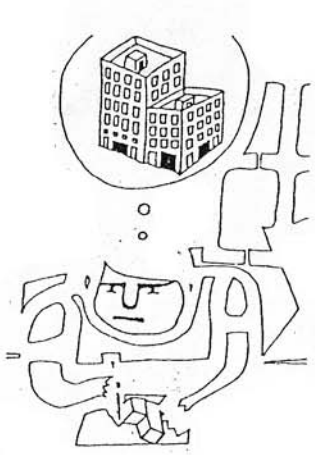


STRUCTURAL COMPUTATIONS FOR PROPOSED MUDBRICK HOUSE FOR L.BORRETT AND D.CUMMINGS

AT

GLENAROUA (VIA KILMORE)

MARCUS WARD - ARCHITECT

Richard Fooks
CONSULTING ENGINEER

LAURISTON RESERVOIR ROAD
KYNETON
TELEPHONE NO. (054) 223432

JOB NO :1061
DATE:24/06/89

CONTENTS

INTRODUCTION

This design is based upon information obtained from preliminary design drawings provided by the Architect. If design aspects change or different site conditions than those assumed are encountered during construction the Engineer should be contacted prior to proceeding with further works.

The structural computations have been prepared in accordance with the Victoria Building Regulations and relevant Codes of Practice.

IF THERE ARE ANY DOUBTS ABOUT ANY INFORMATION OR CONSTRUCTION DETAILS CONTAINED IN THESE COMPUTATIONS, CONTACT THE ENGINEER FOR CLARIFICATION.

Design Sheet

ITEM

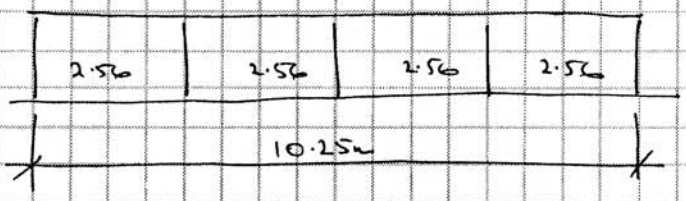
Page No. 1

Date:

Richard Fooks. Consulting Engineer.

1. TIMBER COLUMNS + BEAMS

BEAM.



loading

D.L 1. Decking battens, config $60 \times 6 \times \frac{9.81}{10^3}$ 3.53 kN/m

2. self weight trusses etc $15 \times 6 \times \frac{9.81}{10^3}$ 0.88 kN/m

SW 1 beam 0.09 kN/m

4.5 kN/m.

Verandah

$1 \times 20 \times 9.81/10^3 = 0.20$ kN/m

LL. $0.25 \times 5.12 = 1.25$ kN/m

$0.25 \times 1 = 0.25$ kN/m.

$W_D = 4.7$ kN/m $W_L = 1.5$ kN/m.

$M = 6.2/8 \times 2.56^2 = 5.08$ kN-m

250 x 75

246 x 60 $Z_{xx} = 624 \times 10^3$ mm^3 $I_{xx} = 74.88 \times 10^6$

$f_b = 5080/624 = 8.14$ MPa $F_b = 1.35 \times 6.9 = 9.31$ MPa

$\Delta = \frac{9700 \times 2.56^4 \times 10^7}{185 \times 7900 \times 10^6 \times 74.88 \times 10^6 / 12}$ (continuous over 1 intermediate support.)

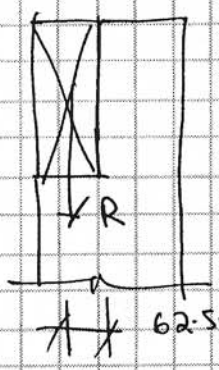
$= 1.84$ mm $\times 2$ 3.69 mm

$\times 3$ 5.52 mm. OK.

ADOPT 250 x 75 beam

F7 Select Merchantable grade Oregon.

COLUMN



$R_{max} = 5/4 \times 2.5k \times 4.7 = 15.04kN \downarrow D$

$\times 1.5 = 4.80\,kN \downarrow L$

$M_{eccel} = 15.04 \times 0.0625 = 0.94$

$4.80 \times 0.0625 = 0.30\,kN\text{-}m$

1.24

Flat ends $K_{13} = 0.70$ $S_1 = 10$ $K_{12} = 0.88$

$\frac{D}{B} = \frac{197}{97} = 2.03$ $S_2 = 0.70 \times \frac{2700}{97} = 19.43$

$S_3 = 0.70 \times \frac{2700}{197} = 9.59$

Column Section 197 x 97

$r = \frac{temp}{total} = \frac{1.5}{6.2} = 0.24$ $\rho = 1.13$

$K_1 = 1.25$

$F_{c//} = 8.6MPa$ $\rho S_2 = 21.95$ $K_{12} = 0.92$ $F_{bc} = 9.84MPa$

" $\rho S_3 = 10.84$ $K_{12} = 0.92$ $F_{bc} = 4.52MPa$

$f_c = \frac{19.04 \times 10^3}{197 \times 97} = 1.00$

$f_{cb} = \frac{1240}{627} = 1.98MPa$

Combined Stress

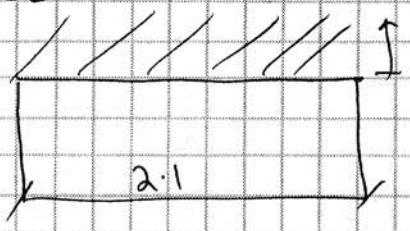
$\frac{1.98}{9.46} + \frac{1.00}{9.84} + \frac{1.00}{4.52} + \frac{0.24(1.25) \times 1.98 \times 1.0}{(1.25)\ 9.46 \times 9.84} - \frac{1.98}{8.25}$

$0.21 + 0.1 + 0.22 + 0.01 - 24 = 0.30 < 1.0.$

ADOPT 200 x 100 column section.

F98

2. LINTOL



800mm sandbrick (Density 1500kg/m³)

$w = 0.8 \times 0.25 \times 1500 kg/m = 2.94 kN/m$

$M = 2.94 \times 2.1^2/8 = 1.62 kN\text{-}m.$

$$\Delta = \frac{5 \times 2940 \times 10^3 \times 2.1^4 \times}{384 \times 9100 \times 10^6 \times 14.98 \times 10^6/10^{12}}$$

$= 5.46 \times 3 = 16mm$

For 2.6m span

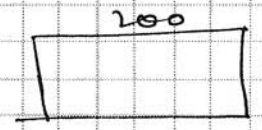
try 200 x 150

$I_{xx} = 52.14 \times 10^6 mm^4$

$\Delta = 3.47mm \times 3 = 10.40mm < 16mm$ reqd.

ADOPT

2.1m span lintol 

2.6 span lintol. 

Note. (Allowance of 16mm deflection)

For Hardwood section.

3. Site classification.

From inspection of soil sample, and geological map site is classified as INTERMEDIATE subject to confirmation during construction by INSPECTION by ENGINEER.

STRUCTURAL NOTES

GENERAL

1. Refer to Designer's drawings or on-site measurement for dimensions which are not shown in computations.
2. Dimensions shall not be obtained by scaling the structural sketches or computations.
3. The Engineer in these notes refers to Richard Fooks of Lauriston Reservoir Road, Kyneton.
4. Site drainage.

   Site drainage must be done in conformance with the requirements of Appendix F3 AS 2870-1986.

FOUNDATIONS AND FOOTINGS

1. The assumed site classification is "intermediate" with firm natural material at a depth of 450mm below existing surface level. Any alterations or changes required to construction details due to different soil conditions than that assumed must be approved by Engineer prior to proceeding.
2. The footings have been designed for a safe bearing capacity of 120 kPa.
3. All excavations for footings must be inspected and approved by the Engineer or Architect or Building Surveyor of local council before any concrete is placed.

CONCRETE SLAB

1. All concrete and concrete practice is to be in accordance with the Concrete Structures Code Australian Standard AS 3600-1988 and the Residential Slabs and Footings Code, Australian Standard AS 2870- 1986.
2. All concrete shall have a Characteristic Strength of Grade 20 at 28 days unless otherwise noted.
3. Concrete sizes shown in the computations and drawings must not be reduced in any way without the approval of the Engineer.
4. Clear concrete cover to reinforcement unless otherwise noted for the conrete edge footing beams is 75mm.
5. Concrete cover shall be maintained by the use of approved chairs and or concrete blocks, conduits, pipes etc., are not be placed in cover concrete.
6. The slump of all concrete at the time of placing shall not exceed 75mm unless otherwise noted in computations or drawings. All concrete placed in position shall be adequately vibrated.
7. Concrete shall be placed and compacted in its final position in the forms within 1.5 hours of the addition mixing water to the cement and aggregate. Concrete shall be carefully handled and placed to avoid segregation. All concrete shall be compacted by a mechanical vibrator.

TIMBER

1. All timber materials, workmanship and practice shall be in accordance with the requirements of AS 1720 Timber Engineering Code and AS 1684 Timber Framing Code.
2. Timber rafters shall be grading as required by the Victoria building Regulations. Any second hand materials must be approved by the Building Surveyor prior to installation.
3. All timber sizes indicated on drawings and in computations refer to the nominal size and sections used in the construction must not be more than 4mm under this stated dimension unless otherwise indicated.
4. Anchorage of rafters must be by metal anchors in conformance for the requirements for high wind conditions.

MUDBRICKS

1. All mudbricks materials, workmanship and practice shall conform to the requirements of the CSIRO Technical notes and the Victoria Building Regulations.
2. Mudbrick walls supporting beams or other concentrated loading must be of good quality construction free of any poor workmanship. Any faulty brickwork due to aging or damage during construction must be repaired using new bricks. Care should be taken to ensure that there is load bearing contact occurs for the full bed width of the mudbrick.

Any faulty mudbricks must be removed for a distance of at least 300mm into sound work and the new work to be keyed into the existing mudbricks.

3. The Builder shall provide sufficient temporary bracing as is necessary to stabilize the mudbrick walls during all stages of construction.

APPENDIX

A. Certificates as to preparation of structural design

Form 7 S.R. 143/88

Building Control Act 1981

VICTORIA BUILDING REGULATIONS 1983

Regulation 8.2 (4)

CERTIFICATE AS TO PREPARATION OF STRUCTURAL DESIGN

I RICHARD FOOKS (insert name)

of KYNETON (insert address) hereby certify as follows:

1. I am a Qualified Engineer as defined in the Victoria Building Regulations 1983 and a director/principal of (insert name of company/firm), which has been engaged to prepare the structural design for the above project.

2. The structural design for the above project:

(i) comprises the following

Drawing Ref. Nos: 1061 – 24/6/89

Engineering Specifications Ref. Nos:

(ii) has been prepared by me~~/under my supervision and control~~.

Dated this 29 day of JUNE 19 89

Signed

Richard Fooks.

The Institution of Engineers Australia

Established 1919

Incorporated by Royal Charter 1938

These are to certify that

Richard Allingham Fooks

was elected

Member

of

The Institution of Engineers, Australia

on the 5th day of September 1977

Witness our hands and Seal

this 5th day of October 1977

L G Rowe President

Secretary.