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Mr S Dobson

**Proposed Conversion to dwelling at
'Jacksons's Barn', Sawley, Lancashire.**

Structural Appraisal Report

D1491 rev0

September 2011

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Document Control Sheet

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Job	Date	Issue	Copy
D1491	September 2011	0	

Originator: AB

Checker:

Approver:

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1.0 Survey

- 1.0.1 The scope of this Structural Appraisal is to offer opinion as to the structural integrity of an existing agricultural building, presently derelict, prior to consideration of conversion to an individual residential dwelling. The structure in question to be surveyed is owned by Mr S Dobson.
- 1.0.2 This report is to be read in conjunction with PSA Design Limited's drawings referenced D1491/PL01 and 02 providing existing and proposed floor layouts, sections and elevations.
- 1.0.3 The structure under consideration is situated approximately 0.5km north of the village centre of Sawley and approximately 6.1km north east of Clitheroe town centre, within a rural environ of the County of Lancashire. The area of proposed refurbishment comprises a traditional masonry constructed; dual pitch roofed ancillary agricultural building, presently derelict.

The ground floor aspect of the property is presently utilised as a storage facility for agricultural products/equipment. Based upon the existing layout, it is reasonable to postulate that the structure has historically been used for animal housing.

Extending beyond the westerly facing masonry gable, a more formatively constructed timber framed, corrugated sheet clad annexe is proposed for demolition with respect to redevelopment. As such, this element of the existing property does not form part of our survey/investigation.

The surrounding landscape is primarily 'soft' in nature. To the rear of the property, an existing walled courtyard extends to the south, bounded by the 'Sawley Road', running adjacent to the eastern boundary of the property.

- 1.0.4 The structural inspection undertaken was limited to the area of proposed redevelopment. We would point out that during the course of our inspection, no intrusive/destructive investigation methods/procedures were utilised to ascertain the nature of construction of the property substructure and superstructure elements. Whilst comment/opinion may be made regarding perceived wall elevation/stability, such opinion is based upon visible evidence of superstructure elements, not upon visual inspection of foundation/substructure.

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The structural inspection undertaken was limited to external and internal visual observations made during the course of our survey undertaken on 30 August 2011. All external observations were made from adjacent ground level. All internal observations were made from adjacent corresponding ground floor level.

Whilst opinion may be made regarding perceived points of a structural nature, such opinion is based solely upon visible evidence observed and experience/knowledge with respect to such issues. Such opinions where given, should, at the earliest opportunity be confirmed or otherwise by suitable and appropriate further investigation techniques.

This report addresses the adequacy of the existing structural integrity of 'Jackson's Barn', and the perceived adequacy to accommodate the Architectural proposals detailed upon drawings referenced D1491/PL01 & 02. Any deviations with respect to structural alterations and proposals from these details should be further assessed prior to construction commencement.

- 1.0.5 Appended to this report, photographs taken during the course of our inspection. Where reference is made thereto, the proceeding commentary should be read in conjunction to their reference, and where appropriate, annotation of the photographs has been made to highlight pertinent points.
- 1.0.6 The area of redevelopment is an unoccupied, dilapidated, ancillary agricultural property. Of load bearing masonry (sandstone) presumed rubble cavity filled construction, generally 600mm thickness, the roof being of traditional timber construction, holding a thickened slate tile finish, supported by means of timber purlins spanning between gable elevations and two number timber truss profiles situated equidistant within the roof plan area.

The ground floor construction is that of a more formatively renewed concrete ground bearing slab, channelled within the central regions, raised adjacent to the existing north and south facing elevations.

1.0.7 External Elevation Survey

Front Elevation (North facing); Plate 01 refers to the coursed stone masonry, north facing front elevation of the 'Barn' structure. The slate finishes to the front elevation roof pitch clearly exhibit evidence of previous historic deflection of underlying structural members.

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The elevation holds a brick infilled former main door opening, containing a Perspex glazed window opening. The original timber lintel member to the door opening remains insitu (reference Plate 02), exhibiting signs of excessive shrinkage and historic wood boring insect infestation. Emanating from the underside of the left hand lintel bearing, mortar bed and perpend cracking extends in a downward, diagonal trend. Vertical cracking emanates from eaves level adjacent to both gable returns, more prominent to the right hand side (reference Plate 03), with evidence of remedial repointing having been undertaken to the left hand side.

Generally, the elevation is reasonably plumb, to the left hand side of the infilled door opening, with slight 'bulging' noted at eaves level (reference Plate 04). To the right of the former opening, 30mm lateral and vertical displacement was recorded over a 1.0m measured length within the localised elevation (reference Plate 05).

Gable Elevation (West facing); Plate 06 provides record of the westerly facing gable elevation general appearance. The elevation holds a sand/cement rendered application, with cracking noted throughout; however no evidence offered of underlying historic or progressive structural movement. The render has spalled within the mid-section of the elevation at approximate first floor storey height.

The elevation 'bulges' from ground to eaves over its full length, recorded at 50mm vertical displacement over a 1.0m length at mid-height.

Rear Elevation (South facing); The south facing rear elevation of the structure is detailed within Plates 07 and 08. The slate finishes to the visible roof pitch exhibit evidence of historic underlying member deflection. Extending in an easterly direction, a more formatively constructed, timber framed 'shed' is located adjacent to the junction with the gable elevation, holding a corrugated profiled sheet metal cladding. Redevelopment proposals indicate the demolition of this annexe.

The heavily weathered, random stone masonry elevation is reasonably plumb throughout, offering signs of more formative repointing remedial works. Vertical cracking emanates from eaves adjacent to the westerly facing gable elevation, extending in a downwards trend to mid-height. Within the area of this cracking (reference Plate 09), a vertical displacement of 20mm is recorded over a 1.0m measured length. Additionally, vertical cracking is noted to the right hand side of the Barn entrance door (reference Plate 10).

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Visual evidence would suggest by the colouration of the masonry directly adjacent to the crack location that such corresponds to historic infilling of an originally wider door opening.

A previous door opening within the central area of the elevation has been subject to historic stone masonry infilling.

Gable Elevation (East facing); Plate 011 provides record of the easterly facing gable elevation general appearance. The elevation, of coursed sandstone masonry is reasonably plumb, offering no evidence of historic or progressive structural movement. It is conjectured that this elevation may be the subject of more formative rebuilding?

1.08 **Internal Survey**

Roof Structure; The roof is of traditional timber construction, supporting slate tile finishes. Internally, the back pointed mortar application to the slate offers evidence of damp penetration and excessive spalling (reference Plate 12).

More formatively replaced timber rafter members span front to rear elevation, supported by means of original purlin members (two number per pitch) and a more formatively replaced ridge beam. In turn, the purlins span from gable to gable elevations, intermediately supported by two number original truss profiles.

Throughout the structural timber roof members, evidence of damp, rot and wood boring insect infestation is clearly evident, particularly at the westerly truss bearing with the front elevation (reference Plate 13) and the purlin bearings with the westerly gable elevation.

Barn; Plate 14 (westerly facing gable elevation) provides an indicative general appearance of the internal aspect of the Barn structure. All internal elevations hold an applied sand/cement render application, with cracking noted throughout. All wall elevations lean 'outwards' from ground to eaves level.

Of note, more significant render cracking is noted at the bearing location of the westerly truss with the rear elevation (reference Plate 15).

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The ground floor slab, would by appearance, be of more formative construction, formed at a level 650mm below the adjacent external ground level of the easterly gable elevation (reference Plate 16). The slab is channelled within the central regions, presumably as a consequence of the structure's former usage. There are no obvious signs of historic or progressive movement within the existing ground floor finishes.

2.0 Conclusions and Recommendations

- 2.0.1 The property is generally of 'reasonable' structural condition considering its age and nature of construction. At present, the structure is stable; however, subject to historic movement and levels of deterioration, we are of the opinion that in its present condition, the medium to long term structural integrity of the property cannot be categorically guaranteed. We would therefore recommend a number of remedial measures to address deterioration of structural timber members and masonry stability/restraint, thus improving the long term structural integrity of the building, particularly based upon the proposed change of use to that of residential.
- 2.0.2 It is recommended that a "specialist" timber survey is undertaken upon the timber elements of the existing structure that are to be retained in redevelopment proposals. Such a survey should identify the nature and extent of any wood boring insect infestation, dry/wet rot and fungal attack and recommend the extent of remedial works necessary to arrest such and maintain the structural member strength to continue to provide necessary support.

Should remedial treatment solutions be a viable option, we would recommend structural design assessment of the existing truss members be undertaken to verify, or otherwise, their suitability to provide adequate support to the roof structure if required.

It is our considered opinion that the existing timber ridge, purlin and lintel members are not structurally adequate to sustain the proposed loading, and as a result, be replaced by structurally competent support members.

- 2.0.3 Whilst not of structural concern, we would recommend a "damp" survey be undertaken to all masonry elevations within the proposed area of refurbishment. If as expected, the level of the moisture within the wall elevations is excessive, remedial treatment solutions should

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be considered if necessary, particularly as proposals necessitate the 'physical connection/tie' to a blockwork lining wall.

- 2.0.4 Where vertical cracking is noted externally emanating from eaves level, we are of the opinion that such is attributable to the historic 'spread' of roof members particularly based upon their proximity to return wall lengths. We would recommend the remedial 'stitching' of all external crack locations, adopting a suitably approved remedial method
- 2.0.5 Whilst not necessarily of structural significance, we would recommend the property mortar bed and perpend joints are re-pointed, particularly where vertical cracking is noted within the external elevations, previously addressed by remedial stitching recommendations.
- 2.0.6 Based upon proposals, a blockwork lining skin is to be constructed internally throughout adjacent to the existing masonry inner leaf. This leaf should be fully tied into the existing masonry using appropriate proprietary wall ties at 900mm horizontal and 450mm vertical centres; 150mm distance from and 300mm maximum vertical centres at all openings.
- 2.0.7 Based upon redevelopment proposals raising the existing ground floor slab level, the provision for a replacement ground floor slab should comprise of a 150mm thick, ground bearing concrete slab, laid upon suitably compacted hardcore and a single layer of 1200 gauge damp proof membrane ("Visqueen" or approved equal), formed upon approved competent sub-base strata, or alternatively if competent bearing strata is proven beneath the existing slab, directly off such. Nominal mesh type reinforcement (A193) to the top of the slab should be provided with 25mm cover. Adjacent to external wall elevations, and where requirement necessitates the provision of foundation for internal load bearing wall elevations, the requirement of a thickening/downstand should be accommodated upon which formation of the proposed blockwork internal leaf can be made. Further investigations to ascertain existing foundation depth and nature of existing bearing strata should be undertaken in order that proposals do not compromise their integrity.
- 2.0.8 Proposals necessitate the elevation height, and subsequently, the ridge height of the property to be raised by 1.655m. Therefore, we would recommend that further intrusive investigations are undertaken to fully ascertain existing wall construction and determine the nature, depth and size of the existing property foundations to determine their suitability or otherwise to accommodate the proposed additional loading. Further investigations are also recommended to determine shallow sub-strata conditions with respect to their load

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bearing capabilities, and the potential influence that such could have on the increased foundation loading.

- 2.0.9 No lateral restraint is presently afforded to the wall elevations. Whilst evidence of lateral displacement is noted throughout, it is not of immediate detrimental effect. The provision of a proposed inner blockwork leaf tied to the existing masonry wall elevations will provide enhanced stability. However, notwithstanding this point, we would recommend as part of the refurbishment proposals, restraint strapping at eaves and apex levels are undertaken throughout.

Additionally, where first floor levels are proposed, again, the introduction of restraint strapping is recommended to be undertaken.

- 2.0.10 Where proposals necessitate the removal and/or demolition of existing structural elements of the property, careful consideration to the method and sequence of temporary support works should be given, not only to ensure the safety of site personnel, but so as not to compromise the structural integrity of the immediate property area.

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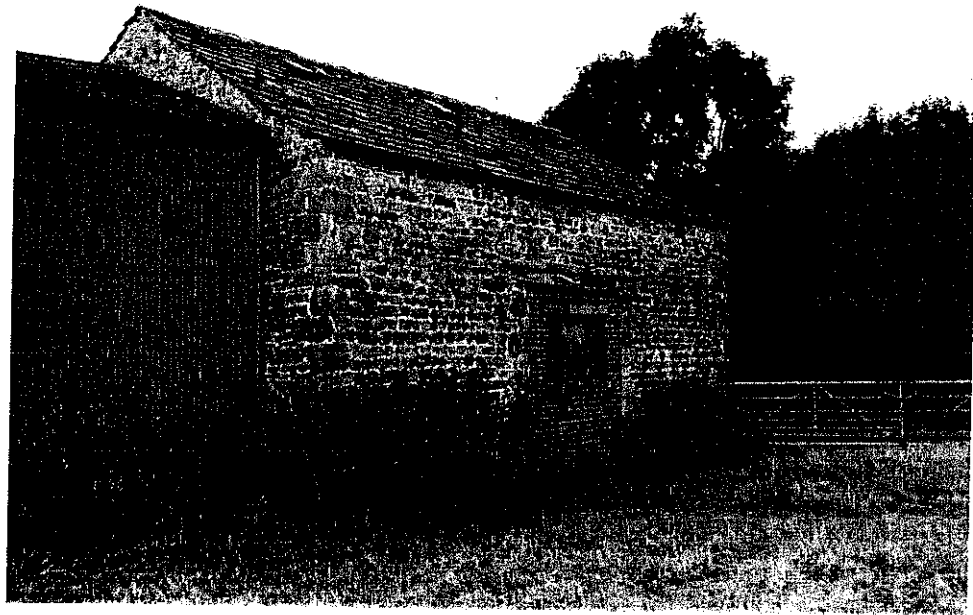
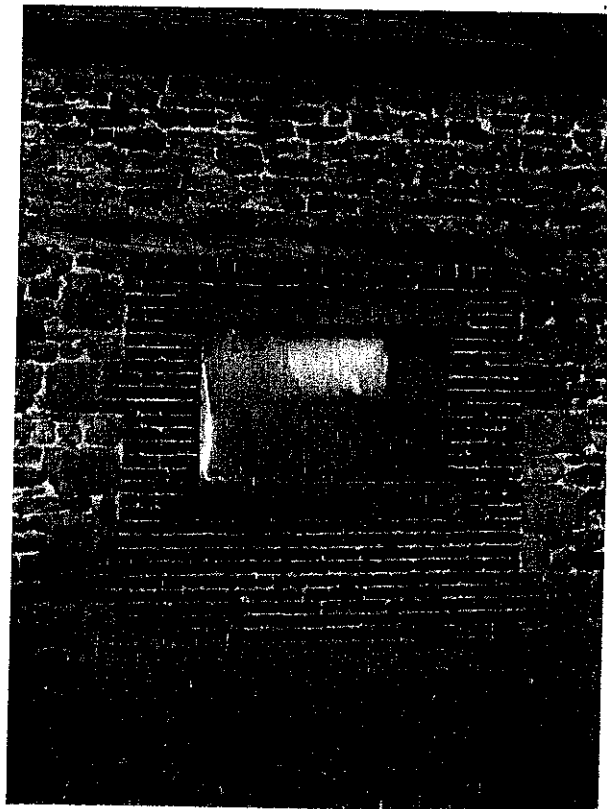


Plate 01. Front Elevation



Original timber lintel member

Plate 02 'Infill' door opening to Front Elevation

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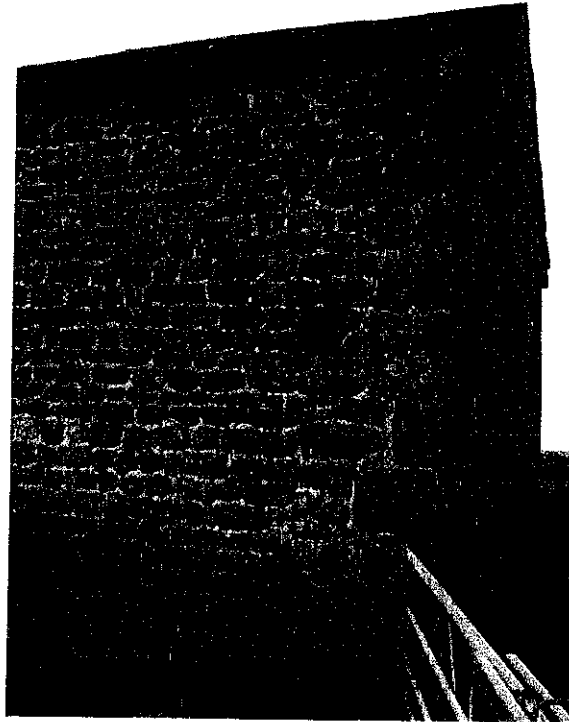


Plate 03 Vertical cracking in Front Elevation adjacent to Westerly Gable

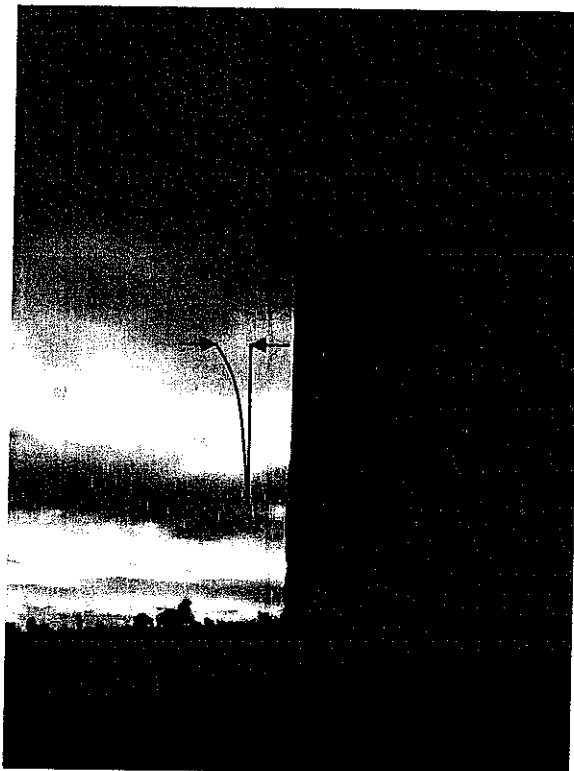


Plate 04. 'Bulging' at eaves to LHS Front Elevation

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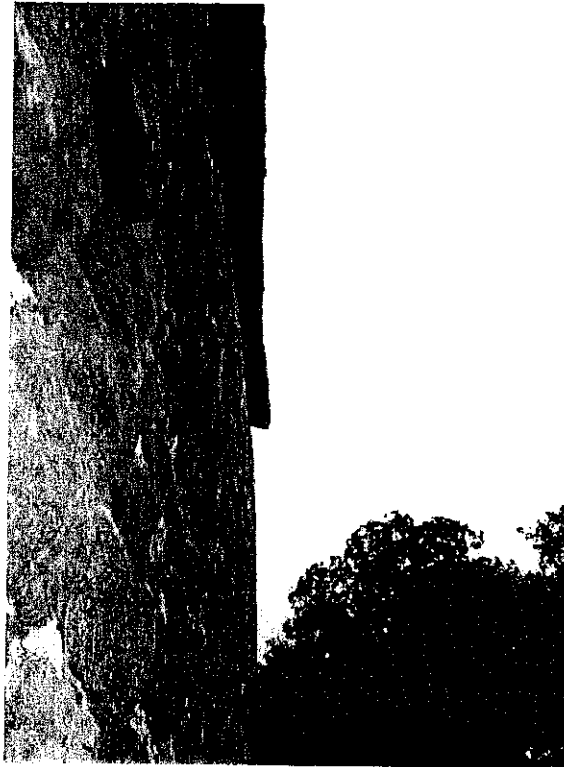


Plate 05. Vertical and lateral displacement to RHS Front Elevation



Plate 06. Easterly Gable Elevation

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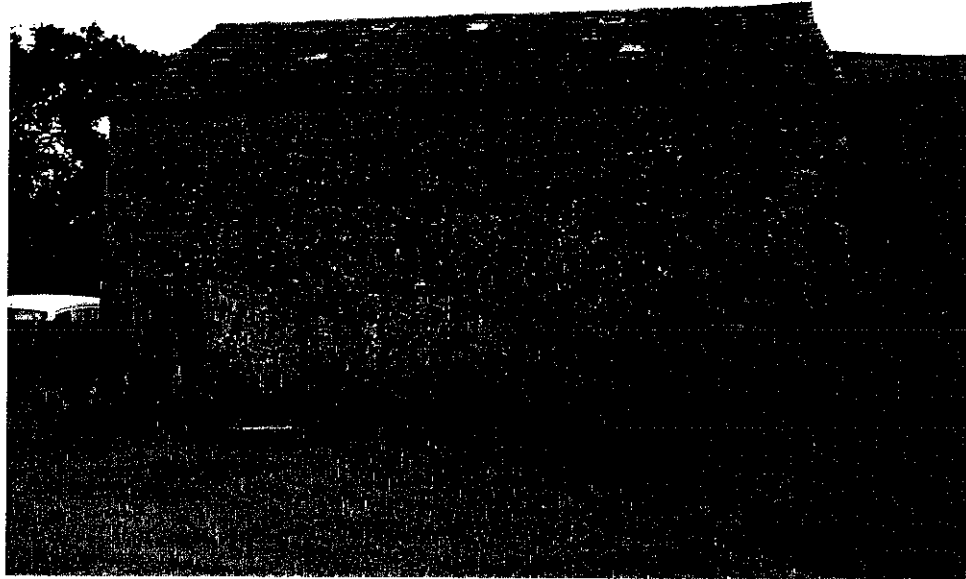
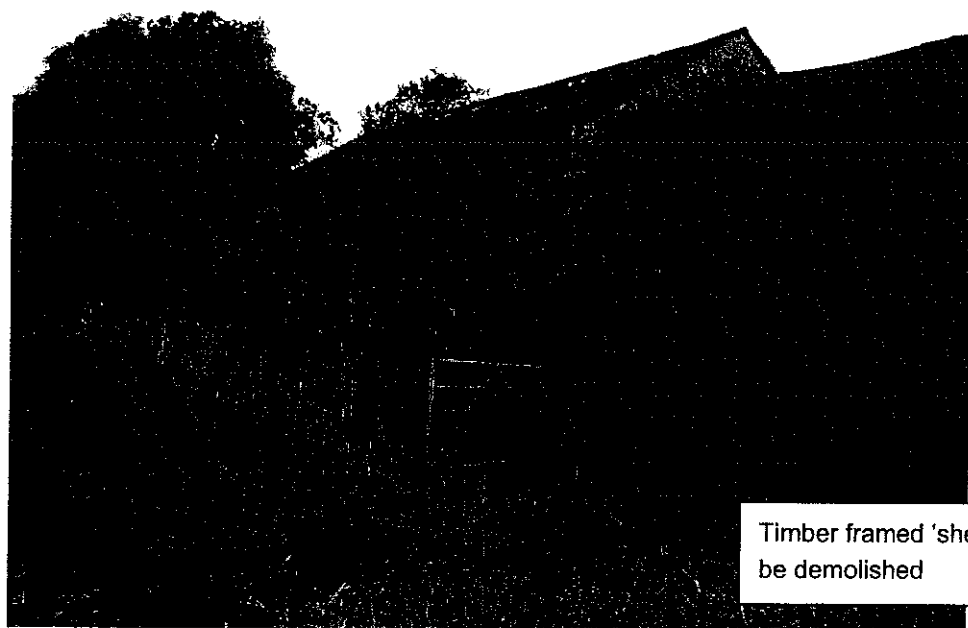


Plate 07. Rear Elevation



Timber framed 'shed' to
be demolished

Plate 08. Rear Elevation

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Plate 09. Vertical cracking to Rear Elevation adjacent to Westerly Gable



Plate 10 Vertical cracking adjacent to entrance door in Rear Elevation

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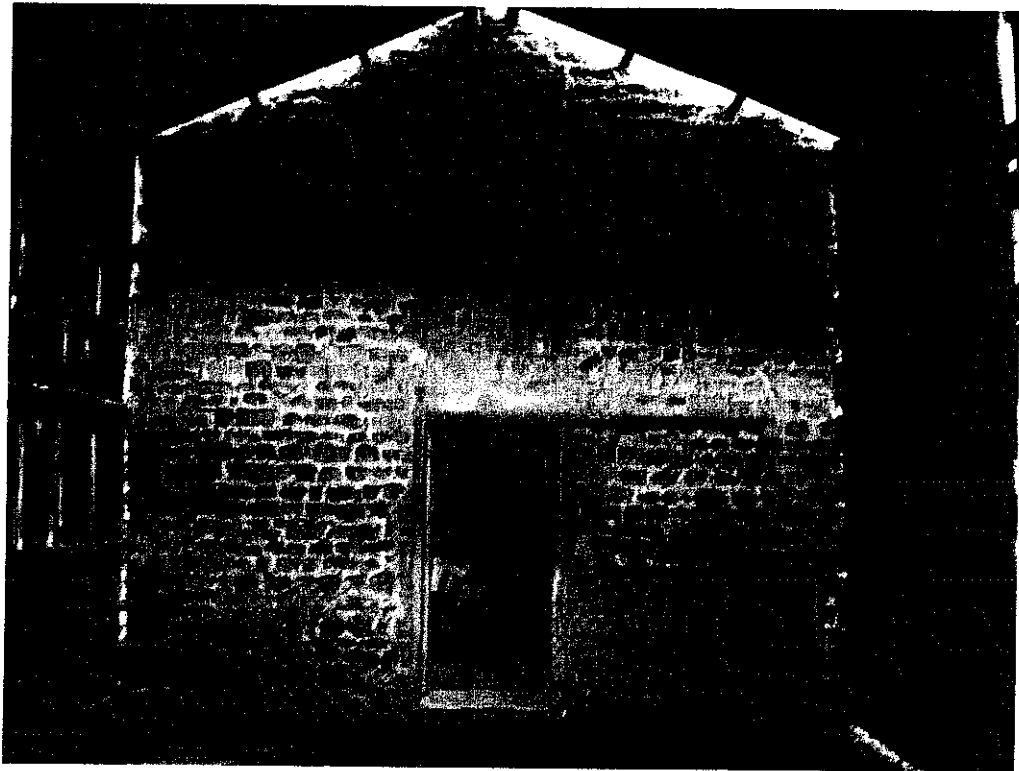


Plate 11. Easterly facing Gable Elevation

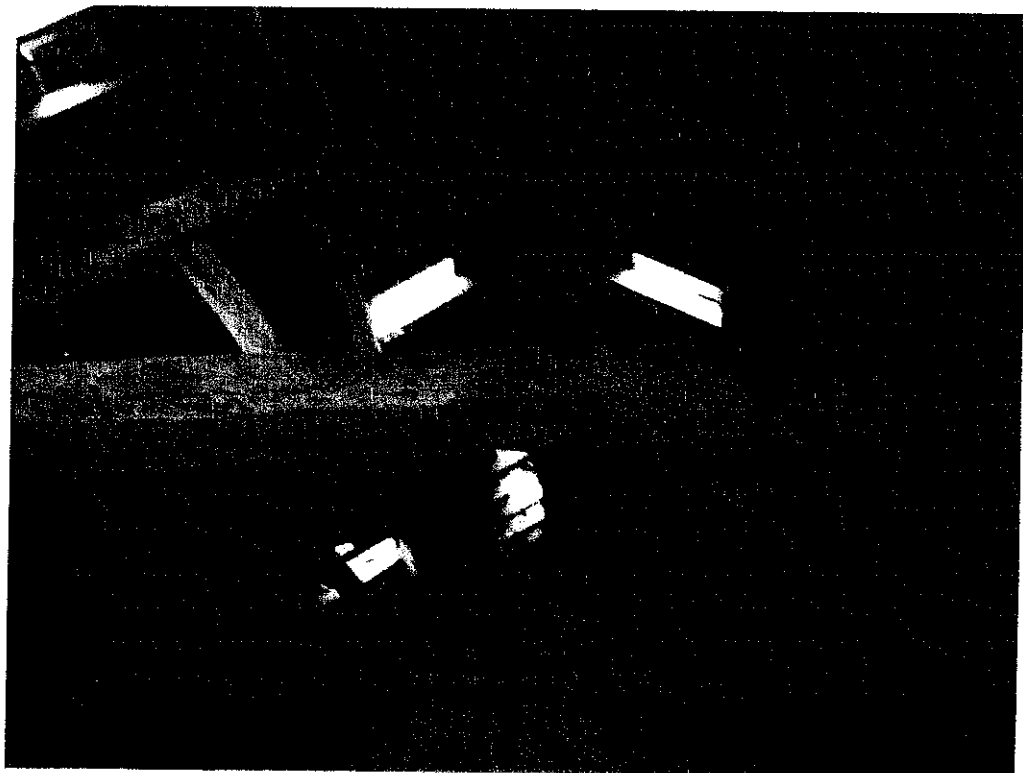


Plate 12. Roof structure

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Plate 13. Rot/damp penetration at truss bearing

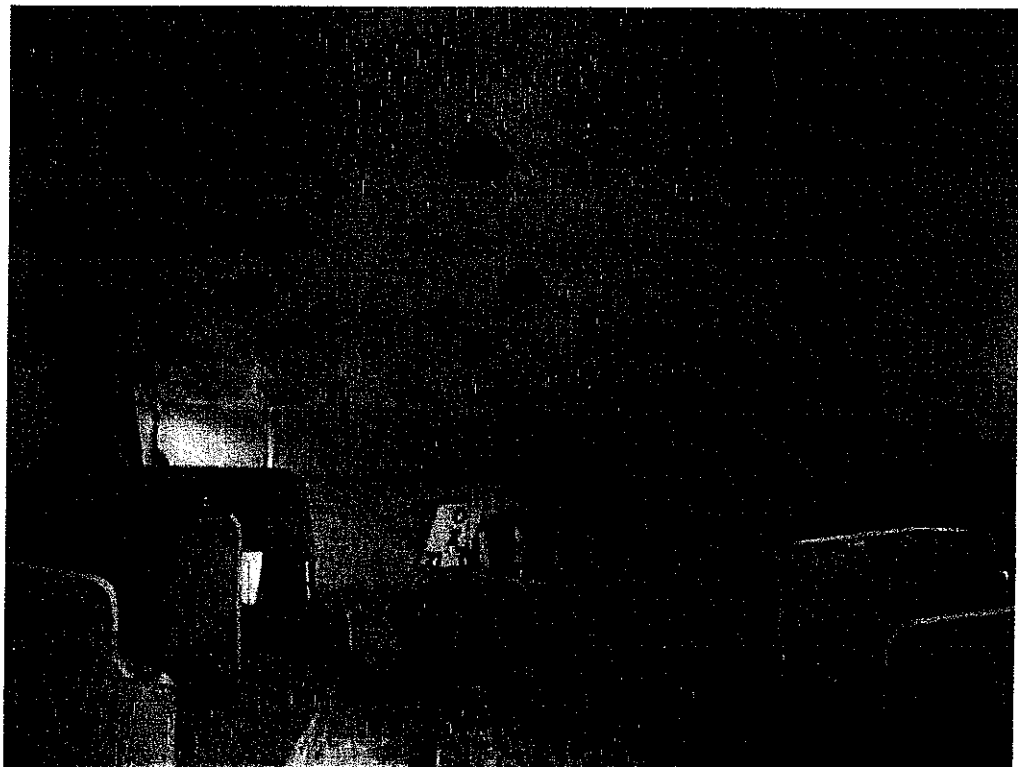


Plate 14. Typical internal aspect (westerly facing gable)

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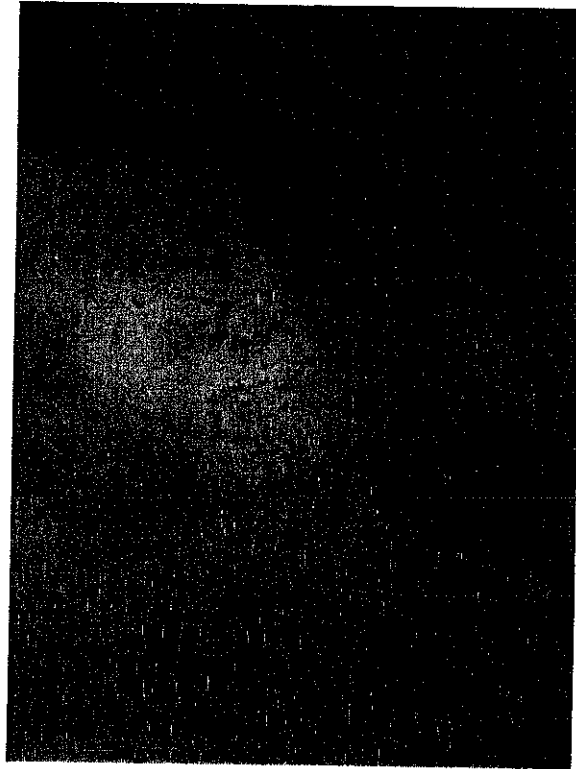


Plate 15. Cracking in render beneath truss bearing

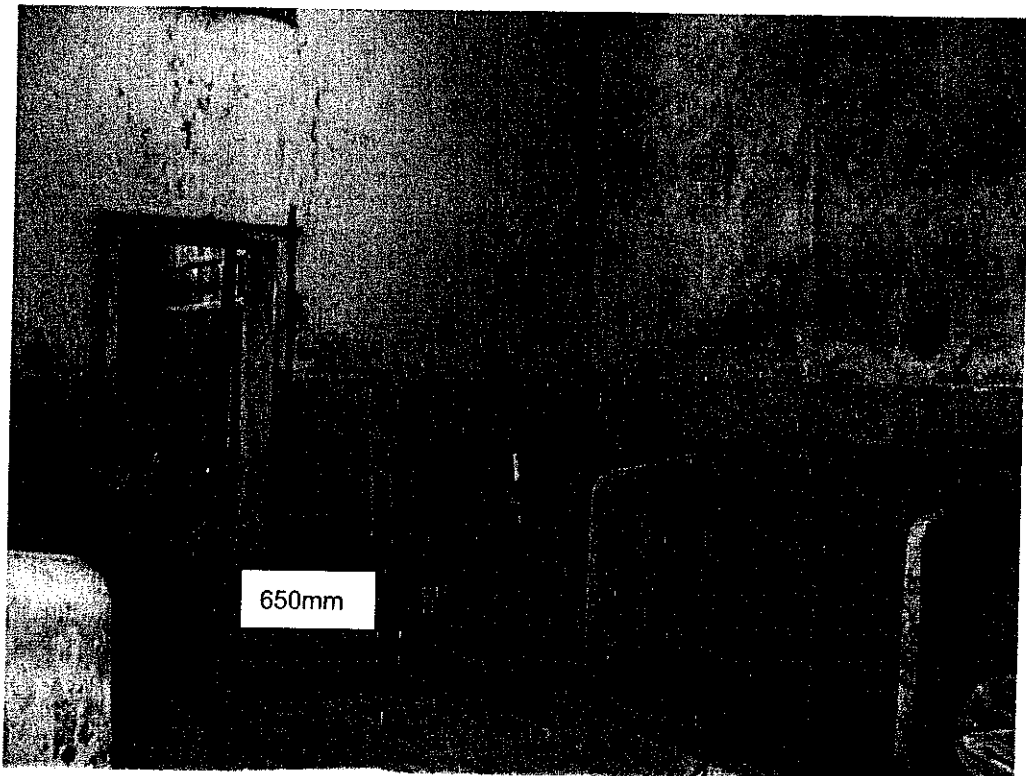


Plate 16. Existing concrete ground bearing slab