

Hutton + Rostron Environmental Investigations Ltd

The Pest House: Timber strength grading report of accessible structures

Site note 4 for 27 November 2018, job no. 148.73

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- A Drawings
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Distribution:

Ray Pearson – Dandara Ltd

File: 148.73

1 INTRODUCTION

1.1 AUTHORITY AND REFERENCES

Hutton + Rostron Environmental Investigations Limited carried out a site visit to The Pest House on 27 November 2018 in accordance with instructions from Ray Pearson of Dandara by email, on 25 June 2018 (08:04). Drawings provided by Dandara, ref 150.01 – 150.06 were used for the identification of structures. For the purpose of orientation in this report, the side entrance to the building was taken as facing west

1.2 AIM

The aim of the visual strength grading exercise was to indicate the probable strength grade of representative elements within the specified roof structure

1.3 LIMITATIONS

The assessment of strength grade is based on physical observation of strength-reducing characteristics such as knots, rate of growth, fissures, wane, distortions and bowing. The assessment of *in-situ* timbers therefore requires all of the faces to be examined. The technique is based on the judgement and experience of the grader and is inherently subjective. Properties such as density and notches, both of which have an important influence on stiffness, are not considered as part of the strength grading process but are reported on if these are known to be present. It was not possible, in all timbers, to assess slope of grain, rate of growth, knots, and other strength reducing defects. In view of these limitations, the visual strength grading procedure cannot be 100 per cent reliable. Accordingly, in all of the timbers inspected, the probable strength grade can only be deduced from the strength reducing features visible on exposed faces at the time of inspection

1.4 STAFF ON SITE AND CONTACTS

1.4.1 H+R STAFF ON SITE

Joe Lovelock
Andrew Ellis
Isabel Mar
Andy Wade

1.4.2 PERSONNEL CONTACTED

Ray Pearson – Dandara Ltd

2 VISUAL STRENGTH GRADING OF TIMBERS

2.1 METHODOLOGY

The timber elements were inspected on the basis of exhibiting strength reducing features such as knots, rate of growth, fissures, slope of grain, bowing, and wane. A probable strength grade assessment of ungradeable (UG), general structural (GS) grade or special structural (SS) grade was made on the basis of measuring the features that were visible. The extent of strength reducing features that are permissible within strength grades for softwood are detailed in British Standard 4978: Specification for Visual Strength Grading of Softwood. A probable strength grade assessment of TH1/THA or TH2/THB was made on the basis of measuring the features that were visible in hardwood elements. The extent of strength reducing features that are permissible within strength grades for hardwoods are detailed in British Standard 5756: 'Visual strength grading of hardwood'

2.2 CLASSIFICATION

The combination of probable visual grade and timber species was undertaken to enable the assessment of strength class by reference to BS 5268: Part 2: 2007 Structural Use of Timber

2.3 SAMPLE DETAILS

Samples of timber were examined on 20 December 2018. H+R coded the samples with the numbers, see drawings attached

2.4 TIMBER SPECIES EXAMINATION

Visual timber species recognition was undertaken on site and the 4 no. samples taken on the day were examined visually with a x10 magnification hand lens to determine their gross characteristics. Thin sections were also cut from each sample in the laboratory and examined microscopically. The anatomical features of each sample were compared with published information and, where applicable, with reference timber samples. The microscopic views of wood samples are shown in the photographs at Attachment B

2.5 TIMBER SPECIES

Sample reference	Element, location	Common name	Botanical name
S1.	Bedroom 2: Floor board	European redwood (ER)	<i>Pinus spp.</i>
S2.	Roof: Purlin	European redwood	<i>Pinus spp.</i>
S3.	First floor: Tie beam	Oak	<i>Quercus robur/petraea</i>
S4.	Ground floor: Sole plate	Oak	<i>Quercus robur/petraea</i>

3 TABLE OF STRENGTH GRADES

Note: The allocated grades are based on timbers visible at the time of the survey and are not representative of all timbers in the structure. Timbers which were found to be decayed or defective were also not included in the table results below. The timber elements of the first floor structure were heavily painted and therefore unable to be strength graded

Code/room no/element	Dimension (mm)	Allocated probable grade	Timber species	Allocated probable strength class
HIPPED ROOF STRUCTURE				
Common rafters	~75 x 50mm	GS (80%)	ER	C16 (80%)
Purlins	~80 x 60mm	GS	ER	C16
Raking struts	~75 x 50mm	GS	ER	C16
Hip rafters	~90 x 50mm	GS	ER	C16
MAIN PITCHED ROOF				
Common rafters	~110 x 80mm	TH2 (50%)	Oak	D30 (50%)
Historic ridge beam	~130 x 130mm	TH1	Oak	D40
King posts (x3)	~180 x 120	THB	Oak	D30
Post braces (x3)	~190 x 50mm	TH2	Oak	D30
Studs	~80 x 35mm	TH2	Oak	D30

SS = Special Structural
 GS = General Structural
 ER = European Redwood

3.1 ADDITIONAL COMMENTS

Note 1

- 1 No 'formal' strength grading was undertaken
- 2 The strength grades given above are based on preliminary observation of accessible faces of the timber only
- 3 The actual grades may be less on the basis of defects that were previously not apparent at the time of the assessment

4 RECOMMENDATIONS

Timber elements should be repaired or strengthened as directed by the Structural Engineer

5 H+R WORK ON SITE

- 5.1** H+R inspected representative accessible structural timbers to assess characteristics that affect their strength grade

6 PROPOSED ACTION BY H+R

- 6.1** H+R will advise on repair and conservation of materials, so as to minimise the risk of decay after refurbishment if instructed
- 6.2** H+R will advise on remedial detailing, so as to minimise the risk of damp and decay problems after refurbishment if instructed
- 6.3** H+R will advise on conservation of original fabric with regard to damp, decay and salt damage, as necessary and if instructed
- 6.4** H+R will undertake detailed further investigations when full access allows and if instructed
- 6.5** H+R will review proposed remedial details as these become available if instructed
- 6.6** H+R will liaise with conservation and historic building authorities, if instructed, so as to ensure the cost-effective conservation of original fabric

7 INFORMATION REQUIRED BY H+R

- 7.1** H+R require up-to-date copies of project programmes, as these become available
- 7.2** H+R require copies of up-to-date lists of project personnel and contact lists as these become available
- 7.3** H+R require copies of proposed remedial details for comment as these become available

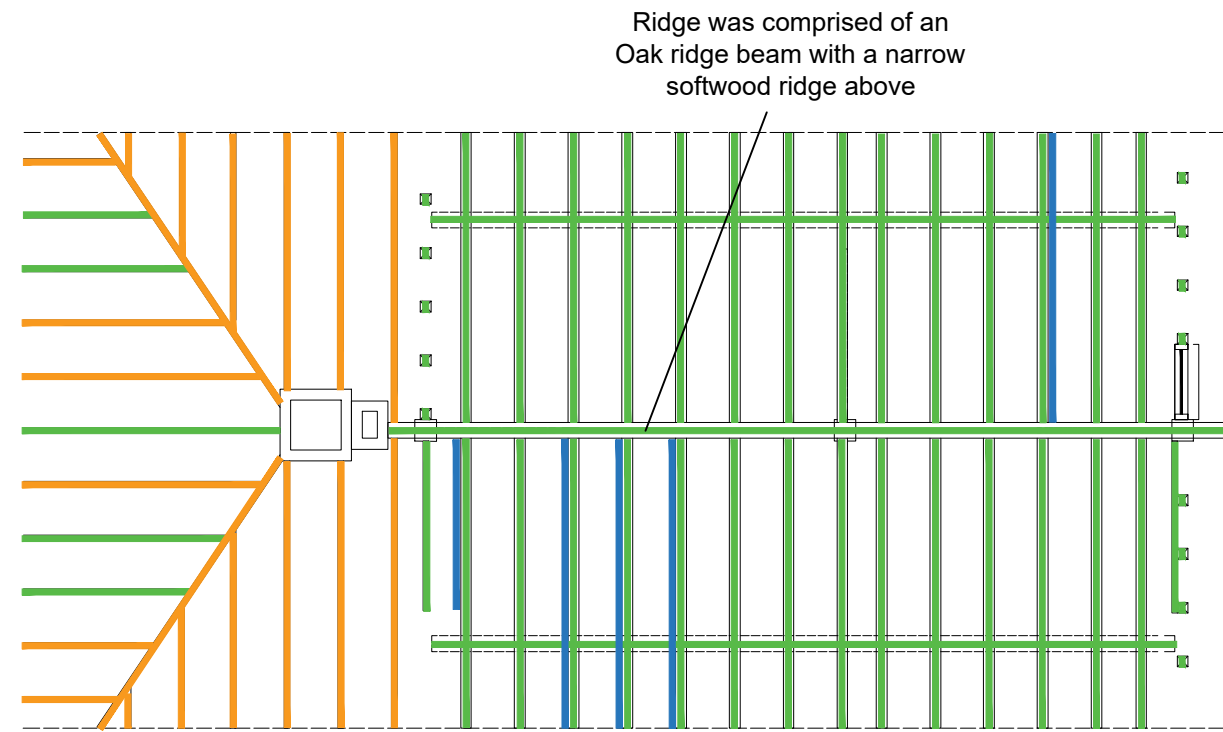
8 ADMINISTRATION REQUIREMENTS

- 8.1** H+R require formal instructions for further investigations and consultancy on this project
- 8.2** H+R require confirmation of distribution of digital and printed copies of reports and site notes

Attachment A

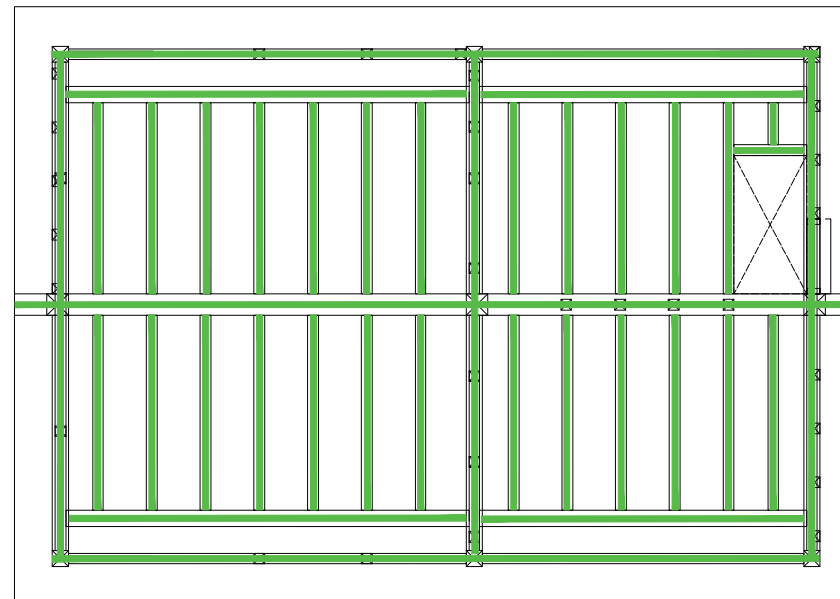


Strength Grading (non-historic roof)	
Rafters	GS 80%
Purlins	GS
Raking struts	GS
Hip rafters	GS



Strength Grading (historic roof)	
Rafters	TH2 (50%)
Ridge beam	TH1
King posts x 3	THB
Post braces x 2	TH2
Studs	TH2

Roof Truss

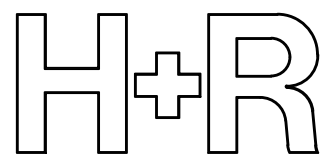


*Roof space floor structure painted with a non-porous black paint and therefore unable to be strength graded, however, all structural timbers were inspected in detail and found to be of Oak (*Quercus spp.*)

Ceiling Joist

Key:

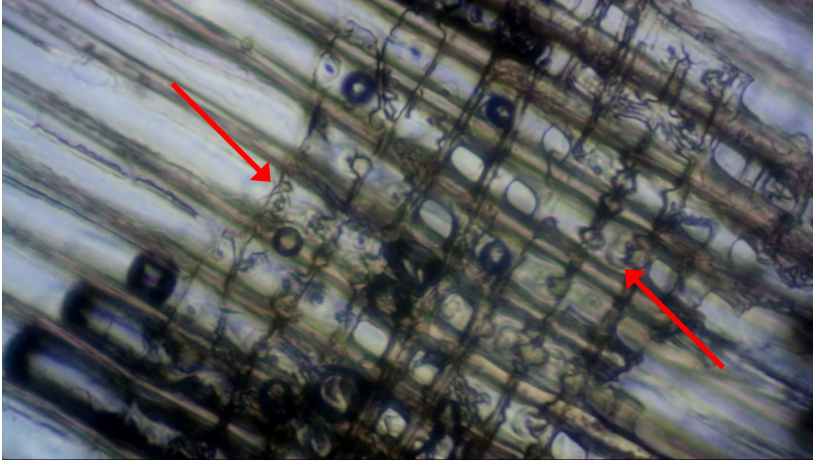
- Oak (*Quercus spp.*)
- Softwood (*Pinus spp.*)
- Remedial intervention



The Pest House, Roof Truss and Ceiling Joist Plans
TIMBER STRENGTH GRADING & SPECIES IDENTIFICATION
 27 November 2018

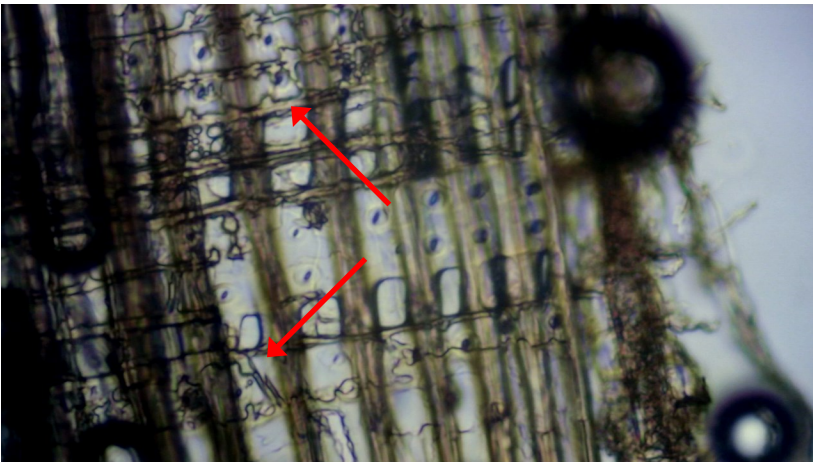
Attachment B

Fig 1:



Laboratory image; showing a microscopic image of Sample 1 from the bedroom 2 floor boards. The 'dentate' (toothed) ray tracheids in the cross-field pitting provide positive identification for European redwood (*Pinus spp.*)

Fig 2:



Laboratory image; showing a microscopic image of Sample 2 from a purlin in the softwood roof structure. The 'dentate' (toothed) ray tracheids in the cross-field pitting provide positive identification for European redwood (*Pinus spp.*)



The Pest House
Photographs
27 November 2018
Not to scale

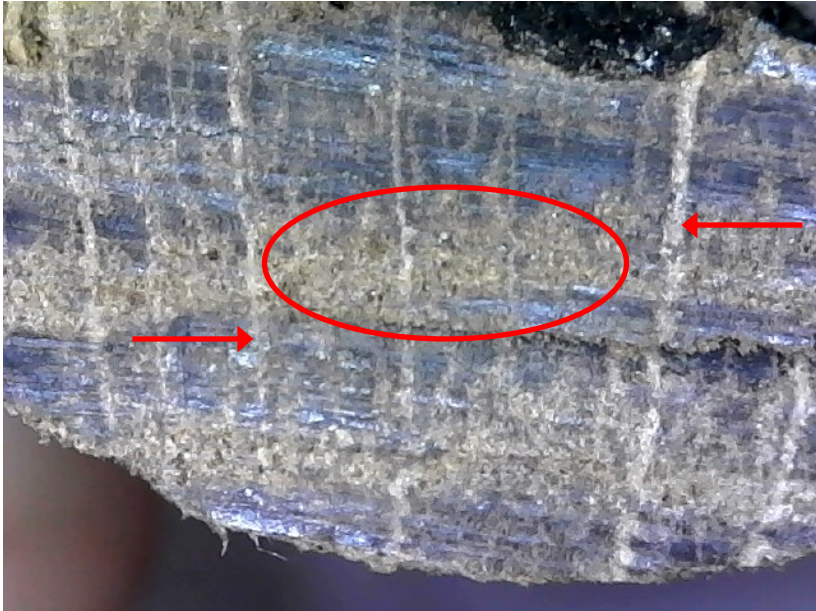


Fig 3:

Laboratory image; showing a close-up image of Sample 3 from the tie-beam supporting the first floor. The strong vertical medullary rays visible to the naked eye, and the ring-porous nature of the timber structure indicate Oak (*Quercus robur/petraea*)



Fig 4:

Laboratory image; showing a close-up image of Sample 4 from the sole-plate on the ground floor. The strong vertical medullary rays visible to the naked eye, and the ring-porous nature of the timber structure indicate Oak (*Quercus robur/petraea*)



The Pest House
Photographs
27 November 2018
Not to scale