The Drying Time of Gypsol Screed

1 SYNOPSIS

Trials were carried out on full size rooms, specially constructed for testing purposes, and in a strictly controlled laboratory environment, and showed the following:

1.1 Gypsol anhydrite screeds at 50 mm thick dried in 11 days from installation when “force dried” using underfloor heating.

1.2 There was no observable benefit for drying time, where “force drying” was used, in removing the laitance of the Gypsol screeds. However different laitance amounts may affect this result.

1.3 In good, well ventilated conditions, unassisted drying took 27 days for a 50mm Gypsol screed.

1.4 Gypsol anhydrite screeds dry as quickly as sand:cement screeds.

1.5 Testing for moisture content and/or relative humidity can be affected by the equipment and process. It therefore requires careful thought and an understanding of this specialist field.

2 INTRODUCTION

Action Dry Emergency Services Ltd was formed in 1996 by Mr Andy Habbershaw, Principal and CEO, to provide a service to builders and building owners/managers to dry out buildings, initially those suffering damage by flood or other major water ingress, later those where residual embodied water was still present in some of the construction materials, for example concrete, plaster, blocks, floors etc. He has since become a leader in the field and Steering Panel Technical Expert on the British Standard Publically Available Standard PAS 64 *Mitigation and recovery of water damaged buildings. Code of Practice.*

Delays to building programmes are often caused by unnecessary and prolonged drying periods for both new and existing buildings undergoing refurbishment/extension. There are conflicting claims regarding the drying times of screeds and many of the often recited rules of thumb may not be applicable to modern anhydrite screeds.

It is not unknown for laboratory test results carried out on small, laboratory size samples, to fail to correspond accurately to the “real life” situation, and perhaps to lead to misleading conclusions. It became clear that existing data, generally based on these small laboratory size samples, was inadequate. Only by testing in full size rooms, in a life size building, could data be obtained that related meaningfully to the “real life” situation.

Due to this deficit of sufficient data on drying times of screed Action Dry sourced a very large building of sufficient size to build within it a full size test house with a series of rooms using different material and structural forms. These were then used to test the drying of either embodied construction moisture or simulated flooding.

As an example, a room could be built of a particular type of block, plastered with a particular plaster, and the drying time measured. Water could be pumped in to simulate flooding a room or rooms and the drying time measured. Drying times could then be compared when drying out naturally, or when accelerated drying was carried out using plant embodied within one of the specialist Action Dry vehicles. Similarly, different types and thicknesses of screed could be tested comparatively for drying times.

3 THE DRYING OF FLOOR SCREEDS

It is not difficult to test the moisture content or relative humidity of floor screed, and Francis Flower are pleased to advise in respect of their Gypsol screeds, but there is misinformation and sometimes a lack of understanding in the field.

Typically, drying times quoted for granular, cementitious or other bonded materials. For example cement:sand floor screed, brick masonry and blockwork are quoted as being “about 1 mm per day”, with scant regard for the specific product type or the particular on-site drying conditions. It is assumed that this relates to a theoretical temperature of 20 °C and a relative humidity of 60%, but on site this is often forgotten.

Further qualification is required to consider thickness, so that we have the theoretical statement above that drying proceeds at about 1 mm a day for the first 40 mm of thickness, but at only 0.5 mm a day for thicknesses in excess of that. As an example then, an 80 mm thick screed could take 40 + (40 x 2) days, or 120 days to dry.

This value is generally a useful start however it is essential to remember that there must be good ventilation. Without good ventilation, i.e. air flow, generally from open windows and doors, moisture cannot escape. It is important to remember that if a newly screeded room is completely closed, with all windows and doors remaining shut, no matter how good the apparent drying conditions are the screed will not dry.

Unfortunately, as modern sites increase security, there appears to be an increasing reluctance to ventilate newly screeded rooms, or indeed rooms where any wet trades, for example plastering, have been carried out. This leads to unnecessarily prolonged drying times and sometimes to the adoption of unnecessarily complex drying solutions.

The application of heat is also sometimes used to accelerate drying; indeed, in colder, inclement weather conditions, adequate drying may not be realistically achievable without the assistance of this additional measure. Care must be taken however, as heating in the form of direct LPG or similar

heater/blower units create moisture vapour, so that whilst raising the temperature this also raises, rather than lowering, the moisture content of the atmosphere, thus potentially slowing or even stopping drying rates.

4 THE TEST PROGRAMME CARRIED OUT BY ACTION DRY LTD

Against the background of uncertainty outlined above, an investigation was carried out by Action Dry Emergency Services Ltd, to investigate the drying of Gypsol, the market leading anhydrite based screed, under conditions that could realistically be achieved on a well-run construction site in a rigorous way and to provide factual and accurate answers.

All the work was carried out in Action Dry's bespoke 110 m^2 research house with a variety of different constructions and conditions as explained below. Humidity and temperature were carefully controlled, and both the moisture content and relative humidity of the screed measured at intervals in each area. This final report of the work refers to the RH (relative humidity) of below 75% as being dry, as recommended in BS 8204-1 and BS 8204-7.

4.1 The effect of drying type

Four different drying regime types were tested as follows:

- With the underfloor heating operating
- Using a thermo desiccant adsorption dehumidifier
- Using a "Speedry" portable convectant heat drying system
- Using a commercial refrigerant de-humidifier

4.2 The effect of removing laitance

Parts of the screed surface in some test bays were left with the laitance in place, others parts had the laitance removed by sanding and vacuuming.

4.3 The effect of surface coverings

Some test bays were covered with timber framed polyethylene covers, others were left uncovered.

4.4 The effect of screed binder type

Both anhydrite and cement binders were tested.

5 RESULTS

5.1 The effect of drying procedure type. It was found that using underfloor heating provided the fastest results with the Speedry convectant drying system from Action Dry producing the next fastest drying results of the portable dehumidifier systems. As the Speedry system provides dry

warm air flow this was not a surprise and reinforces the importance of good ventilation and removal of damp air. Forced drying using the underfloor heating produced very rapid drying and the floor was suitable to receive moisture sensitive coverings in as little as 11 days from installation by using the underfloor heating system appropriately (Figure 1). The procedure for commissioning underfloor heating was followed from the Gypsol website.

In good ambient conditions a 50 mm Gypsol screed was seen to dry suitably in approximately 27 days (Figure 2 and Figure 3) which is half the time suggested by the industry "rule of thumb" which would suggest 60 days were necessary. Although the conditions provided were optimal, this ~~it~~ would suggest that with best site practice faster drying times than the traditional rules of thumb can be regularly achieved.

Bay 1: **Using Hydronic underfloor heating :** Laitance Not Removed: Graph 14

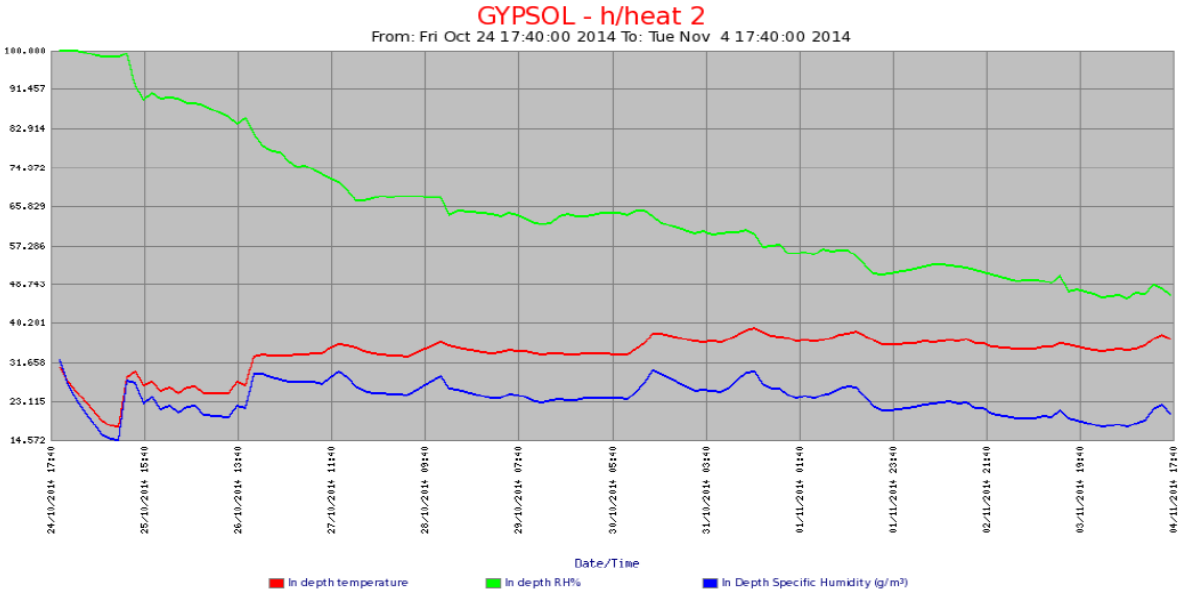

Figure 1 - Relative Humidity (in green) steadily drops after commissioning of underfloor heating.

Flood room: **LHS: 40mm screed:** Laitance Removed: Graph 10

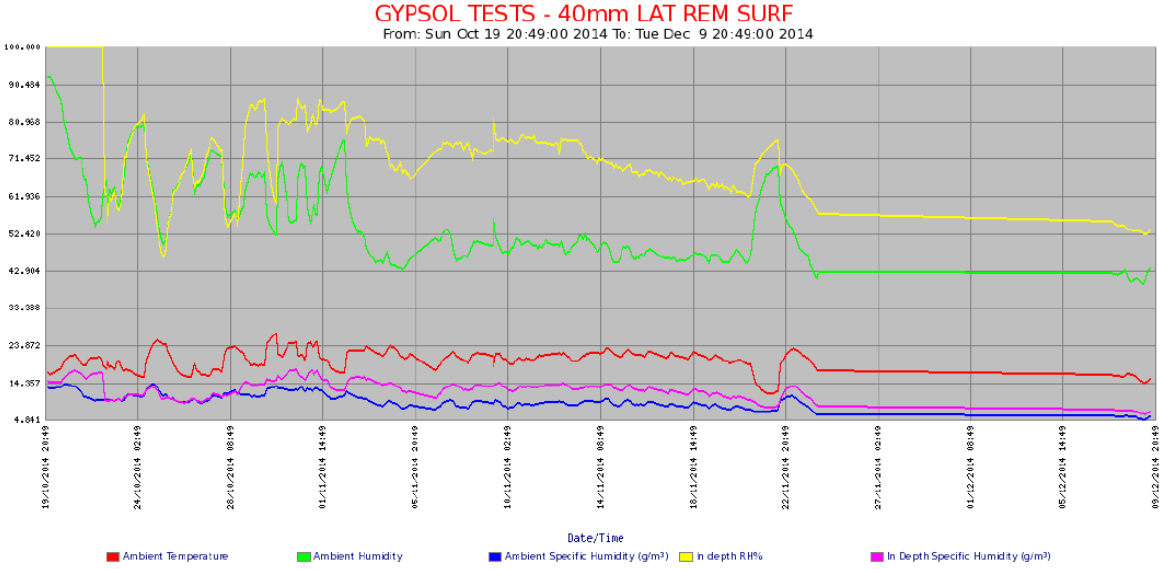

Figure 2 - Relative humidity (in green) in standard conditions reaches <75% within 27 days from installation of a 40 mm Gypsol screed.

Flood Room: **50mm screed: Surface Box ERH -** Graph 18

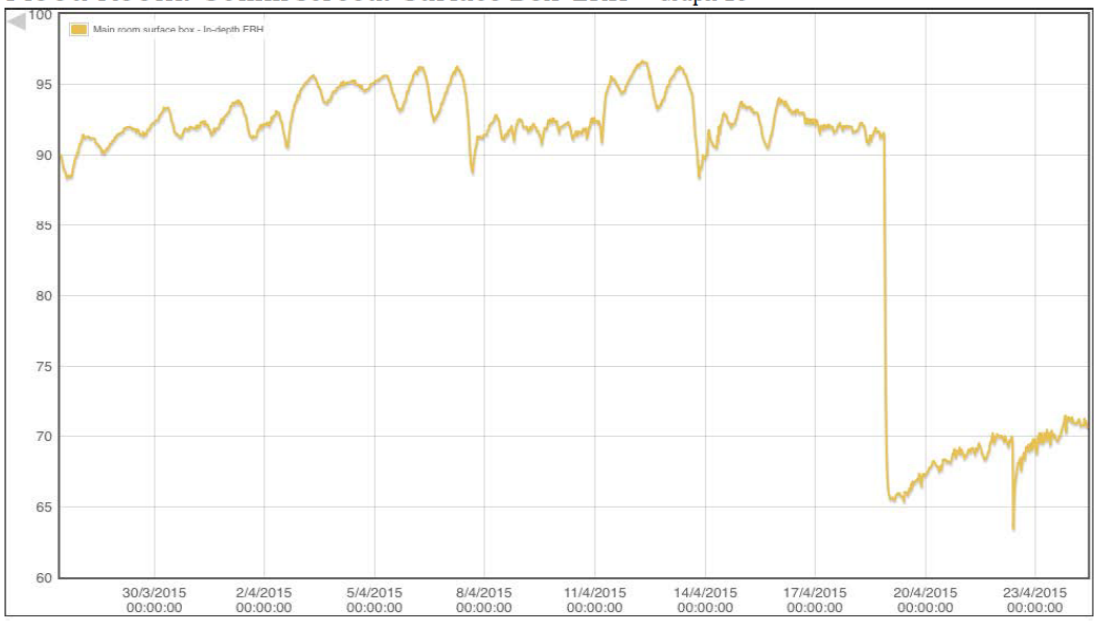

Figure 3 - Using the reference method of surface box RH the 50mm Gypsol screed dries in 27 days.

5.2 The effect of removing laitance. In the areas tested no effect on drying times was apparent whether the laitance was removed or not. It is acknowledged, however, that this tested a screed

produced with a single sand source and different screeds may produce differing thickness and densities of laitance.

5.3 The effect of surface coverings. It was noted that as expected, surface coverings delayed drying times. Proper ventilation to allow exchange of air is essential to effective drying of screeds.

5.4 The effect of screed binder type. Gypsol anhydrite binder did not increase drying times. Indeed very rapid drying was achieved using several methods as noted in 5.1. Sand: cement screeds dried in similar times when left to ambient conditions (Figure 4).

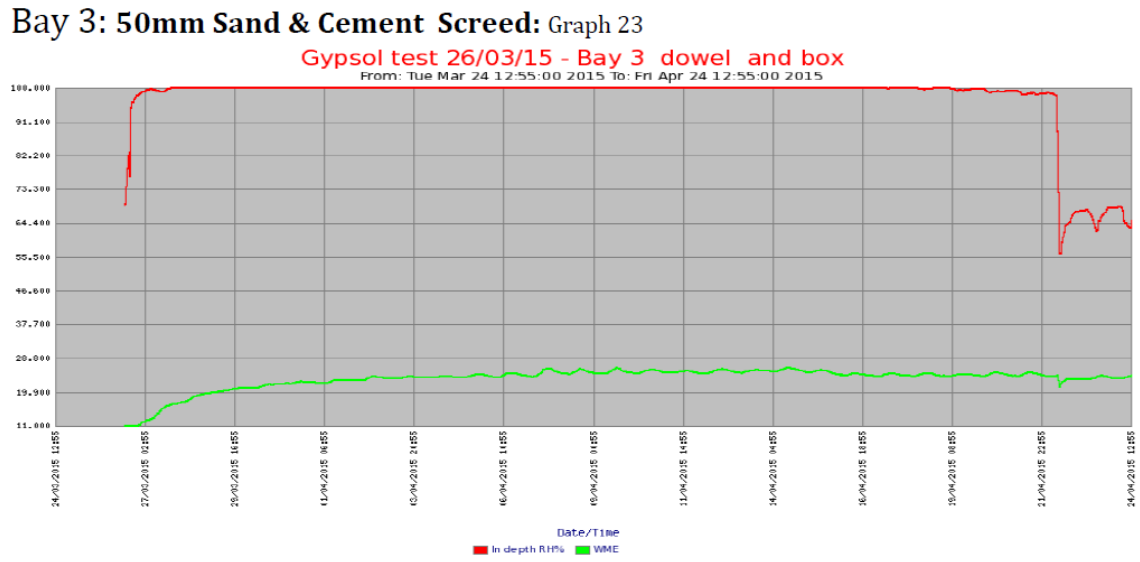

Figure 4 - 50mm Sand:cement screed dries in a similar time as the Gypsol screeds, 30 days.

6 RECOMMENDATIONS

6.1 **Ventilation**. Good ventilation should be provided to dry Gypsol screeds following the initial 48 hours of setting and strength formation. This can be achieved by opening all doors and windows. After 72 hours modern heat based dehumidifiers such as the Speedry system can be used to rapidly decrease drying times if desired, and after 7 days heating can be applied. All of these processes if applied correctly can lead to a rapidly dried screed ready to receive moisture sensitive floor coverings in considerably shorter timescales than the historic and frequently inaccurate “rules of thumb”.

6.2 **Underfloor heating.** Where underfloor heating is installed, if it is commissioned following the binder manufacturer’s guidelines, it can dry the floor in as little as 4 days. This makes a total of 11 days from installation.

6.3 **Laitance removal.** Although no effect was seen in this experiment, it is still advisable to remove laitance within the first 7 days. Industry best practice dictates that any screed should be sanded prior to covering.