clancy consulting

Report for Monitoring Period of RAAC Planks at Haywood Hospital

Prepared for MPFT

17/12/21

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Ally Botfield
ally.botfield@clancy.co.uk
0121 200 7809

enquiries@clancy.co.uk
www.clancy.co.uk

Clancy Consulting Limited
Charles House
148 Great Charles Street
Birmingham
B3 3HT

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Document Origin

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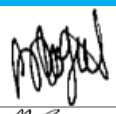
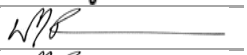
00	17/12/2021	First Issue	Prepared	AB	
			Checked	WP	
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17th December 2021

MPFT
Mellor House
St Georges Hospital
Corporation Street
Stafford
ST16 3SR

For the attention of Michelle Evans,

Dear Michelle,

Report for Monitoring Period of RAAC Planks at Haywood Hospital

Introduction

Clancy Consulting Ltd. (Clancy) were appointed by MPFT carry out a programme of monitoring to assess the condition of the RAAC roof planks at Haywood Hospital.

The purpose of this summary report is to outline the general proposals of the monitoring programme in order to satisfy NHS England's criteria of the assessment of the RAAC Roof Planks.

This report is prepared for MPFT for their own use and no liability can be accepted for reliance or use of the report by any third parties, although can be used

NHS England Criteria for Inspection

NHS England set out certain criteria that is to be inspected during the monitoring period of the RAAC roof planks, these are as following:

- End Bearing
- Deflection
- Cut Planks
- Cracking
- Spalling
- Moisture Ingress
- Rebar

Monitoring Proposal

The proposal for the monitoring period comprises of the following aspects:

1. Clancy will carry out an initial in-depth visual non-intrusive inspection of all of the roof planks over a period of two days.

During this inspection all roof planks will be referenced for future reference, while any visual observations for signs of cracking, spalling, differential deflection, moisture ingress will be recorded.

Furthermore, any mechanical services that are hung from the roof planks will also be recorded.

In order to visually inspect all of the roof planks where physically possible, the insulation fixed to the inside face of the mansard planks would have to be removed. Whilst we will endeavour to inspect all planks, any inaccessible areas will be recorded along with proposed actions to facilitate a complete survey.

2. Alongside this initial inspection a specialist surveying team from Survey Solutions, will carry out a survey involving 3d scanning equipment of the roof planks. This will provide a point cloud survey that records various points on each RAAC plank.

This will then allow Clancy to assess whether the deflection is within the allowable limits for each surveyed plank.

This option is deemed to be the most beneficial and effective method of inspecting for deflection given the restrictions and constraints of carrying out the inspection in a working hospital. This is mainly due to the congestion of roof hung services within the ceiling void. This would restrict physical access to the underside of the roof planks and would also limit the number of planks able to be reached.

In addition to this, due to the depth of the ceiling void a vast amount of ceiling grid would have to be removed to allow access. The 3D scanning equipment is anticipated to be less disruptive to the live outpatients' ward with Survey Solutions experienced in undertaking surveys of this nature in live and sensitive working environments.

3. Following this initial inspection, Clancy will then undertake three follow up inspections over a single 12 month period resulting in a regular monitoring programme of every 4 months.

This will allow for a consistent level of regular inspections of the roof planks, while highlighting any new or worsening defects.

During the monitoring period it would also be recommended that spot checks are carried out by the local facilities team after snowfall or prolonged rainfall.

This would be to inspect for any signs of moisture ingress in these periods, while picking up any other of the forementioned inspection criteria.

4. In addition to this above the roof should be regularly checked for signs of ponding and any indications of deterioration to the waterproof membrane.

This can be carried out and recorded using the RAAC Checklist provided by Clancy.

Future Recommendations

The above monitoring programme does not currently assess the end bearing conditions of the roof planks. At present there are limited ways of assessing this and these are as follows:

- Intrusive investigations to locally break out a section of the RAAC roof plank at its bearing to assess firstly whether there is adequate bearing onto the supporting steel structure below while checking that there is suitable longitudinal and transverse reinforcement above the support.

  This would be required to a vast number of planks as there is a possibility that planks across the roof were produced in different batches and different QA.

  This require large areas of the ceiling grid (and potentially services) to be temporary removed to allow access to the roof planks.

- Scan the underside of the planks to determine known locations of the embedded reinforcement, which would be limited by the supporting steel structure that restricts how close the scanning

equipment can get to the end of the planks.

Once the reinforcement has been determined then a secondary bearing can be provided, that essentially extends the width of the bearing to know location of the embedded reinforcement.

This would also require large areas of the ceiling grid to be temporary removed to allow access to the roof planks to install the additional structure.

- Temporary remove the roof waterproof membrane and insulation to allow access to the top of the roof planks to allow scanning to occur from above to determine embedded reinforcement locations.

  This would require a temporary roof structure designed to span over the existing building to provide temporary weatherproofing during the investigations.

  This method could provide additional risk to the structural integrity of the planks as the erection and dismantling of the temporary structure could adversely load the roof planks. Therefore a sufficient method statement would be required to be developed so that the process would not result in loading the existing roof structure.

Further to the recommendations for the end bearing we would also advise to get annually point cloud surveys, i.e 12 months after the initial survey. This would allow the provide an ongoing evaluation of the roof planks to highlight whether any movement has occurred over a 12 month period.

Snow Loading

With regards to snow loading, Clancy believe based on general loading conditions that this should be limited to 150mm thick of settled snow.

Settled snow would typically have a density of 300kg/m^3 which provide a load of 0.45kN/m^2.

Typically for the design of a building of this nature a general snow load of 0.6kN/m^2 is used, the 150mm provides a reduction to this.

Furthermore, given the age of the building we believe that the structure would have been designed in accordance with the design code applicable at the time, 'CP3', for which it states, "*on a flat roof where access is provided to the roof, allowance shall be made for an imposed load, including snow, of 1.5kN/m^{2}or a point load of 1.8kN."*

Given the access is required to the first-floor plant rooms this loading would reasonably be assumed to have been utilised across the roof structure.

However, as we have previously attempted to limit the roof loading, similar to that of roof with no access. For this scenario CP3 states that "*on a flat roof where no access is provided to the roof, allowance shall be made for an imposed load, including snow, of 0.75kN/m^{2}or a point load of 0.9kN."*

Therefore the recommended snow loading of 150mm provides a further reduction from the designed loading of a roof with no access.

We would also limit the period of days to 3 for the maximum snow load.

Furthermore, due to the areas of the protruding roof, i.e the first-floor plant rooms and double height gym, these would provide locations susceptible to snow drift. This could result in greater depths of snow locally to these intersections while the remainder of the roof would be relatively shallow snow depths.

However, from having discussions with MPFT and the facilities team the removal of the snow from the roof would provide further H&S risks.

Therefore, it would be advised that measures should be explored to provide mitigation of snow build rather than addressing the removal of the snow once it has fallen.

Cost and Schedule of the Monitoring Programme

- Initial Inspection
  - 1 day visually inspecting the planks in the gym area
  - 2 days out of hours visual inspection for remainder of outpatients
  - Tabulating observations and referencing roof planks
    - Fee for this works £7,850 + VAT (Fee Reference 9-2273-01-V01.)
- Point Cloud Survey
  - Fee proposal from specialist contractor is still to be received.
- Monitoring Programme
  - 1 day out of hours visual inspection every 4 months.
  - Tabulating of observations
    - Fee for this portion of the works £1,700 + VAT per visit.
    - Therefore, for the first year comprising of 2 inspections following the initial inspection would be £3,400 + VAT.
    - For a typical year of 3 inspections would be £5,100 + VAT.
    - Fee reference 9-2273-02-V02.

We trust the foregoing is sufficient to meet your immediate requirements, but should you have any queries or if we can be of any further assistance, then please contact the undersigned.

Yours sincerely,

Ally Botfield
Clancy Consulting Ltd.