

Ref: 15022/Shire Hall/PK
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Mr [REDACTED]
Navitron Ltd
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Dear Mr [REDACTED]

Re: Shire Hall, Castle St, Cambridge CB3 0AP

Introduction:

Krige Consulting Ltd were instructed by Mr Edward Reynolds of Navitron Ltd, to carry out a visual structural survey of the roof structure of Shire Hall.

It is proposed to install a photovoltaic solar system on the existing roof structure and we were asked to provide a written report commenting on the ability of the roof structure to support the load from these photovoltaic units.

We were provided with the layout and weights of the proposed photovoltaic system. These were all provided by Mr Will Armstrong of Navitron Ltd, the supplier and installer of the proposed system. We visited site and inspected the roof in order to determine the existing structural arrangement.

The Building

The building serves as the offices for the Local Authority and was constructed around 1930. It is a 4 storey building, the lower three storeys being constructed in load bearing masonry with concrete beam and pot floors, which was typical for that period. The upper, third floor, appears from the street to be a traditional "mansard style" roof top extension, set back from the external walls and raking back at a steep angle, clad in hung clay tiles, with lead covered dormer windows. However, upon accessing the roof it is apparent that the mansard is in fact a relatively

modern addition, perhaps replacing an earlier timber framed version, with the external elevation retained for aesthetic purposes.

This upper level structure appears modular, prefabricated and would seem to date from the 1980s.

Structural observations

Roof Structure

Prefabricated structures are generally lightweight and designed using all structure at, or close to, its capacity. The roof over the third floor therefore, whilst being designed relatively recently, is not likely to have a higher than minimum required load capacity.

As the building was occupied and my inspection was carried out during working hours, I was able to carry out only a very brief inspection internally, just that which was possible whilst walking through the offices in order to access the roof. However, the roof structure appeared to be in good condition, having been recently recovered with felt and I noted no structural defects to either the roof or the building.

Proposed Photovoltaic Solar System

There are two proposed systems, A and B, to be installed on the roof. Using information provided by Navitron, I was able to calculate the weight of these photovoltaic systems on the roof.

For System A, taking the total weight of the panels, fixing system and ballast as 1720kg, over a roof area of 61.20msq, this equates to a uniformly distributed load across the relevant areas of roof of 28.10 kg/msq.

For System B, taking the total weight of the panels, fixing system and ballast as 1203kg, over a roof area of 40.50msq, this equates to a uniformly distributed load across the relevant areas of roof of 29.70 kg/msq.

Conclusions


All roofs are designed to accommodate both imposed and dead loads. These are loads that are applied to the roof, such as maintenance, wind and snow and the self-weight of the roof. The British Standard imposed load for a roof is 60 kg/msq. The roof structure of the prefabricated units should have been designed to accommodate this load.

The proposed photovoltaic system will impose a load of up to 29.70 kg/msq. This load is within the design load of the roof structure and coverings, although it is clear that there will need to be strict instructions to any operatives on the roof to not walk on the panels, something that should in any case, never be done.

As noted, I was unable to inspect the actual roof structure, nor was I able to obtain design information for the prefabricated units. However, I noted nothing on site that would lead me to suspect that the structure is not able to accommodate the proposed loads and the roof should have been designed and installed in accordance with the British Standard Codes of Practice.

Therefore, in my opinion, subject to the above, the existing roof is able to accommodate the loads imposed from the proposed Photovoltaic System and its installation will have no adverse effects on the existing structure.

Regards,

 [BEng CEng MStructE]

Director