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5 May 2020

Dear Peter,

Report on an Inspection of an existing building at Hill Top Farm, Hood Green

Introduction

On 24 April 2020, I was asked to carry out a structural survey of an existing barn building at the above site. The purpose of the survey was to assess the condition of the building and to determine whether any structural alterations are necessary as part of the proposed conversion works.



I visited the building on Saturday 25 April 2020 to carry out the survey. I am now pleased to report as follows;

Description of the Building

The building is located at Hill Top Farm, at the end of a private access road off Eastfield Lane in Thurgoland, Sheffield. It forms part of a complex of agricultural and residential buildings on the site. The shed is used to house pheasants and livestock.

The building is single-storey portal shed with plan dimensions of approximately 100m x 12.5m. The building is about 4.2m high from existing ground level to eaves level.

The shed is split into a series of bays. This survey focuses on the three bays at the north-eastern end of the building, where the conversion works are proposed.

Structural Arrangement

The main structure of the building has a single-span steel portal framed construction, consisting of steel columns and pitched rafters.

The columns are formed from 229 x 102 (9" x 4") rolled steel I-sections. The rafters could not be measured at the time of visiting, but they appeared to have a section size similar to that of the columns.

The rafter connections at the apex consist of bolted end plates which are welded to the ends of the rafters. The end plates extend below the bottom flange of the beams to accommodate a haunch section at the apex. The rafters are connected to the columns with bolted end plate connections.

The base fixing of the columns consists of 300 x 300 steel baseplates bolted to the concrete floor slab.

The roof structure consists of corrugated asbestos cement roof sheets supported on timber purlins. The purlins are supported on steel angle 'shoes' that are welded to the webs of the portal rafters. The corrugated roof panels are underdrawn with a membrane and ceiling panels, which span between additional chamfered timber sections fixed to the sides of the purlins.

The wall construction consists of 150mm thick blockwork up to about 2.1m above floor level. Above this level, the walls have a timber framed construction, consisting of timber studwork lined with ply board.

The exterior of the building has a fair-faced blockwork finish for the lower sections of the walls, and the upper sections are clad with lightweight profiled metal sheeting.

Surface water from the roof is collected by gutters that run along the front and rear elevations of the building at eaves level.

Internal Observations

A visual inspection of the interior of the building was undertaken from ground floor level.

The steel portal frames generally appeared to be in good condition. There was evidence of mild rusting in localised areas where the protective paint finish had chipped or worn away, but this wasn't considered to be significant. There were two instances where holding down bolts were missing from the base plates to two of the columns on the southern elevation, but there was no evidence that this has impaired the performance of the structure.

The timber purlins appeared to be of sound structural condition with minimal signs of damage or deterioration. A few of the purlins did appear to be sagging, but this may be a deceptive observation caused by the rough-cut chamfered timbers fixed to the sides of the purlins, which were not always level.

The inner roof fabric was damaged and deteriorated in places. There were some soffit boards missing and the membrane was torn in places, revealing the underside of the corrugated roof panels above.

The perimeter blockwork walls were generally in a reasonable condition. Cracking to the masonry was however recorded in the following locations at the time of visiting;

- In the bottom three courses of blockwork in the first bay of the south elevation.
- In the top two courses of blockwork about a third of the way along the gable elevation, immediately below the soleplate of the timber framed panel above.
- In the top courses of blockwork in the north east corner of the building. Here, the mortar appeared to have deteriorated in some of the perpend joints leaving some substantial gaps in the masonry.

In all instances, the cracking is not considered to be significant and has likely been caused by thermal shrinkage of the blockwork.

There was also some damage to the bottom courses of blockwork in the north east corner of the building. Here the lowermost block right in the corner was fractured, leaving a large cavity in the block. The cause of this is unknown, but it may be related to some external drainage issues in that area of the building discussed later in this report. There was some cracking to the blockwork above and around the fractured block, but this was not considered to be significant.

The ground floor slab is assumed to be ground bearing. Parts of the slab were obscured from view by equipment and apparatus that were being stored in the shed at the time of visiting. However, where visible, the slab appeared to be in reasonable condition throughout.

External Observations

The roof cladding generally appeared to be in reasonably sound condition with most of the original corrugated sheeting panels still intact. It was evident that a small number of panels had been replaced with newer panels in some areas. The troughs of the corrugated sheets are filled with silt and debris across the majority of the roof, with some light vegetation forming in places.

The external profiled metal wall cladding was in good condition with no observable defects, other than some water staining to the surface in some areas.

There was a vertical crack in the external masonry in the gable elevation extending up the wall from external ground level up to the bottom of the cladding. There was some further cracking to the external masonry in the northern elevation. Here, staggered diagonal cracks were observed extending from ground level through the full height of the blockwork. In all instances, the cracking was not considered significant, and is likely due to thermal shrinkage.

There was evidence of some drainage issues at both the northeast and southeast corners of the building. It is suspected that this is due to the rainwater downpipes being removed in these areas, leading to the water from the gutters being misdirected. The worst affected area was at the north east corner of the building. Here, there was evidence of a long-term issue with water running down the walls. The blockwork was severely water stained and a large area of moss had developed on the surface. There was a similar issue at the south eastern corner, but to a lesser extent. It would appear that a drainage channel has been formed in the external yard slab to direct the water away from the building.

Recommendations

Having seen some preliminary sketch plans, the proposal appears to be to convert the end three bays into a habitable two-storey dwelling, keeping as much of the existing building fabric as possible. I cannot see any reason why this can't be achieved, provided that the roof, floors and walls can be improved to meet the requirements of current Building Standards.

The new first floor structure should be supported independently of the main structural steel frame on the existing perimeter walls, and on new internal blockwork walls built off the floor slab. The capacity of the floor has not been checked as the structural make-up is unknown, but it is likely that the ground-bearing floor slab that once housed heavy agricultural equipment will have sufficient capacity to support the lightweight suspended floor and walls.

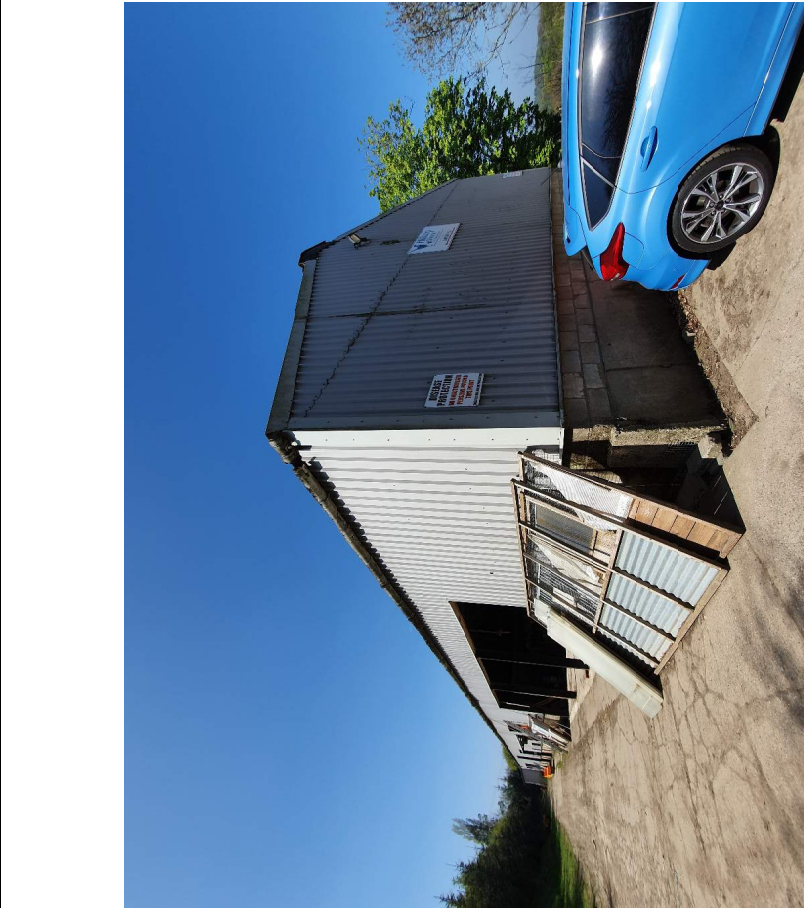
I would also recommend that the following repair works are carried out as part of the conversion works;

- Replace the missing bolts to the column baseplates
- Repair any damaged blockwork by repointing the mortar joints and replacing cracked/fractured blocks
- Repair/replace the existing guttering systems and install new downpipes, ensuring that surface water run-off from the building is properly managed
- Repaint or touch-up any rusted sections of steelwork
- Remove silt, debris and vegetation from the roof

I trust that this report provides sufficient advice on this matter.

Appendices

Photographs



Hill Top Farm, Thurgoland



South elevation

Prepared	AL	Checked	Date	25/04/2020	Photograph No	1 & 2
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East elevation



North elevation

Prepared	AL	Checked	Date	25/04/2020	Photograph No	3 & 4
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Internal view



Bolt missing from column baseplate

Prepared	AL	Checked	Date	25/04/2020	Photograph No	5 & 6
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Missing soffit panel and damaged membrane



Cracked/displaced blocks in northeast corner

Prepared	AL	Checked		Date	25/04/2020	Photograph No	7 & 8
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Fractured blockwork in northeast corner



Mild rusting/pitting to steelwork

Prepared	AL	Checked	Date	25/04/2020	Photograph No	9 & 10
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Downpipes 'missing' and damaged gutter



Evidence of long-term drainage issues

Prepared	AL	Checked	Date	25/04/2020	Photograph No	11 & 12
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Cracked blockwork in north elevation



Cracked blockwork in east elevation

Prepared	AL	Checked	Date	25/04/2020	Photograph No	13 & 14
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