
Sarah Dawkins
205 The Street,
Thornham Magna
IP23 8HB

JA/22/029
21st April 2022

Dear Sarah,

205 The Street, Thornham Magna. Engineer's Report

1.0 Introduction.

Further to your recent instructions and my site inspection on 18th April I am pleased to report as follows on the above property, with particular reference to the structural condition of the brick half-arch over the ground floor fireplace within the main dwelling Living Room.

The property comprises a large, grade II Listed, two-storey, detached historic dwelling, of predominantly rendered timber frame and masonry construction. Further details of the building can be found in my previous report dated 25th May 2021.

Concern has been raised with respect to the condition of the brick half-arch over the ground floor fireplace, which has dropped.

2.0 Survey Data.

A visual survey was undertaken around the area of the Living room and First floor bedroom above. There is a large traditional brickwork fireplace set within the ground floor Living room, which has been sealed with a steel ledger plate and presently houses a wood-burning stove. The frontage of the brick fireplace extends upwards towards the ceiling, where it then arches outwards, projecting 450mm towards the centre of the room. At this point it terminates, where it buttresses against a timber trimmer set within the oak first floor structure, with a supplementary bearing rail fixed to its underside with large, historic nails. Above the ceiling the first floor area here comprises an open brick hearth, with a chimney understood to be capped at a higher level (not visible during the survey). Within the room the bed is positioned on the wall face opposite to the original fireplace. There is a set of clothes drawers situated within the fireplace recess. Regular foot traffic around the room runs between the end of the bed and clothes drawers, directly above the apex of the brick half-arch profile. The masonry to the ground floor fireplace and half-arch comprises traditional soft red bricks set in lime-based mortar.

In the ground floor Living room a number of the bricks that form the half-arch have dropped noticeably, with sections of the original lime mortar becoming loose and detached. Whilst observing from the ground floor small pieces of lime mortar dropped out of the arch as people walked around the end of the bed upstairs.

At First floor level there is a noticeable drop in the floor level across the brick hearth, with it being relatively level across the fireplace, then dropping a maximum of 20mm at the furthest extent of the half-arch projection. Correspondingly, a number of the First floor hearth bricks have cracked above the line of the ground floor fireplace frontage, where the half-arch begins.

3.0 Comments/Recommendations

When looking for causes to the defects, it would appear it may be related to the regular use of the bedroom upstairs. As seen during the survey, people walking around on the bedroom floor between the bed and clothes drawers caused small amounts of mortar to drop down from the arch below. Over time, this cyclical loading may have led to the gradual disintegration of the soft lime-based mortar within the brick half-arch, which has then slowly begun to drop downwards and away from the chimney face. This is reflected upstairs by the cracking of the hearth bricks as they break over the line of the front of the chimney.

The addition of the supplementary bearing rail suggests a similar pattern of arch settlement may have previously occurred, with remedial works perhaps already undertaken. However, the timberwork and nail fixings appear to be historic, indicating this may have happened a long time ago, and that the subsequent brick movement experienced has therefore taken a long period of time to develop, rather than being an issue that has developed more rapidly in recent months.

It is recommended the half-arch is carefully taken down and fully rebuilt, using reclaimed bricks and traditional lime-based mortar. The arch should be packed tightly against the existing timber floor trimmer, mimicking its previous form. It may be possible for the builder to only demolish part of the arch before restoration, however in reality it will likely be impractical to achieve without an extensive temporary shoring arrangement due to the curved, historic nature of the brickwork and soft lime mortar, which will likely become disturbed lower down the arch closer to the fireplace as the works are carried out. It is the nature of historic buildings that running repairs are often necessary. Whilst that proposed above will resolve the issue, the presence of the supplementary floor bearing rail suggests the issue may have happened before. Therefore, the continuation of regular foot traffic over the arch may, over an extended period of time, lead to similar slow degradation of the lime mortar and subsequent dropping of brick levels as already experienced. Without removal of the arch it will be difficult to arrest this behaviour, however the historic appearance of the lower rail suggests it is a slow process therefore its rebuild would be considered an acceptable solution that provides structural integrity whilst promoting preservation of the historic fabric of this Listed property.

4.0 Summary.

- i. The brick half-arch projecting from the ground floor fireplace has dropped by up to 20mm.
- ii. Regular foot traffic directly above the arch around the end of the bed has likely contributed to the slow degradation of the soft lime mortar, leading to the half-arch bricks settling and First floor hearth bricks subsequently cracking.
- iii. The arch should be taken down and rebuilt using traditional methods, with reclaimed brickwork and lime mortar.
- iv. This will provide a suitable structural solution that complements the historic fabric of the Listed property. There is a risk of the same issues continuing to develop due to continuing foot traffic above, which would have to be accepted by the client. It appears to be a slow pattern of cyclical degradation given the similar historic repairs that appear to have previously been undertaken.

I trust that this is clear but if you need anything further please contact me. It should be noted that I have not inspected parts of the structure which are covered, unexposed or inaccessible and I am therefore unable to report that any such part of the property is free from defect.

Yours sincerely,


Jason Albanie BSc (Hons) I.Eng MICE
Director
for Weybreads Ltd