Wooden Staircase Construction: Paul Roberts

August 2022

WAP-2022-08

Presentation Overview

- Background:
- Stair design parameters (layout, safety)
- Fabrication of components
- Installation
- Finishing
- Conclusions (Cost, lessons learnt)

Background

- Location Thesen Islands, Knysna
- Layout of interior staircase in a stairwell
- Lockable storage under the staircase
- Phased construction
  - Phase 1: Temporary stairs (long-term tenant)
  - Phase 2: Permanent construction

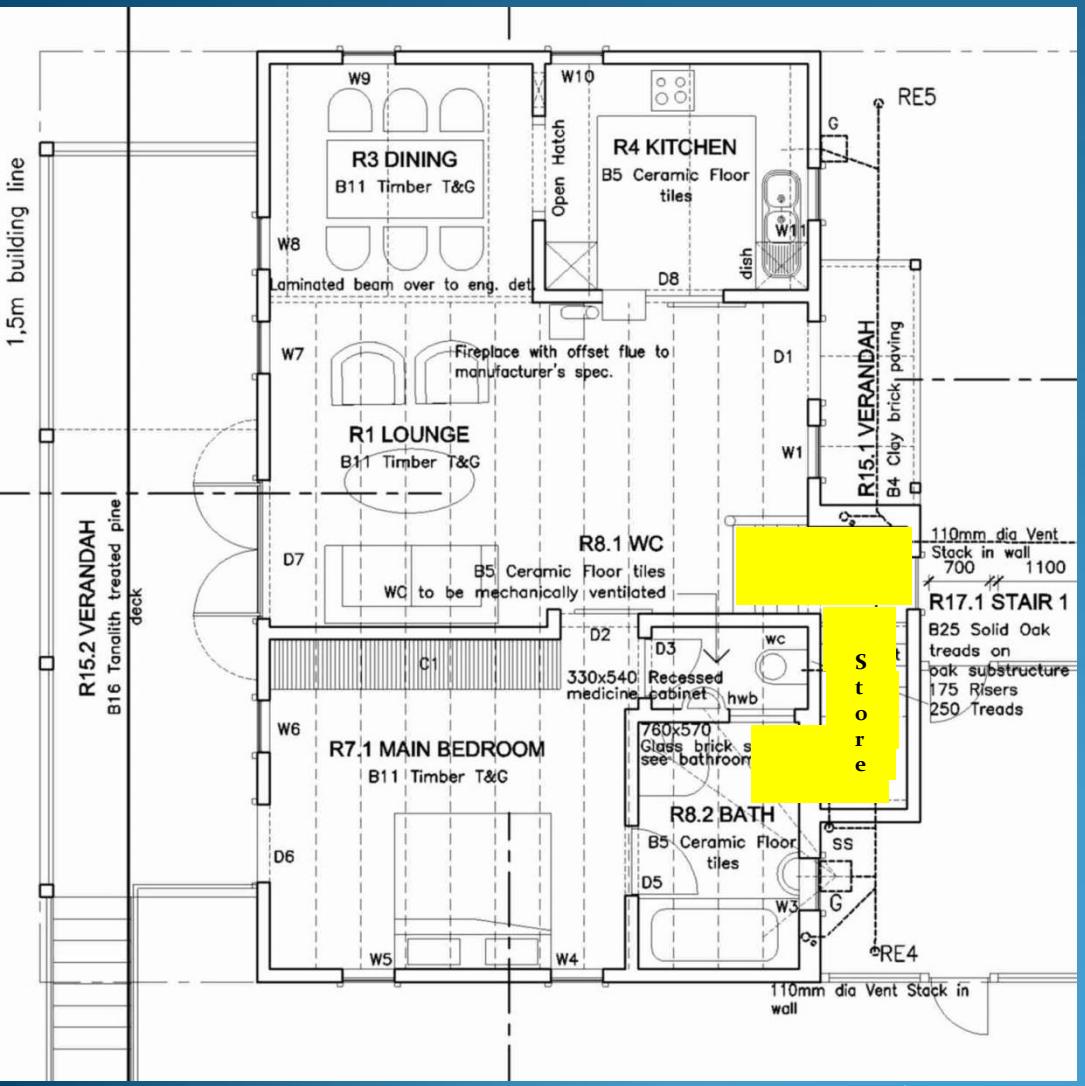
Welcome to Leeward 14

Timber frame construction

Staircase construction from 1400 km

Background: Timberframe

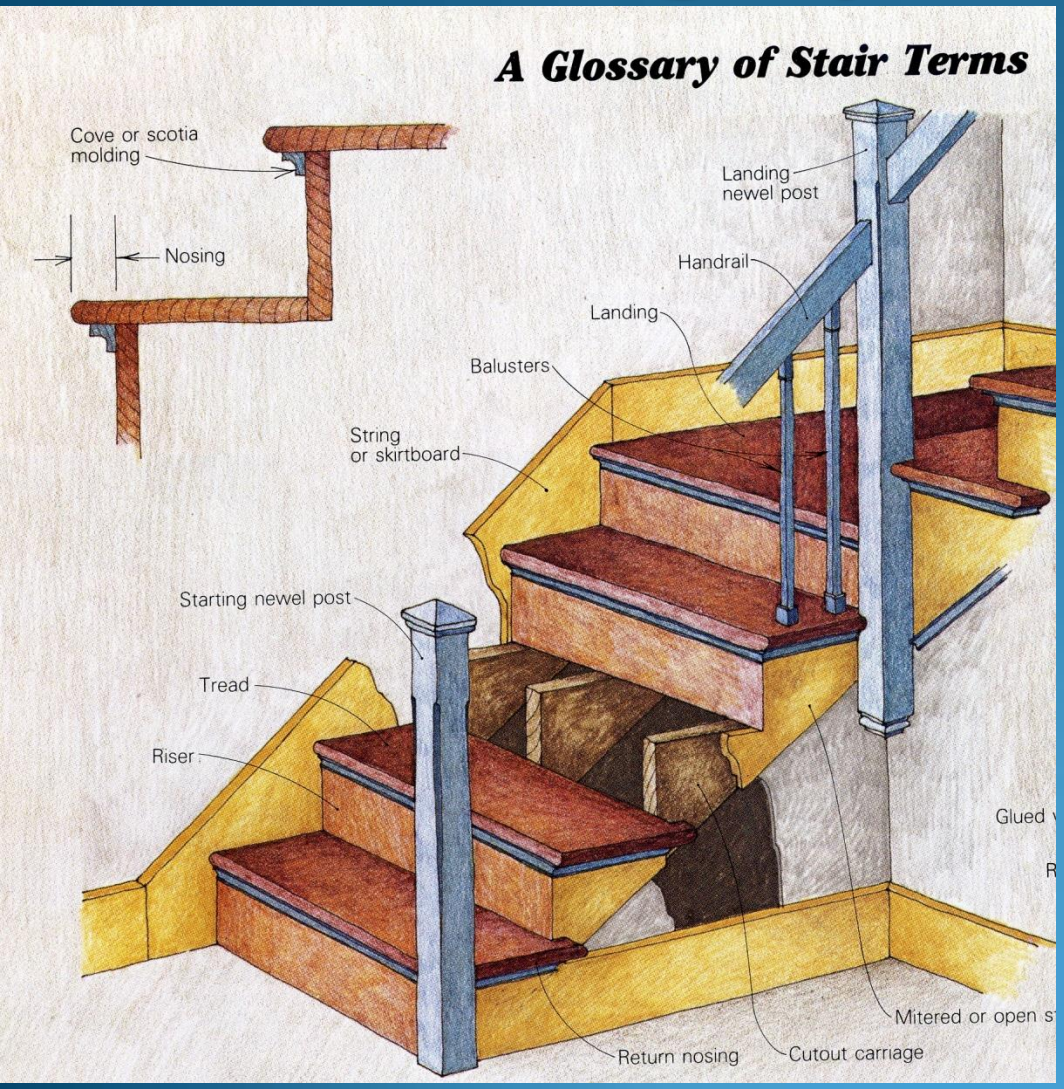
Stairwell layout



Parameters

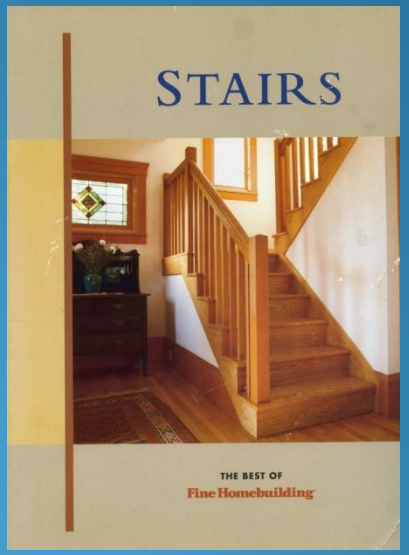
- 2 landings 1x1m
- 3 flights of 5 steps
- No winders-safety
- Lockable storage

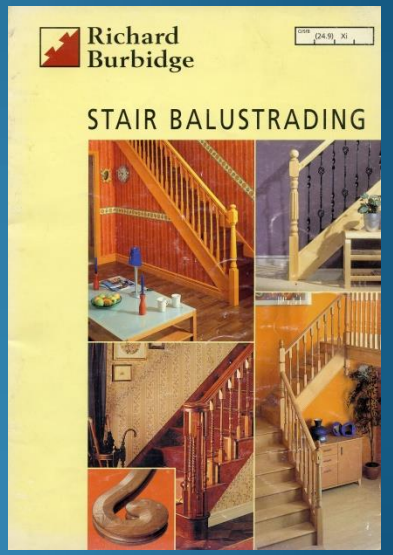
Design parameters



Information Sources

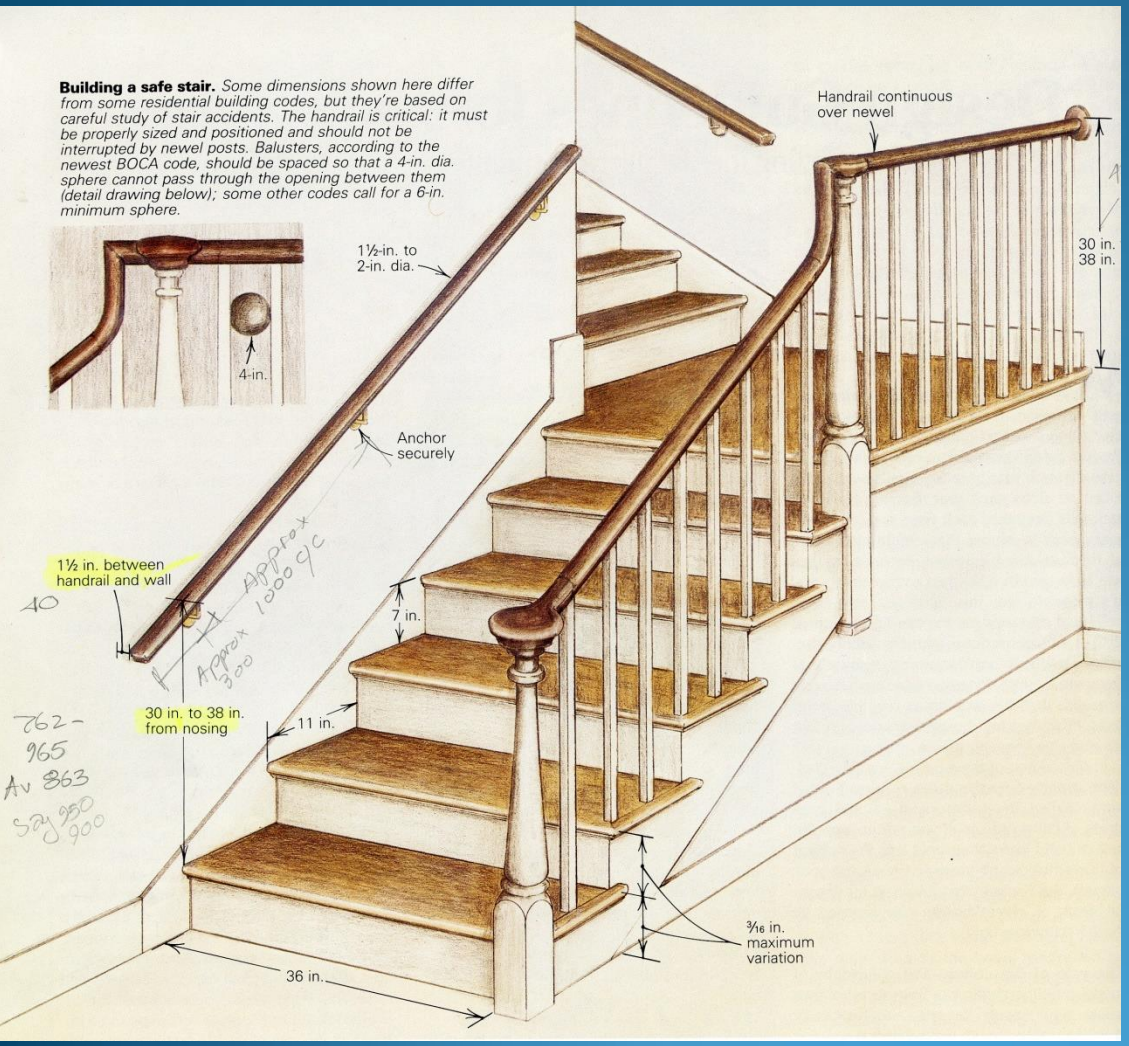
- Book on stairs
- Commercial catalogues
- Building regulations
- FWW





Stair hardware-not in SA

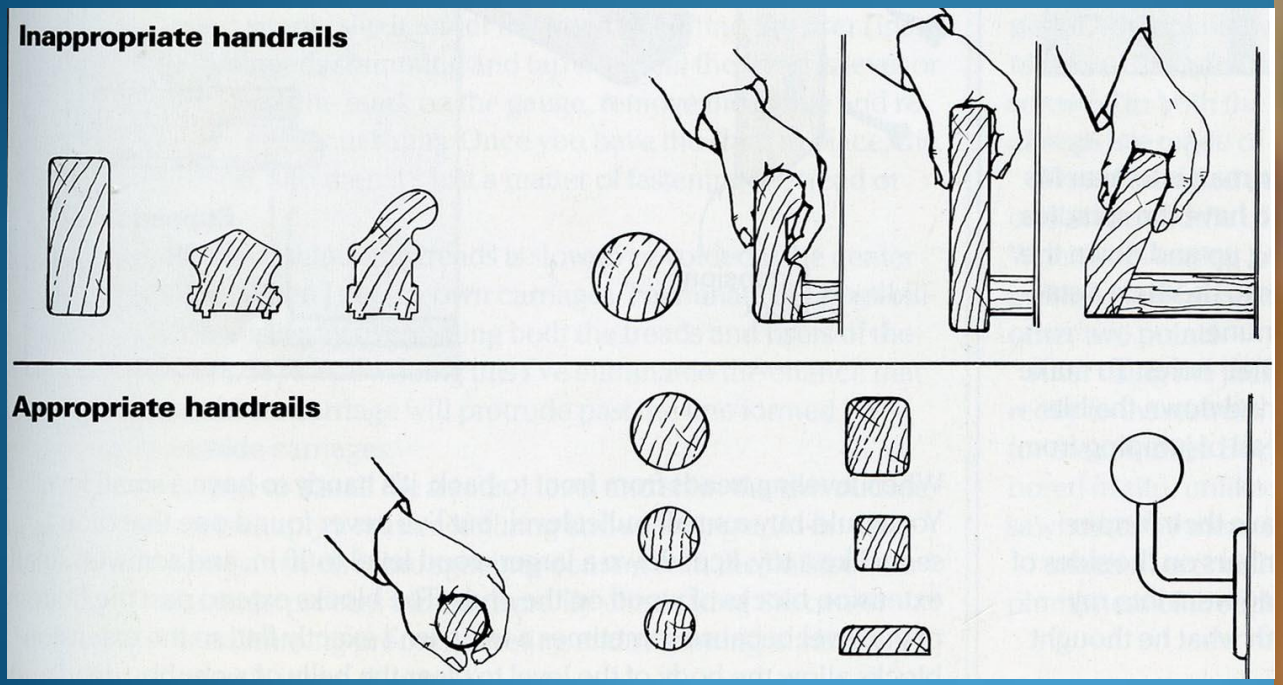
Design: Safety considerations

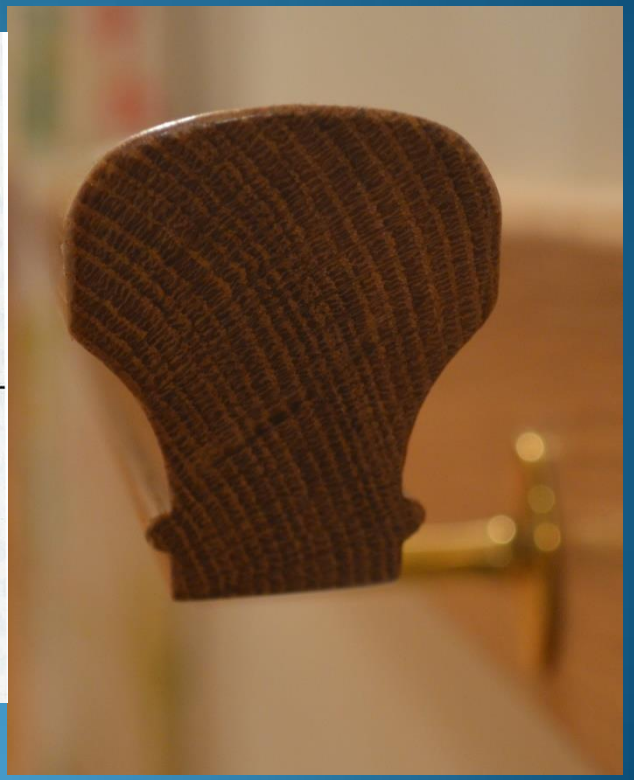


Key safety issues

- "Comfortable" stairs
- Comply with Bld Regs
- Steps tolerance 4 mm
- Non-slip stairway
- White oak selected
- No winders
- Handrails
- Spacing between balusters (100 mm)

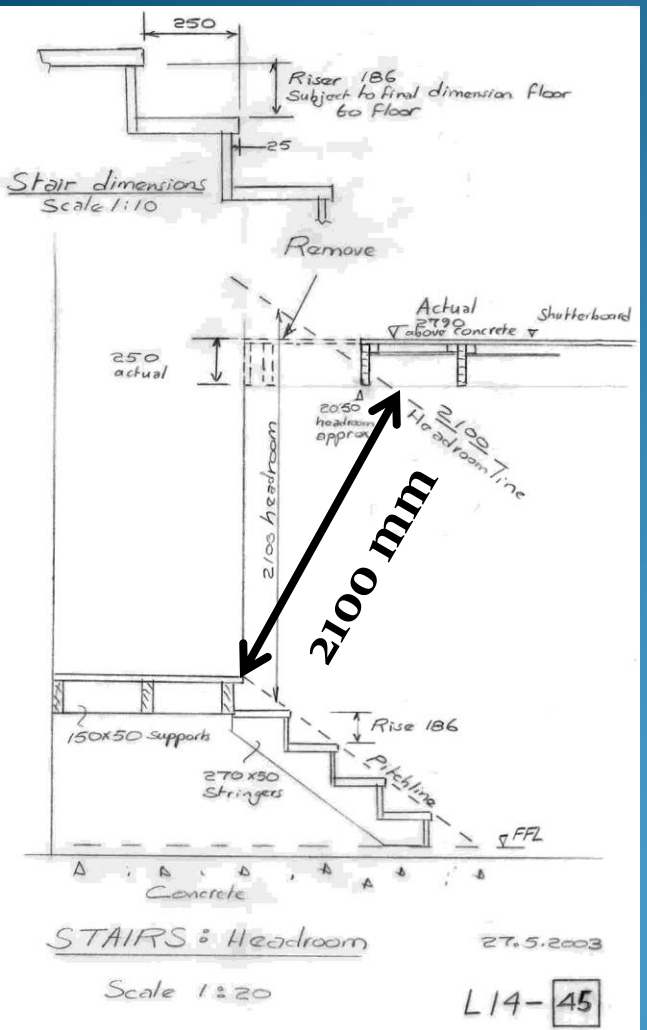
Design: Safety considerations: Handrails





- Most functional 38mm

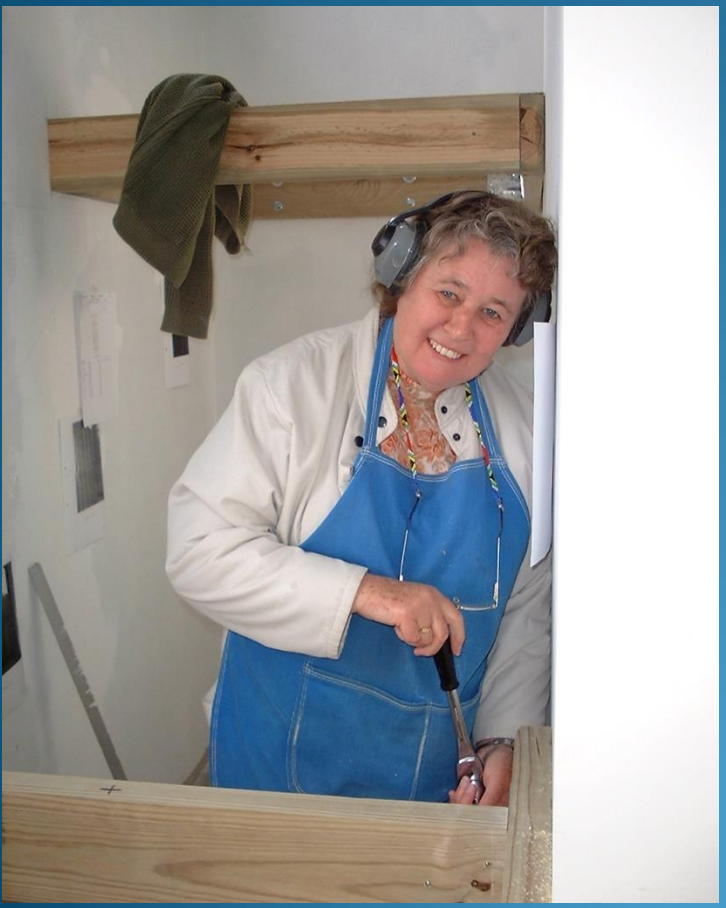
Design: Safety considerations: Headroom & Dimensions



Final Dimensions

- Headroom 2 100 mm
- Riser 184 mm (t=22)
- Tread 275 mm (t=44)
- Nosing 25 mm
- Newels 89 mm
- Balusters 42 mm

Background: Temporary Stairs



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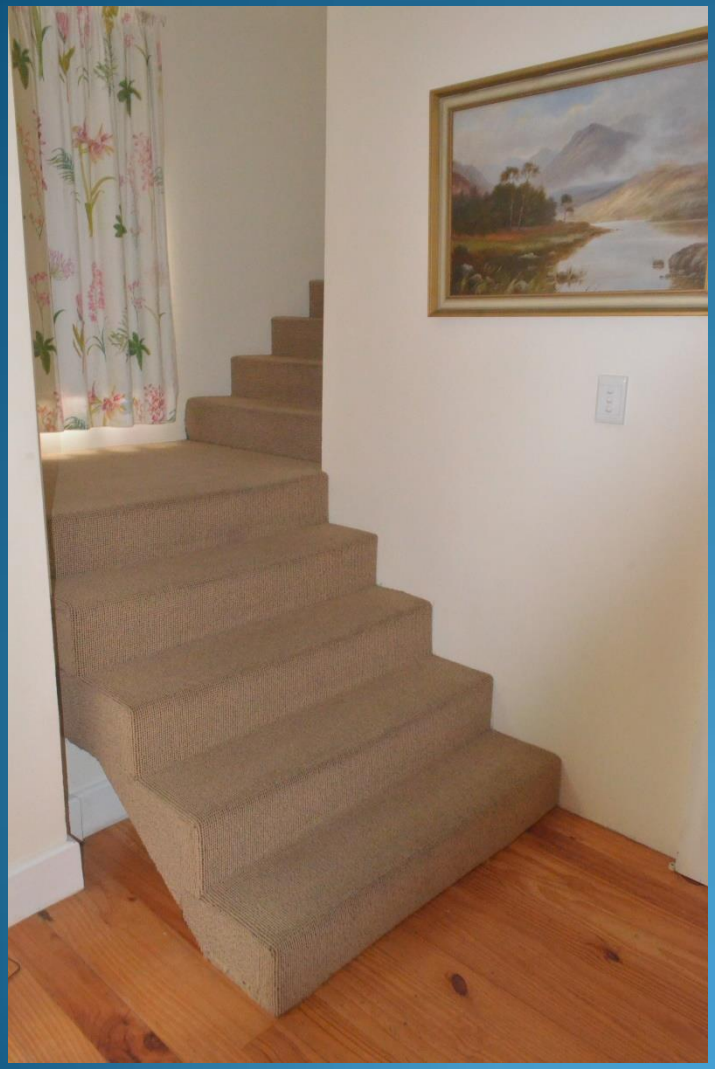


Temporary Stairs

- Carpeted
- No handrails
- Temporary bannister on 1st floor
- Long-term tenant for 11 years used ‘temporary’ stairs till 2016

Fabrication of components

Phase 1: Bannister

- Newels 6 incl 2- ½ newels
- 40 Balusters
- Handrails
- Base rail
- Fillets
- Mounting plate

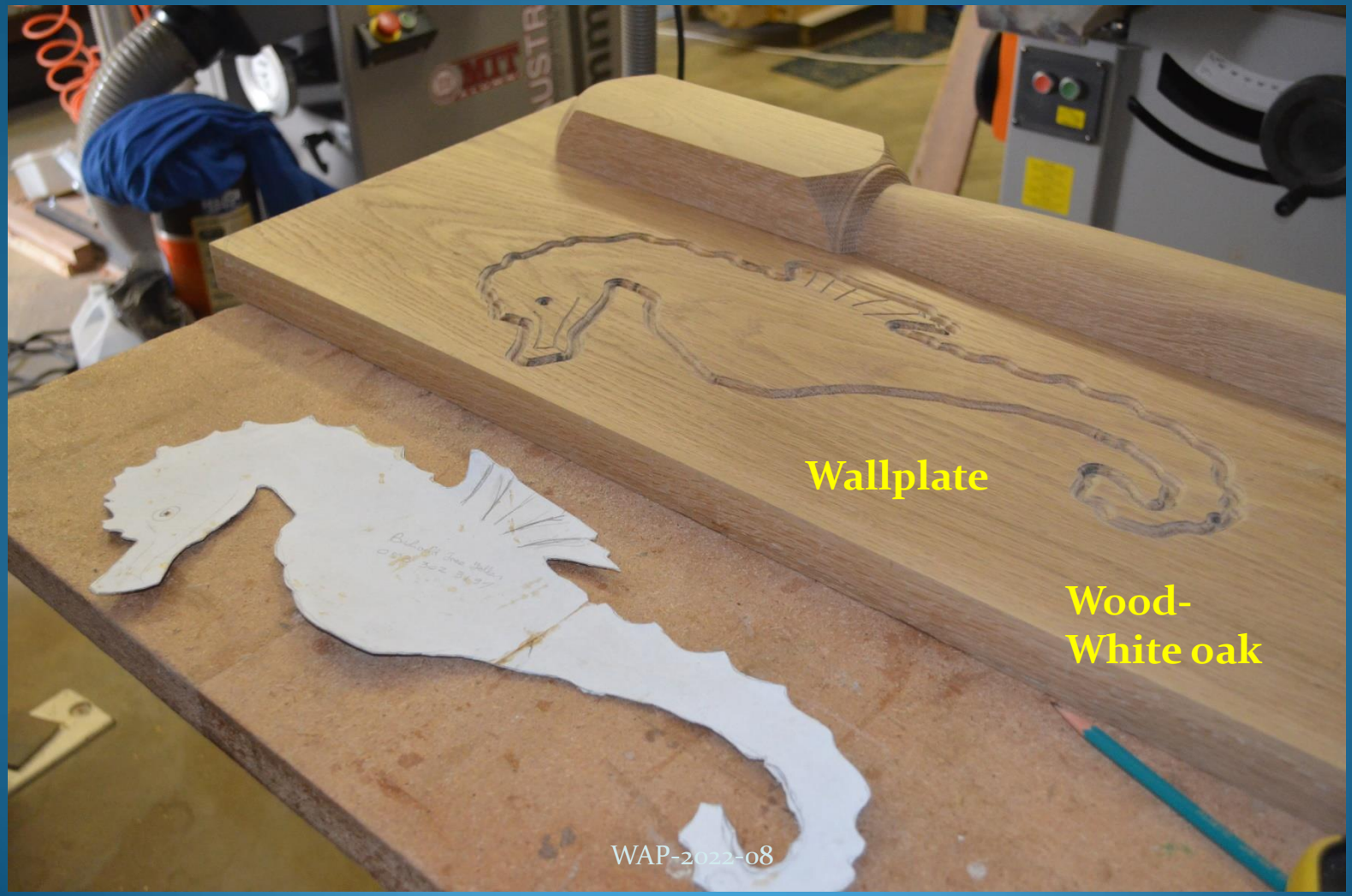
BALUSTRADES-FINAL QUANTITIES & DIMENSIONS							Oak			1100 for lathe max
Item No	Item Description	Item Code	No off	Stock	Net No Off	Final Thickness	Final Width	Final Length	Groove width	Remarks
1	Baluster	B1	30	20	10	41.7	41.7	995		32 tuned by copy lathe. See sheet 1.
		B2	9	8	1	40.6	40.6	995		Turned by self
2	Newel (N=Half laminate)	N	12	4	8	88.5	88.5	1,078		Make larger for lathe and cut with saw afterwards.

Trial Routing: Handrail

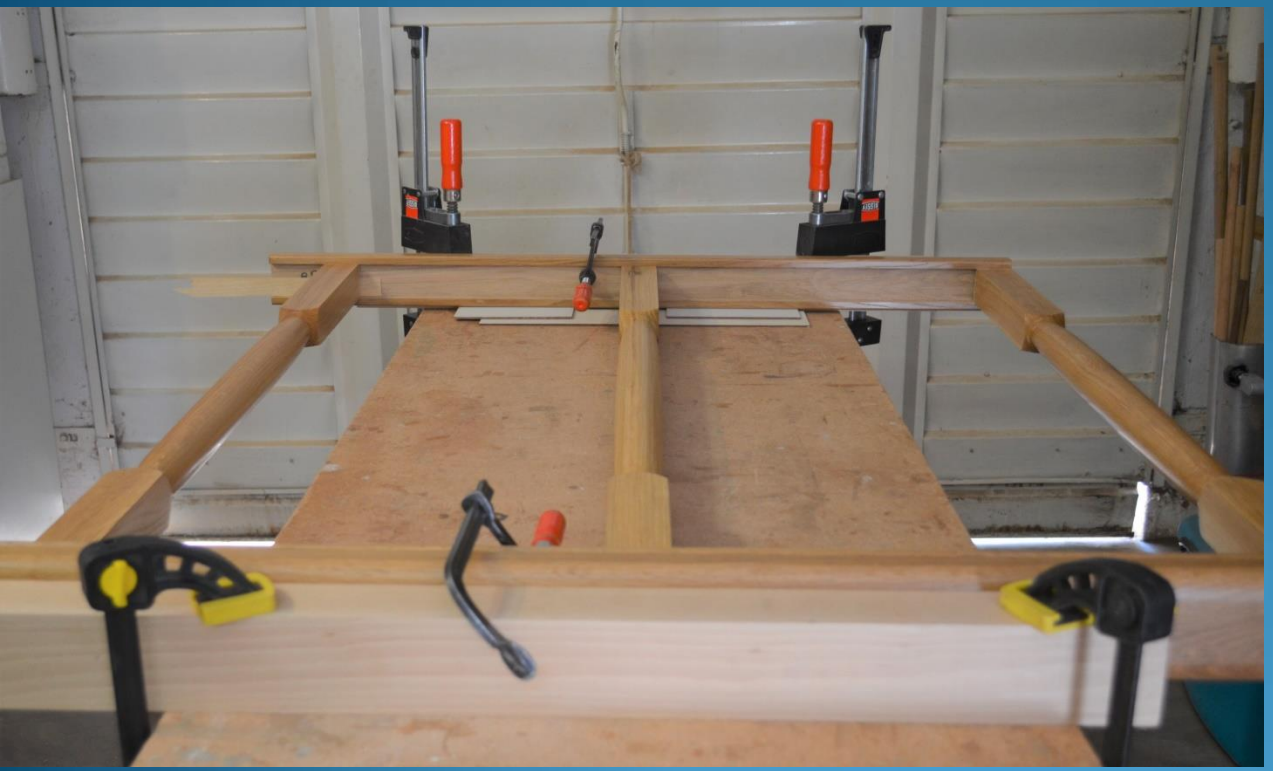
Trial Routing: Handrail

Fabrication of components

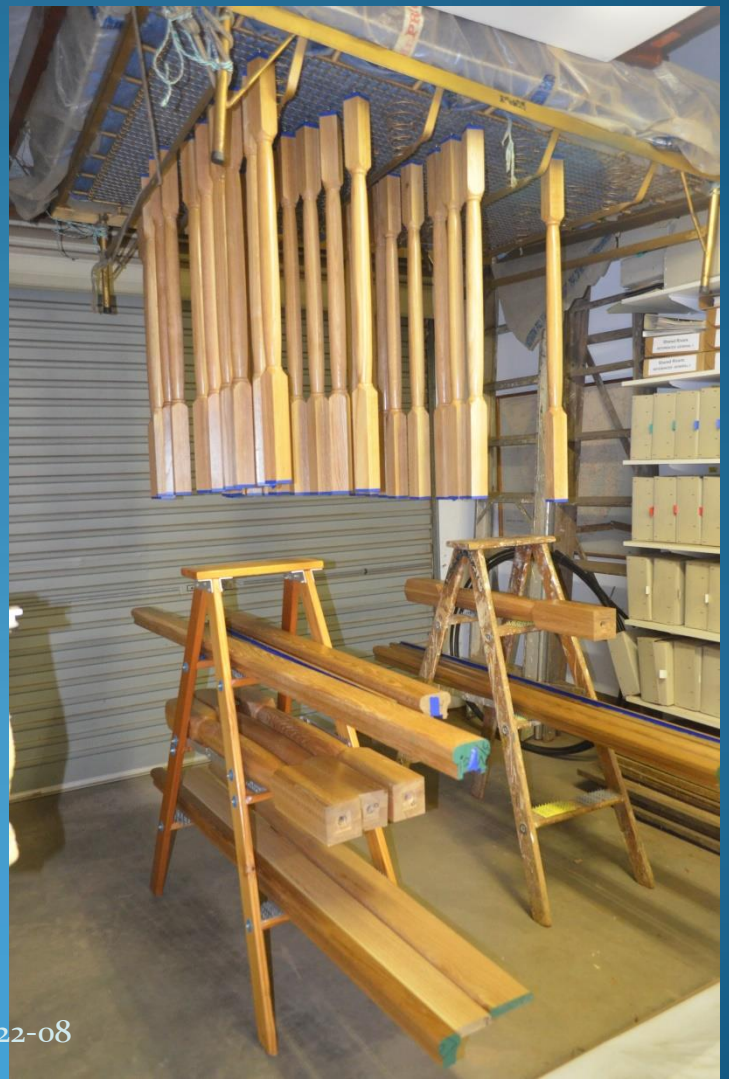
Routing and Turning



Fabrication of components: Trial Set-up



Finishing: Phase 1
Spray painting: Clear lacquer



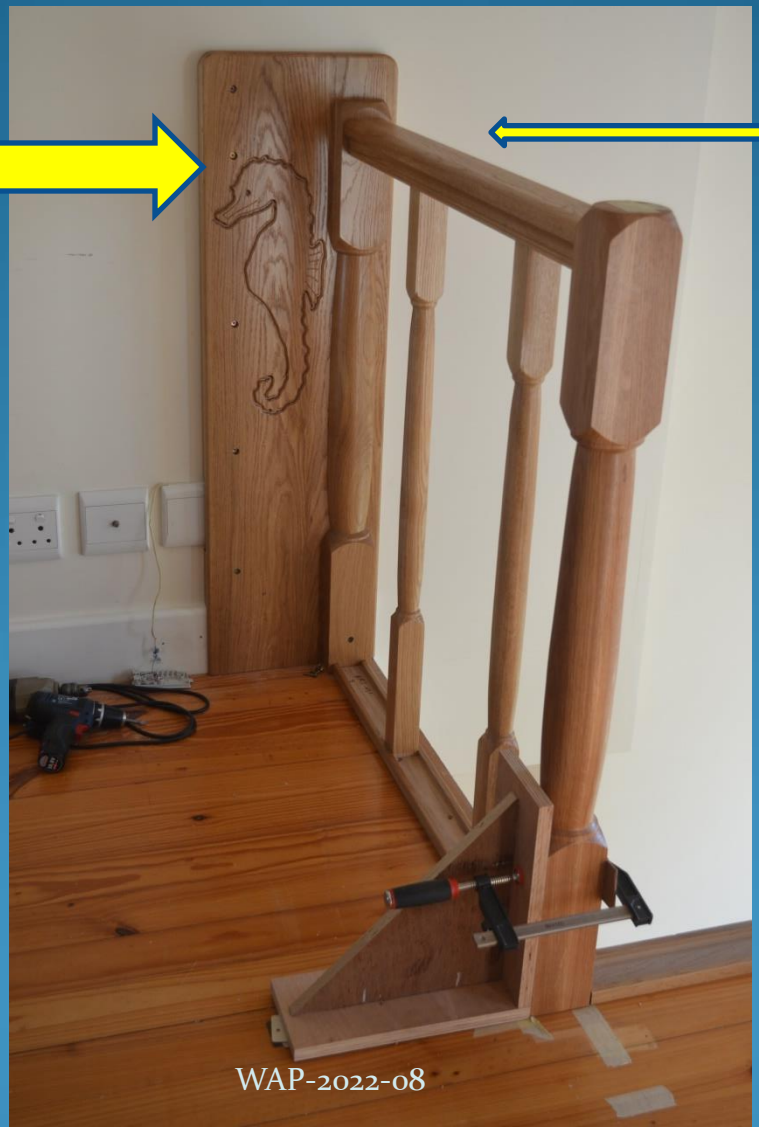
Installation: Phase 1

- Planning (Components, tools, hardware)

Workshop on L14

Mounting Plate

Mounting screws



Half Turning

Allowance for building irregularities Eg out of level, not square.

All pre-finished: Lacquer

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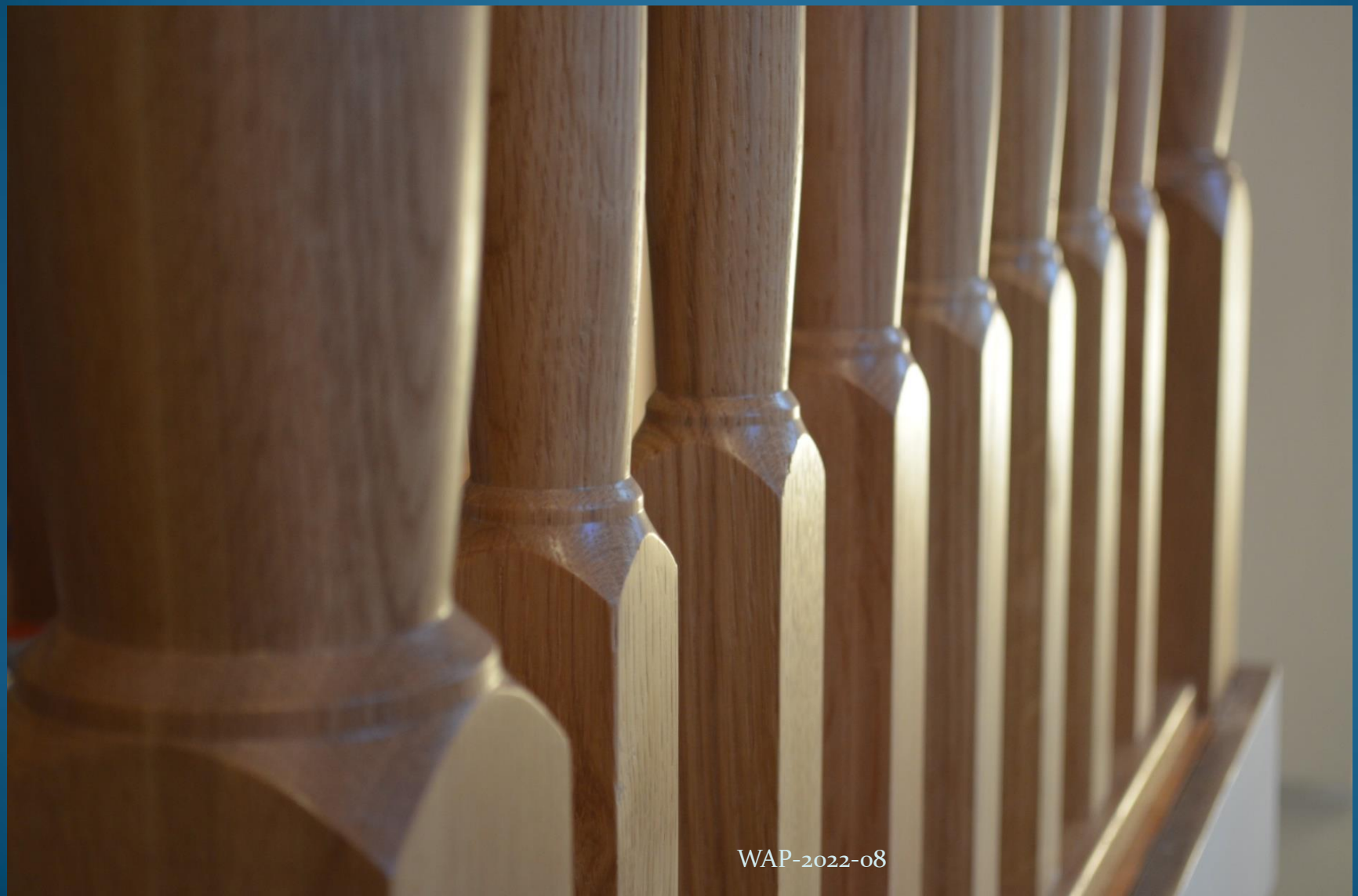
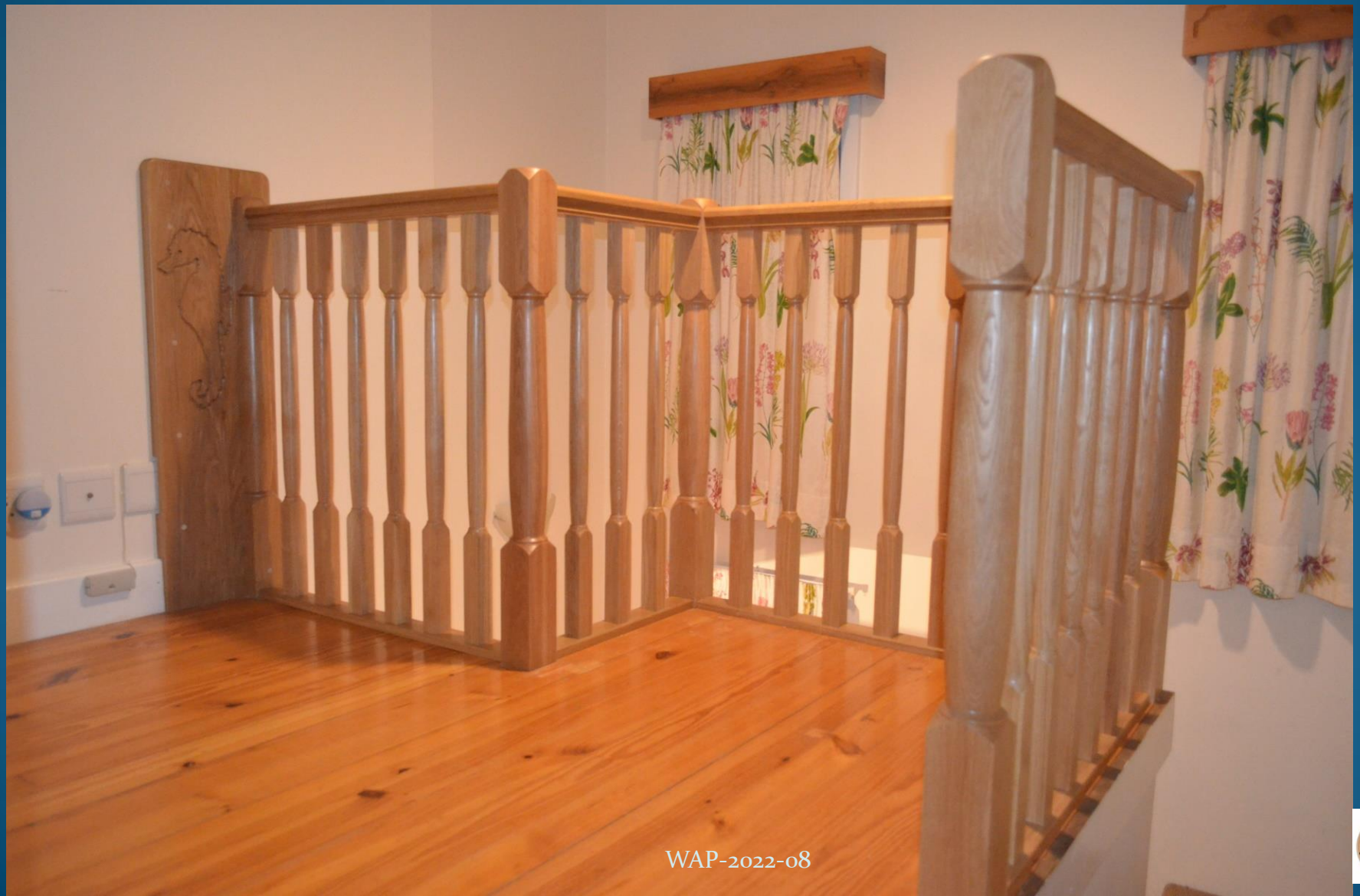
Erection of Newel Posts & Handrail

Corner detail

Newel and Balusters

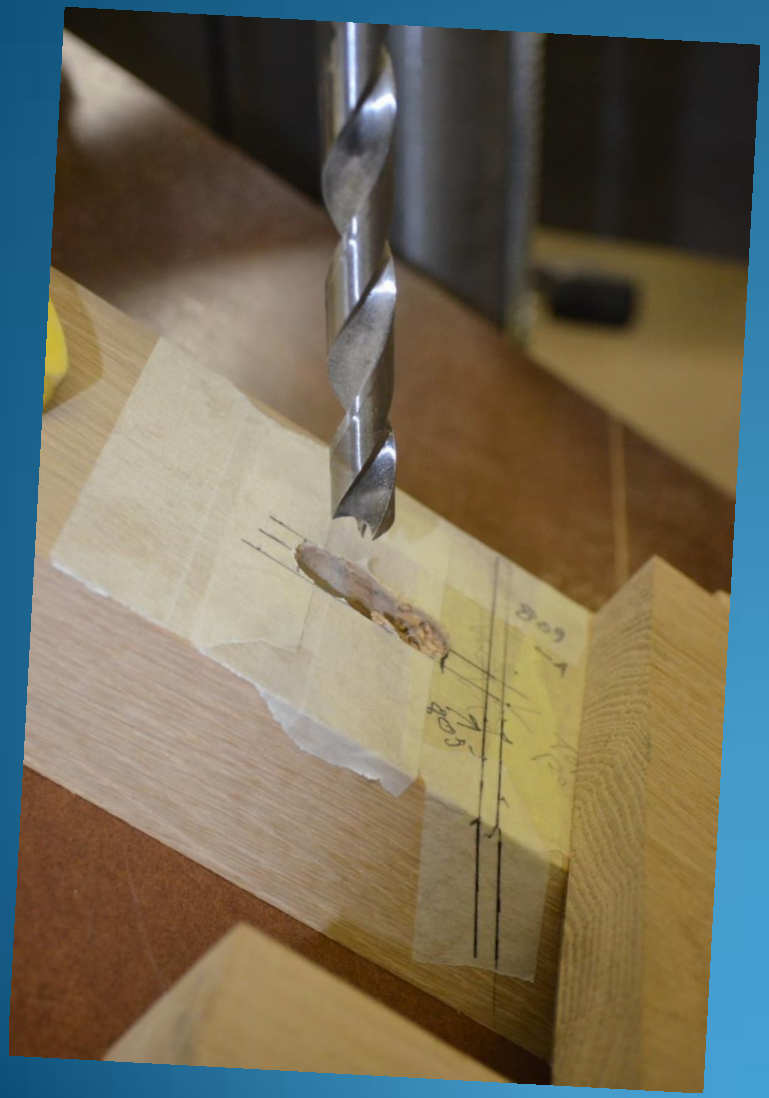


Phase 1 Complete!



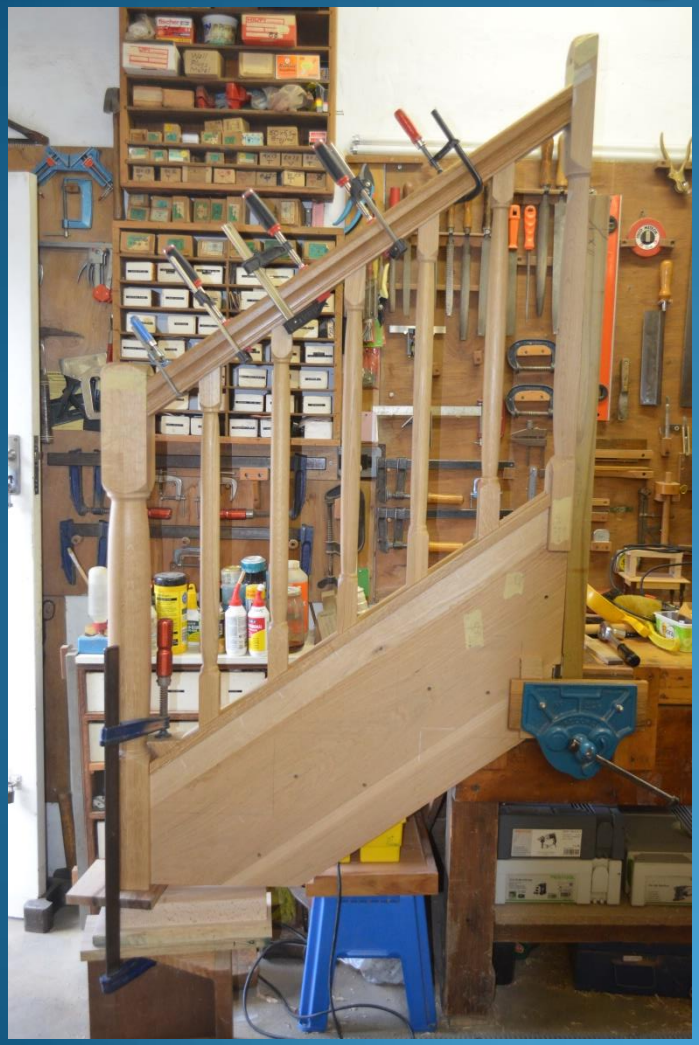
Installation: Phase 2
Staircase: Lower Flight

Lower Flight-Balustrade



Drilling out the angled mortice in the half newel post

Lower Flight-Balustrade



Trial assembly in workshop before spray painting with clear lacquer

Stairs and Landings

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Special tools and jigs

Sealing the underside of treads & risers

Installation of treads and risers: Lower flight

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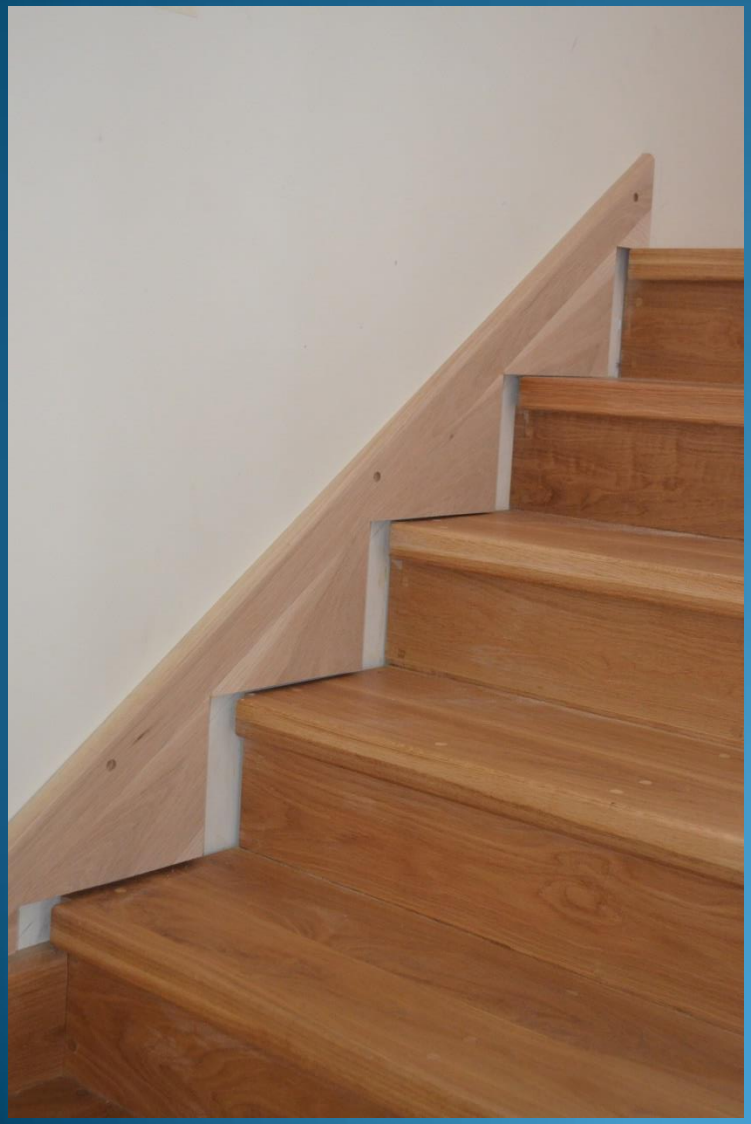
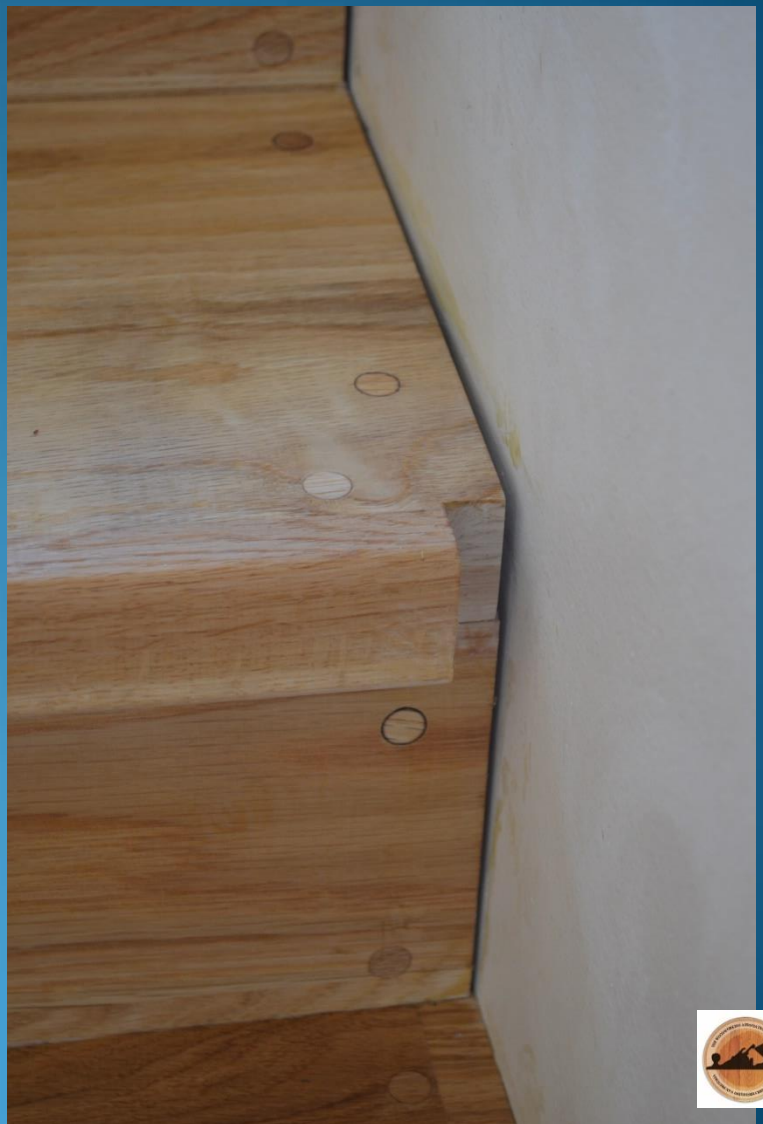
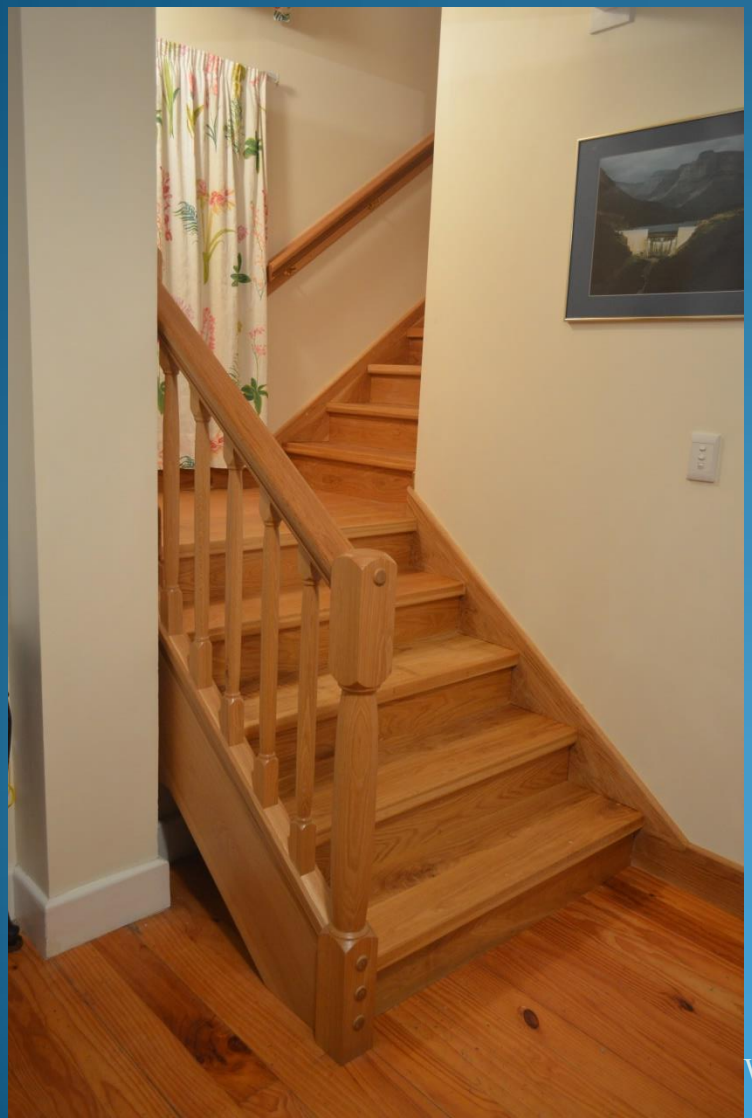
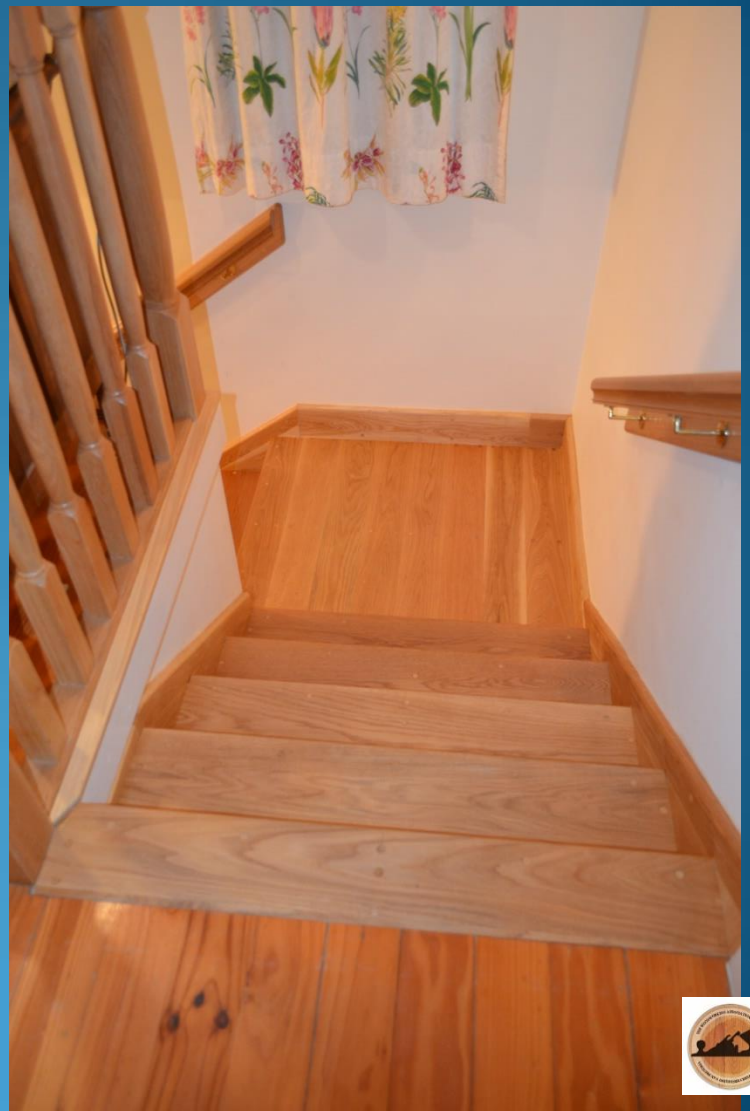
Skirting and handrails





Installation: Almost Complete!





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Finishing: Phase 2
Steps, risers and skirting

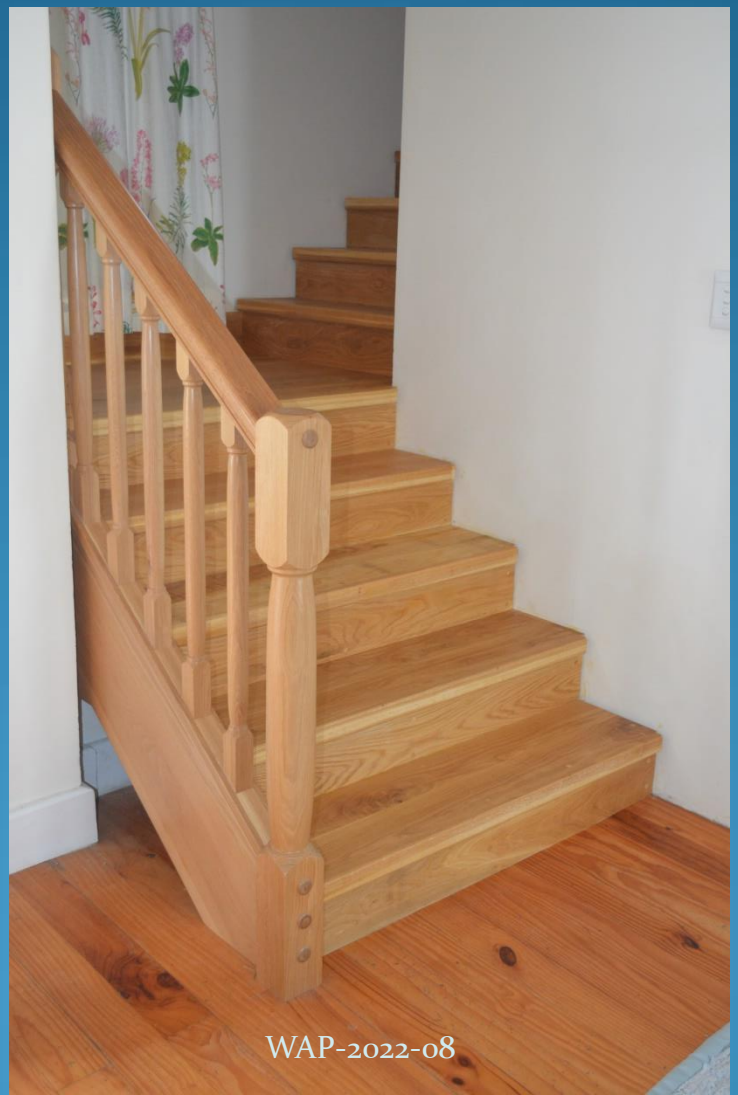
- Selection of finish
- Process
- 6-year experience

Selection of finish for risers, treads and skirting

Rubio Monocoat selected because:

- **Phased construction**
- **Non-skid (150 grit sand)**
- **Easy application and only one coat**
- **Limited time**
- **Expensive (R2 200)**
- **Cost effective (Wood R15 000)**
- **Monocoat training**

Risers, treads and landings



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Mono-coating done in 1 day

Conclusions: Costs

Construction period: 2014-16

Item	Cost (R)
Wood (Oak + Pine)	R19 000
Hardware	R 1 500
Copy Turning	R 1 500
Finishing	R 3 000
SUB-TOTAL	R25 000
Labour	?
Overheads	?

Conclusions: Lessons Learnt

- Problem of working at a distance
- Phased construction over time
- Advantages of pre-finishing (lacquer) and on-site finishing with Monocoat
- Need a “handlanger” and many clamps!
- Lots of detail, accurate measurements and careful stair design
- Wooden staircase construction challenging, cost saving and satisfying!

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