

PETERBOROUGH CATHEDRAL - NAVE CEILING

THE SCHEDULE OF REQUIREMENTS FOR INVESTIGATIVE CONSERVATION WORK

INTERIM REPORT AND FINDINGS

HIRST CONSERVATION,
LAUGHTON HALL FARMHOUSE,
LAUGHTON,
SLEAFORD, LINCS.

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GENERAL ASSESSMENT OF SECTION 2.2

Paragraphs

2.2.1

2.2.2

2.2.3

2.2.4

2.2.5

General:

This interim report has concentrated on the first bays of the Nave Ceiling at the eastern end of the Nave. This is visible from the viewing platform erected beneath.

The roof space investigations have been confined to the area between the first and second roof trusses and are considered to be reflective of the general condition and construction of the roof area in total.

Access is via circular staircase from the northern transept.

Para. 2.2.1.

From visual examination Oak, (probably *Quercus pedunculata*) is apparently used for the oldest boards within the ceiling.

Some boards remain un-identified at this point in time but appear to be of the Mahogany species. These boards show straight grain and are assumed to be from the middle period of the ceiling's life.

Other boards are thought to be of the European Redwood species (*Pinus silvestris*) or similar. This species is also known as Northern Pine, Scott Pine, Baltic Pine etc. depending upon the original source of the material.

Positive identification can only be achieved by laboratory examination of a sample of each species. Some guide towards the date or age of the board may also be gained from this examination process.

We will seek to obtain permission to remove samples for testing from the Architects.

Suggest test samples be submitted to the Timber Research and Development Association.

The extent of use of each species with the sample area of ceiling boards is not calculated at this time. Neither is there information included here on the original boards or later repairs.

Some ceiling boards however clearly show saw milling marks through the paint layers. Earlier boards show signs of being riven while others have parallel grooves approximately 1mm deep x 10mm wide worked in the painted surface. The purpose of these grooves I believe was to assist in the setting out of the decoration of the ceiling (photo) and were worked with a planing tool.

Timbers used within the roof space for ceiling carcassing and roof construction are also Hardwood and Softwood.

Oak joist/beams are present alongside those of softwood within the joisting system of the horizontal and sloping ceilings. The oldest being of Oak and later repairs of Oak and European Redwood.

Some components show evidence of re-use.

Also evident is much variance in the method of support given to binders and ceiling joists, although all ceiling joists are hung from binders with 25mm iron bolts with nuts and washers uppermost and with 440mm - 220mm between binders and ceiling joists.

Some of the older ceiling joist/beams have been replaced with a built up joist in softwood (photo .) This detail is not included within the first bay of focus but within the second and subsequent bays heading west.)

A set of drawings are being prepared to show these constructional details and positions of both hard and softwood within the sample area of the roof space.

There is also being prepared detailed drawing of the scissor beam roof truss and its relationship to the ceiling construction.

There is no visual evidence of preservative treatment of ceiling components although the heavy barks of the trusses and roof components have been treated with a type of Swedish oil.

Para. 2.2.2

TO IDENTIFY FIXING METHODS OF ORIGINAL BOARDS TO SUPPORTING BEAMS AND TRUSSES.

A variety of fixings are visible from both sides of the ceiling.

From above heavy iron bolts are visible from which the ceiling components are suspended. These bolts in turn are secured to heavy binders haunched over and fixed to the truss collars.

Within the roof space are many examples of diagonal noggings fixed between the joist/beams and running approximately square to the lay of the ceiling boards fixed to the underside of these noggings.

The noggling details and construction vary somewhat with six or seven differing styles of construction. All seem to be of a built up system using two or three wide boards laid flat on top of the ceiling boards with stouter stiffening pieces fitted centrally on top of these flat boards.
(photo)

The purpose for laminating these noggings was probably to facilitate the differing gaps between the underside of the ceiling joist and the tops of the ceiling boards which in some cases have dropped away from the underside of the original ceiling joists. Considering the ease of working with lighter materials in a difficult work space, together with the angled abutment of the noggling to joist, all of which would make the fitting of these noggings much easier to facilitate over a delicate ceiling below.

Galvanised screws were run vertically downwards through these noggings to penetrate and secure the loose boards below and generally give additional support to the longest of the ceiling boards.

These galvanised screws being approximately 120mm in length x 6 - 8mm.

Also visible from above and below are smaller steel screws that have been run in from above along some of the ceiling board edges. These screws have occasionally penetrated the ceiling board decorative surface as have most of the 100mm x 6mm galvanised screws. Rust being evident from the underside on the smaller steel screws

The noggings, screws and bolts within the ceiling construction appear to be carried out at the time of the 1926 re-roofing works.

From the underside of the ceiling, various types and periods of fixing for the ceiling boards are visible.

These range from the earlier wrought nails of cast iron with clout heads which show signs of the most deterioration and cause for concern. Many of which are already missing or showing advanced creeping (photo) leading to further loss of grip and danger to people at floor level some 80' below.

Some of the clout heads have corroded away or broken off.

Others have turned over and failed to grip after deflecting off the hardwood joists/beams during the driving process.

Smaller iron nails are also visible and used to fix the ceiling board edges at the point of overlap and the fixing of smaller repairs or re-fixing split elements of ceiling boards.

There appears to be no screws used to fix any of the repairs from the underside of the ceiling.

Periods of joinery are being assessed at this time.

The area of structural weakness that causes the most concern is that of the condition of the ceiling boards themselves and that of the iron nails of four types that secure them.

Insect attack and wood borers have also downgraded many of the boards.

This area of decay is at present being attended to with fuller detail being compiled shortly. However it must be noted that decay for the reason of insect attack has left some boards in a dangerous condition.

Para. 2.2.3

Photographic records of above and below have been taken and are being compiled.

Drawings of the roofspace construction and detail are being compiled following an in depth diamentional survey of the roof space components.

Para. 2.2.4.

The overall roof construction and joisting system are in good order.

Elements that cause concern are the cutting away of the sloping ceiling joists at their junction with the horizontal ceiling joist. The joists thus releaved offer no continuity of support for the ceiling at the point of intersection. The fitting of purpose made iron straps to link the two ends of the ceiling joist to prevent any independent movement of the joist ends is desirable.

With regard to the joisting that is hung from the binders with wrought iron bolts.

From a constructional aspect I would suggest that Oak hangers were placed alongside each joist and to rise up by one face of the binder. This Oak hanger could be haunched on the relevant two faces, one at each end and to provide a tight fit between the haunched shoulders and the top/bottom of the joist/binder.

A further tightening of the bolts which the ceiling are hung upon would ensure a secure and solid fitting of these hangers.

The hardwood hanger would be bolted through the haunched ends and to each joist/hanger position. Thus preventing the resination via Cathedral activities viabrating the ceiling any further than necessary. (Heavy resination from the organ and associated musical activities causes concern for the present state of the fixings within the ceiling.)

With regard to the proposed application of additional fixings to the loose boards or short lengths of board, I would suggest that consideration be given to the advantage of using pneumatic nailing equipment which could be applied to the fixing of the board overlaps and the board to joist as and where deemed required.

This form of fixing using a serrated nail offers minimal damage to the boards in question. For less cost than ordinary nails or screws, stainless steel or hardened aluminium provide a rust free, secure and positive fixing. Nail hole size approximately 1mm square or a little larger. This would also provide flexibility and speed of application with considerable cost saving over the traditional systems with no making good of nail holes required.

sample

It has also been suggested that the existing galvanised screws which penetrate the underside of the ceiling boards should be removed from above.

The remaining hole should then be cleaned through and a 4mm galvanised coach bolt could then be inserted from the underside leaving the domed head visible on the ceiling. Tightening of these bolts from the roof space side would provide a considerable upgrade on the existing fixings and match the clout heads of earlier iron nails.

In some cases screws will need to be inserted through the faces of the ceiling boards to provide adequate fixing.

Stainless steel fixings advised.

Likewise it will be required that further noggings matching the type fitted in 1926, or similar, to provide fixing of some loose boards or components of the ceiling. Positions yet to be determined.

Details of these proposed noggings to follow this report.

This section of this report to be continued...