The County Cinema, Portobello

Structural Observations

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1.0 Introduction

David Narro Associates were appointed by Out of The Blue to carry out a preliminary structural appraisal of The County Cinema, Portobello. This appraisal was to form part of a Feasibility Study into the reuse of the building being led and coordinated by ICOSIS Architects. The appraisal was to identify any obvious defects in the structure of the building and to comment on the sort of structural repairs that should be allowed for as part of a full refurbishment.

This report is based on a walk over visual survey carried out on 19 January 2016. No investigations were carried out as to the strength of individual structural members nor was any site investigation work or inspection of the foundations undertaken. No finishes were removed or floorboards lifted. No specific inspection was made in relation to timber decay or infestation.

2.0 Observations

1. The building appears to be a typical example of its age and type in both construction and quality.

2. There are two parts to the main structure of the building – the main auditorium to the rear and the entrance and circulation block at the front.

    - The auditorium is a large single-volume box with solid brick-masonry walls; these walls are rendered externally with a wet-dash render. The duoptich roof is of trussed construction, with steel 'angle iron'-type roof trusses carried by steel stanchions; these stanchions are built into the walls of the auditorium – the walls sit in between the flanges of the stanchions, meaning that the flanges project into and appear as nibs within the external render. There is a balcony to the rear of the auditorium. The floor structure at ground-floor level is of timber joisted construction spanning between sleeper walls in the solum below. This balcony is carried by steel plate girders spanning between the main stanchions. The floor of the balcony is of cast in situ reinforced-concrete (RC) construction and carried by a grillage of steel beams spanning between the main girders. There is a small basement below the screen to the rear of the auditorium. The walls of this basement are of brick-masonry construction. The auditorium stanchions continue down through the basement, being founded beneath its floor.

    - The entrance block comprises cellular masonry construction with brick-masonry walls and a flat roof. The entrance hall and lounge over incorporate steel stanchions in the walls. Internally the walls are solid, externally the walls are of cavity wall construction. It is likely that the walls are load-bearing. The floors and roof appear to be of in situ RC construction. The aggregate used in the concrete appears to be of natural stone however this should be checked – concrete of this age can often contain clinker as aggregate, which can be deleterious to embedded ferrous work in the presence of moisture.

    In overall terms, although described in contemporary press as being "steel framed throughout" the building appears to be a hybrid structure, being neither a fully-framed steel structure nor a fully load-bearing masonry structure in the modern sense. This is not unusual in buildings of this age (mid-1930s).

3. Those parts of the building that are regularly used as part of its normal operation appear to be reasonably well maintained. However, the more remote parts – for example, the rainwater goods at roof level – are not well maintained and are failing. Of most significance structurally are the rainwater goods and external render, as their failure is letting water into the building, leading to deterioration of the embedded structure.

4. In overall terms the structure of the building appears to be in a reasonable condition – I did not see any obvious indications of significant distress to the main masonry or steel structures. Of most concern is the failure of the protective cladding and rainwater goods as the embedded steelwork within can be seen to be deteriorating, which will be a direct result of the rainwater ingress. Thus far, this deterioration of the structure appears to be causing localised problems only however if the deterioration is left unchecked, the rate of deterioration will accelerate and lead to escalation in the scale and cost of the remedial works required.

3.0 Recommendations for structural repair

5. The sort of structural repairs that should be allowed for at this time are as follows:

    a. Repair of stanchions within the external walls of the auditorium.
    Be prepared to cut out and replace the lower section of the stanchion – say the first 3.0m above ground level. This work might entail:
        i. Erect temporary support to upper part of stanchion being retained. Such support could be basic – although very tall – scaffold or could with thought comprise a structure that spans between adjoining stanchions and carries weight of stanchion being worked on.
        ii. Cutting out 330mm brickwork either side of section of stanchion to be replaced.
        iii. Dig out locally to expose foundation.
        iv. Cut out affected height of stanchion, including baseplate and its fixings.
        v. Insert new galvanised stanchion, sized to match existing. New stanchion incorporates baseplate and new holding-down bolts into existing foundation.
        vi. Fix new stanchion section to existing (it is assumed that an ordinary plated splice connection can be adopted, using either close-tolerance site-drilled bolts or HSFG bolts).
        vii. Tooth in new brickwork to existing.

    Assume such work required in 10 locations (including two at corners). The work would be assumed to be carried out sequentially. One location may need to be within the basement to the rear of the auditorium.

    Allow for replacing 1 stanchion full height. Such work would be similar to process described above however step (vi) would require the attachment to the roof truss.

b. Expose external flanges of all stanchions. Wire brush and treat with new corrosion inhibitor.

c. Allow for repairing by splicing 50% of the ends of the timber joists to the ground floor of the auditorium where they bear onto the external walls.

d. Replace all embedded steel lintels in external windows with new precast RC lintels.

e. There are indications that the upper parts of the projecting bays of the main (front) elevation are peeling away from the building. This movement is suggested by vertical lines of cracks and open joints in the masonry. This has clearly been a long-standing problem, judging from the existence of steel straps across the joints/cracks. This movement stems from the poorly-considered interface of the masonry with the steel framing at the front of the building. The movement can easily be cured through the insertion of ties across the cracks/joints (longer than the existing straps), and may be helped further through the installation of lateral restraint straps at roof and each floor level (depending on how the roof and floors actually meet the walls).

f. In some instances, exposed reinforcing bars in the RC roofs and floors will need to be repaired through the adoption of proprietary concrete repairs. This work would include the removal of all loose material, wire brushing of the exposed bars, application of corrosion inhibitor, primer and concrete repair mortar.

g. Allow for localised repair through steel splice plates of corroded truss ends below failed rainwater goods.

h. Repair of the existing below-ground drainage system is likely to be required.

6. The structural repairs identified above assumes that the following non-structural repairs are carried out: the external render is replaced (certainly properly and robustly repaired, and most certainly around each projecting stanchion), the rainwater goods are made good, the roof coverings repaired / replaced as necessary and any moisture ingress into the basement area properly dealt with.

4.0 Comments on the structural aspects of possible intervention

Our initial thoughts on the structural aspects of proposed intervention to upgrade the building are as follows, based on the presumption that its structural form shall remain broadly unchanged:

7. The roof structure to the auditorium is a particularly lightweight construction carrying lightweight cladding (asbestos sheets). The roof structure will not have the capacity to carry any great increase in additional load over the existing without significant structural intervention. At this time we would suggest that dead loads (i.e. weight of construction) could be increased perhaps by 10% or so, although a detailed survey and appraisal of the roof structure would need to be undertaken to confirm this.

8. It may be desirable or necessary to improve the sound and thermal insulation offered by the ceiling. Given the limited capacity of the roof structure we would suggest that allowance is made for constructing a new secondary structure within the ceiling space to carry the load of additional sound and thermal insulation. This new secondary structure could also carry specialist equipment like lighting bars or a grid and (as has been mooted) trapeze gear. The secondary structure could be of lightweight steel construction spanning between the external walls of the auditorium: in overall building terms, the weight of things like insulation, lighting and trapezing are not significant – it's just that the existing roof structure will not be able to carry them.

9. Depending on the current formally-recognised occupancy of the building, it may be necessary to submit Development Impact Assessment (DIA) to Scottish Water to check that their existing public sewer can accommodate any change (increase) in discharge from the building without upgrade.