

Issued by email
07th November 2024

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To whom it may concern,

RE: Visual Structural Inspection of Glass block Rooflight at Newport Civic Centre

Cambria Consulting Ltd were appointed by Newport Norse, hereafter known as 'Client' to perform an assessment of the Glass Block Rooflight at Newport Civic Centre, Godfrey Rd, Newport, NP20 4UR, the purpose of the assessment was to inspect the structural condition of the glass block rooflight within the previous education office. We understand an incident where a section of render/concrete detached from the roof onto the suspended ceiling panels below started the investigation into the condition of the roof.

Our findings are restricted to a visual inspection completed Thursday 24th October 2024, by James Spencer CEng MICE of Cambria Consulting. Photographs taken at the time of the inspection are contained within Appendix A of this assessment.

We have not inspected all areas which are covered, unexposed or inaccessible and we are therefore unable to report that any such part is free from defect. We cannot be held responsible for unforeseen conditions which may exist that are covered. Conditions may exist beneath the structure that are not detectable from our visual inspection. No intrusive investigations were performed.

The following letter report will seek to determine the structural integrity of the glass block rooflight, following a section of concrete which detached above the suspended ceiling and caused concern. Only this glass block rooflight localised area has been considered as part of this report and no other structural areas have been assessed.

Our assessment as described above, and in associated appendices, relies wholly on visual inspection at the time of the site visit. It is further noted that this report does not provide any assessment on the proposed fixings, connections, or any proprietary elements.

This report shall be for the confidential use of our client, and the report shall not be reproduced in whole or in part or relied upon by a third party without the express written authorisation of Cambria Consulting Ltd.

The area in Figure 1 which has been shaded red, is the location of the glass rooflight.



The inspection was limited solely to the glass rooflight section of the building and due to the extent of the deterioration to the concrete members. We understand Newport Norse have consulted with a concrete specialist regarding the ability to repair the structural members.

Observations

There is cracking and spalling noted to the concrete frame of the rooflight, this was noted as substantive to the size of the sections. The cracking was noted in areas to be circa 15mm. **See Photos 2,8-11.**

Spalling has also been noted to these members in area there is a loss of section of up to 50%. The rebar has also deteriorated, and a loss of section has additionally been noted to the reinforcement bars. **See Photos 5,15.**

There is cracking noted to the primary RC beams additionally. **See Photos 16-17.**

Water ingress has been identified to the structure which has caused areas of damp and likely the culprit to the cause for spalling is such a substantive extent. **See Photos 6,12-13.**

Diagonal cracking has been noted from the corner of the window to the roofline. It is unclear if this is just within the plaster finish to the wall or whether it extends into the structural wall behind. **See Photo 14.**

Summary

In our considered opinion, the structure is in a poor condition and is unsafe. Therefore, we believe the concrete testing specialist should be consulted as to perform intrusive investigations to the structural integrity of the concrete sections. At this stage we do not believe that for a majority of the structural framing of the rooflight there is the option to repair, but more than likely replacement in consultation from Cadw historic environment authority of Wales, due to the structure being listed.

For the structural RC beams the option to repair may be applicable, following the inspection and suite of concrete testing by a concrete specialist, if they believe the elements can be repaired, ideally concrete repairs would be performed in localised areas following render removal, guidance follows in the recommendation sections. Additionally in areas where there is water ingress this will need to be addressed, and the root cause outlined as to limit future ingress causing similar deterioration.

Recommendations

Following the assessment of the rooflight structure, in our considered opinion we do not believe the structure is fit for purpose in this area and should not be used prior to a detailed intrusive investigation and the following repairs being carried.

Following future consultation with concrete specialist regarding the findings of their intrusive investigation we would recommend that the concrete frame for the Rooflight be replaced, unless the concrete specialist believe there is an alternate approach for remediation, this would need approval from Cadw historic environment authority.

It would be advised that the removal of any external coatings (plaster) to the RC beams as to ascertain if there are any additional cracks to the underside of the beams. Any areas where there are cracks should be addressed and if there is any exposed rebar the methodology below should be followed.

Patchwork repairs are recommended to all cracked or spalled concrete. Many products are available within the UK such a manufacturer of a product is Sika (OSA) and are available for the proposed concrete repairs and protection of the beams from further deterioration.

Appropriate contractors who are competent to carry out concrete repairs should be commissioned. It is suggested by Sika, that concrete testing is carried out to confirm that the method of concrete deterioration, eg, water ingress, carbonation or chloride penetration. We recommend a suitable concrete specialist contractor assess this in line with the correct methodology. Due to the underside of the beams have been historically rendered. The products listed below, generally requires a clean uncoated surface for them to be totally effective therefore the current coatings would need to be stripped back and adequately removed prior to implementing any repairs or new coatings. Contractors should carry out adhesion testing on the beams prior to start coating them with the protective painting to assess their suitability for overcoating.

The following works schedule should be followed to repair the spalled concrete and protect the beams and slab from further deterioration, which would be covered with a product guarantee of up to 20 years (and 15 years with Ferrogard) by Sika UK.

- Remove all cracked or loose concrete. Clean all of the exposed reinforcement to sound sheen steel surface. Remove all dust from the reinforced concrete.
- Apply Sika Monotop 610 to all exposed reinforcement. This product acts as primer and protection to the exposed reinforcement. It appears that only surface corrosion has occurred to the reinforcement, therefore it is assumed that no replacement reinforcement is required. However, if after cleaning back, it is found that the reinforcement has lost significant amount of its volume to delamination, engineer is to be consulted for re-inspection.
- Apply Sika Monotop 615 on the areas of spalled concrete to repair the spalled concrete.
- If the concrete testing shows that the surface of the existing beams is suitable for overcoating the following products should be applied to all exposed surfaces:
 - Apply Sika Ferrogard over the whole extent of exposed concrete beams (provided suitable following adhesion testing)
 - Apply Sika MonoTop 620 over the whole extend of concrete beams (as overcoat to Ferrogard)
 - Apply Sikagard 552W Aquaprimer over the whole extent of concrete beams (as overcoat to Monotop 620)
 - Apply Sikagard 550W Elastic over whole extent of concrete beams (as overcoat to Sikagard 552W Aquaprimer).
- All to be installed to manufacturer's specification

Alternative products are also available by other specialists such as Fosroc Ltd for treating the spalled concrete beams and protecting from further deterioration. The following products should be used (pending approval from Fosroc representative / approved Fosroc contractors):

- Clean back reinforcement and apply Nitroprime Zincrich Plus on the exposed reinforcement for protection and Nitrobond AR/HAR as primer.
- Apply Renderpoc GP as concrete repair product.
- Apply Dekguard products over all beams as overcoating protecting. This product should be confirmed by the approved contractor for suitability over exiting coating.

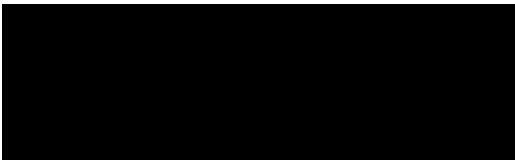
The above outlines the guidance for suitable available products. An appropriate contractor should assess the requirements for the products and their preference. As the engineer we do not specify a specific product but rather options for the required repairs. As previously aforementioned we would recommend this only be completed post consultation with the concrete specialist as to understand the extent of the deterioration the main reinforced concrete beams and not prior, and this not be attempted on the concrete framing of the rooflight members due to the extent of the cracking and spalling.

Following any repairs to exposed rebar which have been highlighted during the investigation or may be uncovered during the removal of any coatings, we recommend that localised repairs to the plaster finishes are performed. Tapping would be beneficial prior to localised re-rendering as to assess if there is loose render in areas close to where new localised repairs are being implemented. All damaged, loose or mouldy plaster will need to be removed prior to localised repairs.

Where all plaster is loose or damaged in both ceilings and beams it is recommended to be replaced. It would be advisable that all loose and tapped render/plaster be stripped from the beams and re-rendered/plastered with the addition of a fibreglass render mesh, and that the render finish be fine as to combat further water ingress.

We trust that the above provides an adequate summary of our observations, conclusions and recommendations but if you wish to discuss any matter, please do not hesitate to contact us.

Prepared by:



George Kenyon MEng
Structural Engineer

Approved by:



James Spencer BSc (Hons) CEng MICE
Director (Structures)

Appendix A – Site Photographs



Photograph 1 – View of Rooflight



Photograph 2 – Close up of cracking to concrete supporting frame



Photograph 3 – Deterioration to main RC beams



Photograph 4 – Showing section of Glass Rooflight



Photograph 5 – Large section of concrete missing from concrete rooflight frame



Photograph 6 – Water ingress to main RC beam



Photograph 7 – Perforations to RC beam



Photograph 8 – Cracking to concrete rooflight frame



Photograph 9 – Additional cracking to the frame



Photograph 10 – Severe cracking to the frame in separate location



Photograph 11 – Additional noted cracking



Photograph 12 – Large deterioration to main RC beam exterior



Photograph 13 – Further section on main RC beam damage



Photograph 14 – Diagonal cracking propagating window to roof



Photograph 15 – Close up of spalled area concrete from rooflight frame



Photograph 16 – Cracking to the RC beam horizontally



Photograph 17 – Large crack in RC beam up close



Photograph 18 – Spalling and cracking to Rooflight frame