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Report Into Structural Condition

of

The Main Hanger, Shoreham Airport

ADUR & WORTHING
PLANNING SERVICES

PLAN	AWDM/1090/16
DATE VALID	20 JUL 2016

Interim Report into Structural Condition The Main Hanger, Shoreham Airport

1.0 Authority and Scope

1.1 The authority for the survey came in a request from the airport owners representative Mr Terry Bartholomew of Calford Seaden LLP (Surveyors)

1.2 The scope of this report is limited to a walk round inspection and consideration of the condition of the structure of the hanger, with regard to the present condition and re-cladding required for continued use.

1.3 The inspection was carried out on 20 July 2012

1.4 I am a Chartered Structural Engineer and an equity director in the Dixon Hurst Kemp Group, Consulting Engineers. I have written many expert witness reports on a variety of technical problems, and my regular workload includes the survey, design and analysis of all types of commercial structure

2.0 Description

2.1 The hanger is built on a level site underlain by alluvial soils of the nearby river. Actual foundation conditions are not known, but based on a single inspection there was no indication of significant foundation weakness.

2.2 The plan dimensions of the hanger are roughly 31m deep by 66m wide. The roof is split into two equal spans with a valley on the centre line. The ridge height is around 12m, and the internal clear height is around 6m. The sliding hanger doors to this height occupy most of the north (airside) elevations.

2.3 The hanger is clad in corrugated asbestos cement sheeting to roof and walls, carried on angle purlins and rails. The floor is plain oversite concrete. The main hanger doors are clad with plain 'corrugated iron' sheets.

2.4 The ancillary areas around the south east and west sides are used only for storage and light engineering, although there used to be public access to a visitors centre on the east side. These areas have mono-pitched lean to roofs covered in asbestos sheet. Walls are mostly solid blockwork/brickwork.

2.5 Day light is gained inside the hanger at present using two lines of roof glazing each side for the depth of the building, one at the eaves and one near the top of the slope. The glazing bars are aluminium, carried on the angle purlins. No method of cleaning or maintaining the glazing is provided.

2.6 The whole construction of the building is utilitarian and of its period. Architecturally there is no relief to the shape of the 'box' in the roof or walls. There is also no fire lining or addition internally. At present it is used to store small light aircraft only; they are serviced elsewhere.

2.7 The lean-to roofs on the three non-door sides of the building are adding some rigidity to the building, although only to a secondary degree. On the east and west sides the lean to roof structure comprises steel beams and angle purlins, and appears to be a typical design for its period similar to the hanger.

3.0 Description

3.1 The hanger design is around seventy five years old and is typical of the period i.e. double channel stanchions with light bolted angle trusses supporting angle purlins and rails. The enclosing block walls add considerable rigidity to the building. By modern design standards the section sizes used do appear light, although the trusses are at relatively close centres (12'6").

3.2 A full analysis has not been carried out, but the hanger structure has stayed serviceable through events such as the 1987 hurricane. It is however probable that factors of safety against large internal wind pressures (e.g. with the doors open and a strong north easterly gust) and other such load cases are below the factors that would be required today.

3.3 There are stability wind girders on the north and south walls, and lateral stability is provided by the 'haunch' angles (although they are themselves poorly restrained) and the lean to sections each side.

4 Condition of main hanger frame

4.1 The condition of steelwork is generally adequate, but there are areas of corrosion, particularly under the valley, above the doors and close to the roof sheets, but also to the truss gusset plates and angles closer to the doors, where wet and damp are blown in. Most of the corrosion would be classed as mill scale, but lamination (i.e. serious structural decay) is evident in some locations. There are many hard to access or hidden areas where corrosion may be progressing e.g. near ground level behind the main doors on the north wall.

4.2 There appear to be inadequacies in the bracing, particularly in the truss elevation bracing at third points, with bent and buckled members being noted in the angle trusses. Some 'bent to fit' joints were noted, along with welded or bolted repairs presumably made in 1941 after war damage.

5 East and West lean to structures

5.1 These lean to areas are framed in steel and are believed to be monolithic with the hanger frame. Inclined UB rafters support rolled steel angle roof purlins that carry the asbestos cement roof sheeting. There are glazed roof areas intermittently. At eaves level there is a RSC rail, between the steel frame posts under the ends of the main UB rafters. The outside wall is a single skin (half brick) wall on the east side (one brick thick on the west side).

5.2 The condition of these areas is acceptable structurally, although obviously the fabric is very basic by modern standards, in terms of weatherproofing, insulation etc. There have been resulting problems for the occupiers with some decay probably occurring where the original linings below the roof sheets are becoming detached.

5.3 Over the north west corner (generator housing and adjacent office) there is an insitu concrete slab at ceiling level, cast between the outer eaves beam and the hanger wall. The slab may be original or cast in the 1950's, but the purpose was not clear. In any case there was no evidence of deficiency that would cause concern.

6.0 Condition of main hanger envelope

6.1 It is in the sixty year old envelope rather than the structure, that there are chronic problems with the hanger, creating serious health and safety issues: -

- The asbestos cement roof and wall sheets are a hazard due to their composition, but are also becoming brittle and time expired. There are numerous holes and cracks in the sheets, which are stressed by wind buffeting from above and below depending on whether the doors are open and on the direction of the wind. The proposed replacement Marley fibre cement sheets are a good fit with the current cladding, and will be attached to the angle purlins and rails in the same way.

- The large upper glass rooflights are dangerous and should be replaced with translucent sheeting.

- The lower smaller lights at the eaves of the building on the east side will also need to be replaced

- The main hanger doors are time expired. The steel frames are rotting and shards of rust fall from the track and supports onto operators whilst in use, but they could be re-clad in similar galvanised sheeting and generally overhauled.

7.0 Overall recommendations

7.1 The cladding of this building needs to be replaced, and for weathering and safety reasons we support the decision to use translucent sheeting for glazed areas instead of roof lights.

7.2 With the cladding stripped the condition of the frame can be checked closely. The steelwork should be cleaned by air blasting only, except where structural corrosion has occurred. Light corrosion is of no particular concern, provided that the future roof covering is watertight as intended. Where structural corrosion has started i.e. pitting and/or lamination the structural engineer should be asked to inspect and prepare a remedial work detail, probably involving additional plates or angles. Only as a last resort will new replacement angles be specified where the existing are bent or broken, bolted or butt welded to sound sections of the existing.

7.3 Fixing of the new cladding will be achieved with galvanised 'J' bolts and no drilling of purlins or rail sections should be necessary.

7.4 The weight of the new cladding will be almost identical to the existing and therefore the stability of the building is not altered.

7.5 Carrying out the re-cladding shown should not have any significant effect on the current structure. Only maintenance type repairs to corroded areas will be needed, and with a more weathertight envelope the structure will be preserved in a better condition for the future.

KEMP HURST DIXON

Designed by	Date	Checked by	Job No	Sheet	Rev.
			3503	12.01	

Job Title: SNOEENHAM DEPOT

Item: MAIN MASTER SHEET

NTS

[NOT TO BE SCALED]

(NOT TO SCALE)

MAIN ROAD

PRESENT ROAD LEVEL

EXISTING

PROPOSED ROAD LEVEL

PROPOSED CLOSE BOARD FENCE TO BE ERECTED ON CONCRETE POSTS AT 2.44m CENTRES

PROPOSED CHAIN LINK FENCE TO BE ERECTED ON CONCRETE POSTS AT 2.44m CENTRES

[TO BE SCALED]

PROPOSED HARDSTANDING

PROPOSED CONCRETE KERB AND CHANNEL

KEMP HURST DIXON

Job Title	Item
SNOSENOM AIRPORT	MAIN HOUSE SURVEY

Designed by	Date	Checked by	Job No	Sheet
			36703	15.02

POST SECTION

EXISTING TURF TO BE REMOVED AND STORED FOR REINSTATEMENT

EXISTING TOPSOIL TO BE STRIPPED AND STORED FOR REINSTATEMENT

EXISTING SUBSOIL TO BE EXCAVATED TO FORMATION LEVEL AND REMOVED FROM SITE

EXISTING SUBSOIL TO BE EXCAVATED TO FORMATION LEVEL AND STORED ON SITE FOR REUSE IN EMBANKMENTS (SEE DRAWING No. 36703/16)

EXISTING GROUND LEVEL

EXISTING TOPSOIL TO BE REMOVED AND STORED FOR REINSTATEMENT

EXISTING SUBSOIL TO BE EXCAVATED TO FORMATION LEVEL AND REMOVED FROM SITE

EXISTING GROUND LEVEL

TEST & TRIAL EMBANKMENTS OF LOAM (SEE DRAWING No. 36703/17)