evans in October 2011.

5-Year Plan for Tan yr Wyddfa December 2010 Onwards

The HSC's first 5-Year plan for work at Tan yr Wyddfa and its cost estimation was begun in Autumn 2010 and presented to the Oread Committee in Draft form at their meeting on the 14th of December. Items for inclusion in 2011 included loft insulation, new food storage shelves in the corridor, new storage heaters and the replacement of tiles on the roof of lower building,

particularly where it butted up to the wall of the main building. This was soon to prove prophetic. The plan was updated on a rolling basis at least until my retirement from the Hut Custodian role in at the AGM on 27th April 2013.

Fitting Guard Rails to Upper bunks December 2010 to March 2011

In November 2010, a child had fallen from a top bunk in his sleep. The matter was discussed at the HSC meeting and the main Oread Committee meeting, both in December. It was agreed that we should fit guard rails to the top bunks as a priority. Interestingly, this matter had been brought up in the Oread Committee meeting some years earlier but had been rejected by the then HSC. It was also agreed that children would not be permitted to sleep in top bunks and notices to this effect would be posted in the hut.

Half-length rails were designed to allow adults safe and comfortable access and egress from the bunks. They were fitted by Nick Evans and me on the 30th of March 2011.

General Risk Assessments November 2010 to March 2011

The fall of a child from a top bunk (see above) prompted the Oread to establish a habit of conducting risk assessments at Tan yr Wyddfa. These were led by Chris Wilson, who provided us with a valuable guidance document. This included a detailed methodology, a list of possible hazards, and a scale of risk from 1 – 25 on which to rate the hazards.

A pro-forma was also provided with the following questions for us to address: what are the hazards; the perceived risk; who might be harmed and how; what are we already doing; what further action is necessary; action by who and when; and date done?

On the 2nd of February 2011, Chris Wilson, Pete Lancaster and I visited Tan yr Wyddfa to carry out the risk assessment. The results were presented to the HSC on the 1st of March 2011. Chris explained that he based the assessment on BMC guidelines plus other sources including the Residential Landlords Association Guide to Risk Assessment. The assessment was based on common sense and because it required no specialist knowledge, he suggested that it be kept separate from the Fire

Risk Assessment. Ten items were identified where the risk was rated 10 or more and recommendations were made to reduce these risks. The highest risk was because bleach bottles were stored where children could obtain access to them. It was recommended that they be moved to secure storage. The assessment was subsequently approved by the Oread Committee and HSC and held on record by the Club.

Fire Risk Assessments and Establishment of Annual Inspection Agreements 2011 to 2013

Over the years 2004 to 2006 the club were required to raise safety standards at Tan yr Wyddfa. This included the installation of fire doors, rewiring of the whole hut, the installation of a hard-wired fire alarm system and the establishment fire extinguishers and notices throughout the building. This had been project managed on behalf of the club, by Chuck Hooley and the HSC. The contractor for the work had been Gwynedd Fire Protection (GFP) based in Penygroes. However, it was now time to review our fire risk assessment and to put in place a system of scheduled inspections and maintenance of the hut and the new fire safety equipment and procedures.

In February 2011 Nottinghamshire Firefighters were staying at Tan yr Wyddfa and Pam Storer (on the behalf of the HSC) asked their Crew Manager Tim Storer to do a fire risk assessment for us¹⁰. His recommendations included:

- a. Signage detailing actions to be taken in the event of a fire, plus locations of all exits and the assembly point.
- b. A fire blanket in the kitchen and specific types of fire extinguishers in specific locations around the property.
- c. A log book for all equipment to be tested at least on an annual basis. This should include all extinguishers, smoke alarms and fire doors.
- d. Since there was no mobile phone signal near the hut, he suggested we consider a land line for calling emergency services, or at least a notice informing people as where the nearest phone box was.

¹⁰ Appendix to HSC Mtg of 1/03/2011.

Items 'a' to 'c' were addressed through Snowdonia Fire Protection (see below). Regarding the phone issue we chose to place a notice in the hut informing occupants of the location of the nearest public phone box.

Chuck had proposed that I contact Snowdonia Fire Protection based at Waunfawr. He had put in place an annual Maintenance/Service agreement with them in 2003 to deal with the hut's fire extinguishers and other equipment. However, this had lapsed, probably because their competitors GFP had been awarded the major upgrading work described above, and they assumed GFP would be taking over the service contract.

In the autumn of 2011, I contacted Snowdonia Fire Protection (SFP) and arranged for them to visit Tan yr Wyddfa to service our equipment. On the 12th of October a man checked all of our fire equipment. We had more extinguishers and fire blankets than we needed, and some did not meet current standards. Several were taken away for disposal and a few were replaced with compliant ones. All other equipment passed their tests. On the 13th another employee came to do the PAT testing. Our appliances all passed their tests. We also purchased new signage from them, including a new (smaller) Fire Assembly Point notice.

On the 8th of November I signed a contract with them for annual inspection and maintenance of our fire equipment. This included fire extinguishers, fire alarm system, emergency lighting, Dorgards and PAT testing of all our portable electrical appliances. This was still in place well beyond my retirement as hut Custodian and presumably is still in place today.

Additionally, we had learnt that it was a legal requirement that the hut's electrical systems be tested every 5 years. This was carried out on the 9th of February 2012 by Jones and Whitehead, local electrical contractors. Everything was satisfactory.

Dry Rot Treatment at North End of Building: August 2012 – February 2013

On the 4th of August 2012 Colin Hobday reported a new dry rot infestation at Tan yr Wyddfa, this time at the north end of the building. He and other HSC members had been conducting maintenance work over the previous few days. He identified & photographed a fruiting body in the top RH corner (looking out) of the kitchen window recess, and rotten wood in & under the

floorboards of the bedroom above. Other affected areas were known to include the wall between the kitchen window and the west entrance door; the west side back bedroom (above kitchen) the upstairs toilet floor & walls nearby. Colin felt that it might also extend into the east side back bedroom and parts of the roof.

On 19th August, Pam Storer & Pete Kennington reported additional fruiting bodies in the wall outside the upstairs toilet door. [A six-member work party had been at TYW over the weekend]. Pete also proffered the view that there was likely to be a serious leak of water from the connection of the lower roof to the main building wall & that this was the likely cause of previously reported ingress of water onto the lounge rear windowsill.



Dry rot over kitchen window.

It was clear that there was no lead flashing here, and probably never had been. There was only a rusting and disintegrated metal one, perhaps galvanised steel. We might have expected lead flashing embedded between the 'bricks' of the vertical main wall and fed under the slates of the lower roof. However, it was clear that since the wall was faced with irregular-sized and shaped stones it would not have been simple to embed the flashing into the wall. Clearly an alternative method of obtaining a robust seal would be needed for us.



Extension roof, west (Y Garn) side showing poor seal.

Chuck informed us that the lower building had been extended northward in the 1960s and this new section had obviously been fitted with a new slate roof. Also, the main building roof had been replaced in 1994. This meant that the southern section of the lower roof, that which abutted the main building, was the only roof section of the whole hut that was original.

Mike Jones from Peter Cox Ltd, and Peter Banham (builder) investigated the situation on 22nd August in the presence of Pam Storer and me. They confirmed the presence of the above leak and poor seal. Peter Cox & Peter Banham subsequently reported the damage & provided quotes for remediation & repair work.

Cox's 29-page document reported the areas to be investigated, treated and repaired included the kitchen & entrance door area, the west side of the back (utility) room, the connecting doorway to the hallway, the upstairs toilet & men's' shower room plus both back (north) bedrooms. The cost of this essentially internal work would be £7,911.00 plus VAT. At 20% VAT, that is £9,493.20. If more damaged wood or infestation was found than anticipated, the final cost would be higher.

Cox's guarantee for the 1994 dry rot treatment was conditional upon the area being kept dry. So, our roof leak invalidated this. [*Chuck had informed us that the 1994 infestation was centred on a window in the west wall of the kitchen close to the present position of the gas isolation valve. This window had been removed and the space blocked off in 1994.*¹¹]

Peter Banham's quote for supporting building work included:

- removing all the extension roof & replacing the slates over a felt base.
- making good the seal with the main building, including the addition of a plastic cover on the connecting wall.
- stripping off & replacing (ground level to roof) all the rendering on the west side of the extension from the corner north of the downstairs toilets, beyond the entrance door to include the main building wall as far as its west corner.

The cost would be £6,850.00 plus VAT. At 20% VAT, that is £8,220.00. If more damage was found than anticipated, the final cost would be higher.

The total cost of the whole job would therefore be £17,713.20 including VAT at 20% - if they didn't come across more extensive problems.

A Special joint meeting of the Oread Committee and the Tan yr Wyddfa HSC was held on the 11th of September 2012, to consider our options and the quotes we had received.

Our Treasurer Michael Bate reported that a maximum of £33,000 could be made available for this work, and I as Hut Custodian would be allocated a maximum of £25,000 for this work without further approval.

However, the day before our meeting Pete Lancaster and Dave (Snod) Helliwell suggested a silicone-based damp proof course (DPC) for the hut. Mike Jones (of Cox's) told me that this was a successful product they offered with guarantees. Application would require removal of interior plaster and external rendering in the lower parts of the walls to be treated. Moisture content measurements by Mike Jones revealed that this would be to at least 1m from the floor. There was an obvious cost saving to be made

¹¹ HSC Minutes 30/10/2012

by fitting this (DPC) to areas where we were committed to removing plaster and rendering for the proposed remediation work.

We also asked the contractors about roof insulation in the sloping sections of shower rooms.

In addition to the works itemised in Cox's and Banham's original quotes, we eventually asked for,

- a silicone-based damp proof course installation below the kitchen window and the south (old) end of the back room that is below the window next to the fridges. That is the areas where the walls would benefit, and the plaster/rendering had already been removed.
- foil backed insulation on the sloping sections of the roof.
- new wall plates on the back roof.
- new plastic facia on the toilet block, where the new wall plates were fitted and on the rear wall above the new lead flashing. This was to provide a robust seal over the lead flashing between the lower roof and adjacent wall.



New Concrete lintels over back room door and window, walls stripped.



Replacement joist ends (protected) over back room door and window



New wall plate and roof insulation above toilet.



Toilet wall of soil filling.



West side new roof with breathable felt and insulation.



New lead soakers and protective cladding east side.

The work was completed in late November and payment made in early December. The final bill for Cox's was £10,183.20 including the additional damp proof work and an interim payment and VAT. For Peter Banham this was £10,461.60, including additional work and VAT. The combined total was £20,644.80 including VAT.

On our rehabilitation work meet, on the 9th November we found that water was still coming through the wall around the lounge north window. That is after the builders had fitted a new roof & seal above!

This leak could not be reproduced with a hose pipe two days later. However, the issue was raised with the builder. A gutter blockage was cleared and a hole in the rendering over the bedroom windowsill above was sealed.

We were concerned that future leakage would cause the lounge window lintel to rot & initiate another spread of dry rot. Consequently, we commissioned P Banham to replace this wooden lintel with a concrete

one. It was done in early February at a cost of £546. No rot was found in the lintel, giving us confidence that we had dealt with a potential problem in a timely manner.

Lessons I learnt from our Experience of Dry Rot

- Dry rot spores are everywhere but in order to grow sufficiently to damage a building it needs a substantial source of infected & rotting wood. So it's critical to find & remove all such sources & potential sources.
 - Dry rot will only propagate when the moisture content of the wood exceeds 20% and where there is no ventilation. So it's critical to keep our walls dry in the future. Most particularly we need to keep an eye out for leaks and deal with them ASAP.
 - We have known for years that the wall area around the back room window was wet, but we were satisfied to paint over it! I would be told 'It's a mountaineering hut not a hotel'.
- When a specialist firm treats dry rot, he removes all contaminated wood and plaster and treats the masonry for 1 meter beyond the furthest signs of contamination. His guarantee covers this area only & is invalidated if there is a significant leak wetting the area. Our infected area was close to that treated in 1994 but was wetted by a roof leak, so even if the contaminated area this time had overlapped with the area treated in '94, the warrantee would be invalidated. This further emphasises the need for us to keep our walls dry!