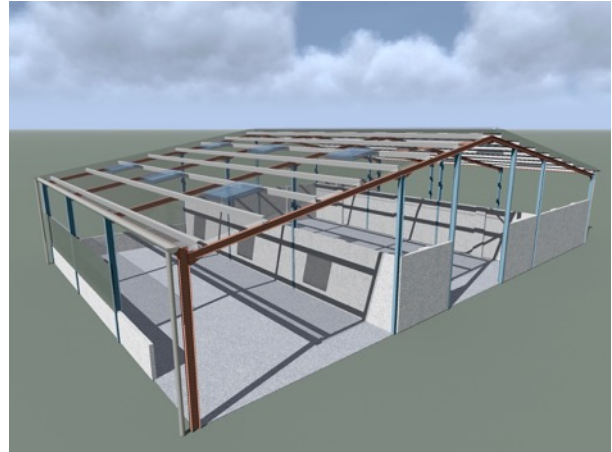


Structural Assessment

THE STRUCTURE

This is a conventional agricultural building built about 40 years ago. It is constructed in concrete blocks, concrete stock proof panels with lightweight high level cladding and a corrugated sheet roof. The whole is built around a portal frame system. In this instance there is a series of steel stanchions and connected pitched steel roof beams forming portal frames that in turn support a series of metal roof purlins. The floor is mainly a concrete slab. The whole is in a fair condition and there is no ingress of water through roof walls or floor.



Building structure digital model

STEEL FRAME AND CLADDING

The 4 no steel portal frames composed of hot rolled steel 'I' beams divide the building into 3 bays of similar width. Each portal frame roof frame member has two full height intermediate 'I' beam column supports. Steel horizontal diagonal wind bracing rods are fixed at high level in the central easternmost bay. There is a steel lower perimeter rail connecting the frames at gutter/roof level at the base of the two roof slopes.

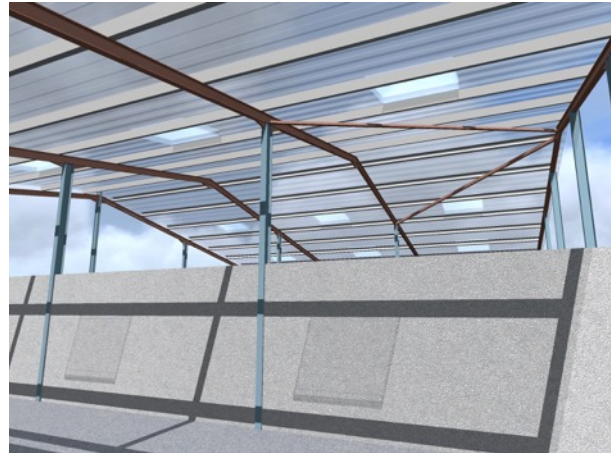
On the external wall between each steel stanchion is a 100 wide x 2300 high dense concrete block wall with 450 wide piers at intervals. This element is acting as a vertical wind brace.

The steel framing is performing quite satisfactorily, all gussets and connecting plates are present and in the correct locations. There is some mild surface pitting showing through the primer but this does not affect integrity. From an inspection at ground level aided by close up photography of the higher frame areas there is no visible structural deterioration detected. There is also no indication that any member is not performing satisfactorily.

Over the portal framing are set cold folded and galvanised 'Z' purlins acting as the direct supports and connections to the roof corrugated covering. There are eight purlins to each slope which is quite an adequate number. These purlins turn support the corrugated metal roofing which is itself party self spanning. The purlins appear to be in sound condition with no displacement or deformation occurring.

From a ground level inspection all the roofing structure appears sound and all junction and fixing details satisfactory and working well. The fixing of the roof cladding appears sound and weathertight.

The external cladding over the concrete blocks is mainly held in place with 60 x 60 steel horizontal angled rails with some additional 100 x 75 timber wall top plates at its base. Some of this cladding is beginning to look tired and a small section is missing in the south east corner. However the majority of it is intact, attached and resisting the ingress of rainwater and wind.



The model shows the horizontal wind bracing (roof) and the vertical wind bracing (concrete block walls)

MASONRY

Together with the external low level perimeter walling, there are two internal block wall subdivisions 100 wide (with piers) 2300 on either side of the barn centre about 8800 mm apart running the whole depth. Both they and the external block walls appear to be in sound and upright condition with little cracking or displacement.

All 100 mm wide dense concrete blockwork is laid in a running or stretcher bond, a single block thick. All wall elements appear to be in a fair condition. There is no evidence of inadequate foundations or other settlement. The 450 long x 200 wide block piers at intervals are bonded to the walling using the same blocks laid on their side to cross bond.

FLOOR

This is a concrete slab, laid level and in bays and where I could inspect it clearly there was no signs of distress or differential movement. The whole appears sound and relatively level. I cannot tell the thickness from this inspection but there has been no visible structural deterioration in use such as spalling areas, broken slab elements or deformed panels. I assume it has been used for regular agricultural purposes over the life of the structure and it appears that this floor material is still performing adequately.

OVERALL

The structure is of sound quality with reasonable structural integrity. The appearance of some of the upper cladding is shabby but that is not unusual with such buildings and the visual finish does not affect the reasonable integrity of the overall structure. The roof and rainwater goods are performing satisfactorily. The provision of the main portal framing is quite adequate and the bay intervals fall within the normal parameters. The roof level portal elements are sound, as are the purlins over them. The block walls are also sound and mainly tidy. The concrete floor appears level and has retained its finish and it shows, as far as I can determine, no particular sign of distortion, movement or distress in any way.

CONCLUSION

This is a simple steel framed barn structure. The main steel framing is quite capable of reuse. The roof structure is working well, looks undistorted and free from corrosion. The provision of purlins is more than adequate. The block walls could also be reused and retained in situ with only minor

repair. The outer cladding is getting shabby but this does not affect structural integrity and it is still doing its job. The floor looks sound and functional.

I can see no physical reason why this structure could not be converted to a residential use, keeping the steel stanchions and trusses, the concrete floor, the concrete block external walls and replacing the outer upper cladding and roof coverings. The existing structural system is capable of supporting the additional insulative and service measures necessary for residential use.

Mick Morris AADipl RIBA Architect

December 2020

Note. This structure was inspected at ground level internal and externally. I have not uncovered any foundations, other structure or removed any part of the in situ fabric. This appraisal is based on this visual inspection alone.

Mick Morris AADipl RIBA Architect.

In private practice for 25 years. Winner of several awards from The Portsmouth Society for restorations and conversions of buildings (some listed) ranging from the Georgian period, the Victorian and Edwardian ages up to Lord Foster's RIBA Gold medal award winning IBM building 1972. (also Grade 2 listed). The practice is a Civic Trust regional finalist and Winner of the Best New Building City of Portsmouth 2010 and has entries in 'The Buildings of England' South Hampshire Edition 2018.

Conversion work has included the reuse of churches, schools buildings, a brewery, oak framed barns, pubs, Georgian warehouses and also more modern redundant structures including steel framed barns similar to the one appraised here.

Many projects involve the inspection of building fabric and structure, the suitability for adaption or reuse and the methods by which such structures can be adapted for different functions. Other appraisals and surveys regarding the character or architectural, social or historic quality of buildings have also been undertaken.

Over the last few years the practice has dealt with several steel framed modern barn structures with a view to conversion for either holiday or long term residential use. Some have now completed their full conversion.