

# Engineering

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March 8, 2026

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# Preface

This is a live document, and is full of gaps, mistakes, typos etc.

Part I

**Bushcraft**

## Part II

# Stone tools

**Part III**

**Bronze**

## Part IV

# Iron

**Part V**

**SORT**

# Chapter 1

## SORT 2025

### 1.1 Introduction

#### 1.1.1 Introduction

Burgler alarm. how do they work

cement ingredient in concrete

cement: limestone + clay

concrete: cement + water + sand + rock

bricks: from clay

lime: hydraulic lime vs non-hydraulic lime hydraulic - harden with water non-hydraulic - harden with air both breathable, but non-hydraulic slightly more so non-hydraulic lime is also called putty but also available in non-putty form - can have powder

nhl 3.5 - 3.5MPa (Megapascals) refers to strength after 28 days exists: 2, 3.5, 5 higher is stronger but less breathable

bike stuff 700x25. 700 mean mm diameter of tire. standard road size. 25 mm means width of tire. is 25 or 28 generally road bikes can generally fit either of 25 and 28 valves + presta valves. thinner, has nut on top to tighten. more common on road bikes + schrader valves. wider, no nut + also have dunlop valves, but less common

rim brakes vs disc brakes can use lubricant on chain if rim brakes, not otherwise

Engineering. Wood screw Vs screw Vs nail

engineering making sawhorses making handtools

Patch co for ceilings? Has fibres?

Companies for lime: Chalkdown lime Mike Wye The limestuff Road to jericho  
 main british rifles lee enfield + .303", 7.7mm (x56mm) 11a1 self loading rifle  
 (slr) + 7.62x51mm ammo (nato) + aka FN FAL SA80 L85A1 bullpup (bullpup  
 means grip ahead of ammo chamber) + 5.56mmx45mm (other nato)

usa rifles m1903 springfield m1 garand + m14 + 7.62 nato m16 + 5.56 nato m4  
 carbine + 5.56 nato

NHL for plaster?? <https://cornishlime.co.uk/products/lime-binders/st-astier-nhl/> <https://www.lime.org.uk/hydraulic-lime-st-astier.html>

easifill brand for polyfiller

Drills. 3 different head types? Hammer Vs other setting knife maintenance  
 - honing with rod, sharpening with whetstone ceramic whetstone vs diamond  
 sharpening stone steel honing rod or ceramic honing rod leather strop

Spalling brickwork? How does soakaway work? Porous Vs non porous bricks?  
 Steel lining Firm flex lining? flue for chimney Paint spot repair Using paper in  
 corners and "plastering" over Chimney cowl Chimney flue Filler Vs caulk? Filler  
 can be sanded, but this not important for skirting boards For skirting boards  
 can also use filler though? Or adhesive if gaps could go back Caulk shrinks  
 after use? Drywall Vs sheetrock What is drywall mud? Chimney flaunching?  
 non-electric clocks

typewriter

non digital photography

Telling north with time and sun Moss? North Star Polaris. Other constellations.

ax saw

cartography timekeeping compasses

Bike engineering Fork shape Wheels, tyres, inner tube Brake system Suspension  
 Handlebar Gear chain

food preservation

### 1.1.2 Bushcraft

Cordage. Eg stinging nettles

Shelter. Y sticks, main stick, bravken?

fibre tarp

making shelters

Tree identification? Plant identification

### 1.1.3 Water preparation

water filters + Granular activated carbon (GAC) + total dissolved solids (TDS) is metric + Brita filter is either granular activated carbon or powdered activated carbon AND ion exchange resin (hardness and lead?) + other more complicated ones include block carbon or reverse osmosis

Water. Plastic bag on branch

Water prep Water filtering Boiling to avoid virus bacteria parasite. Can still have heavy metals chems Iodine tabs? chloride tabs heating water

### 1.1.4 Fire

food cook Fire starting? Flint steel etc. Spark. Tinder bundle  
kiln

### 1.1.5 Pottery

pottery ceramics

### 1.1.6 Wood

making charcoal

making fire: + prep area (can't spread) with clear grass, surround with stone + bow drill?

### 1.1.7 Stone

stone chipping

Quernstones: + for grinding

### 1.1.8 Metal work (bronze, iron)

forges wrought iron cast iron Knife types. Scandi grind? Sharpening knife?

Whetstone? Steel sharpener? DC diamond carbon Stropping a knife?

### 1.1.9 Animal

crayfish traps lobster pot spear fishing net fishing squirrel pole snare animal tarp

Animal preparation. Gut fish. Bird. Mammal.

+ fur + leather + wool Rabbit. Put net over each Warren hole Put ferret into Warren. Catch rabbit in net. Can also smoke them out? Spring trap

**1.1.10 power generation, piston and gears**

linkages

mechanisms are things which transmit different types of motion

gear systems: + standard \* gear ratios \* chain drive \* belt drive \* ratio of teeth (circumference?) of first and last chain all that matters \* every gear reverses direction \* idler gears (ones not first or last) \* drive shaft is the thing that goes into first (or last?) gear? rotating cylinder \* external gears vs internal gears. external normal looking ones, but internal possible too \* spur gear (standard?) vs helical gear + changing motion types \* screw thread: converts from rotation to up/down \* worm gear: similar to screw? less efficient? \* bevel gear: eg gears at right angles, so motion changed by 90 degrees + time \* escapement. moves regularly, used in clocks/watches + bike \* freewheel (how bikes work so can move without pedalling) \* freehub?

gearing: + change direction, by being at angle + change speed, by relative teeth

watermill: water movement to rotation

windmill: water movement to rotation

external combustion engine (steam engine)

internal combustion engine

piston. rotate to up don. with connecting rod

piston valves

**1.1.11 home engineering: foundation**

foundations: + excavate for foundations + fill foundation

underpinning + strengthening existing foundations

**1.1.12 home engineering: structural stuff**

Wood nail vs dretwoid nail

Building a stud wall

noggins + between joists or studs to increase strength

loft trap + is the hatch to get in via ladder

staircases

Lintel for construction. + goes above where windows/doors/fireplaces go

trenches backfilled with pea shingle

logical flow of construction + foundation + floors/walls/roof, single story, inc damp proofing + multi story + insulation of walls/ceiling/floor + ventilation of properties, types of ventilation

construction notes + damp proof course. physical layer or injection between ground and bricks, floor.

clay (walls etc)

scaffolding

House maintenance: repointing. Reapplying mortar to bricks?

partition walls, load bearing walls, removing load bearing walls with reinforcement?

Prestressed concrete Beam and block Beam Frame all as structural engineering Joists and bearers under floor? Floorboards Breathable walls? Roofs sawn lathe exists. Riven before Riven doesn't give Sawn does. Always would give, no big problem?

### 1.1.13 home engineering: drain

Drains can be on different systems. Rainwater Vs waste water. Rainwater front Vs back. Branching sewer pipes, traps, access points soakaway or something similar sounding for rainwater?

How to unblock drains

drain rods for maintaining and unblocking drains also boiling water then bicarb soda and vinegar 50:50 mix for 10mins then more hot water

trenches for drainage runs Lead flashing connect sewer to drains

guttering downpipes

### 1.1.14 home engineering: plastering, lathe walls, paint and distemper

wall plaster can be modified to be damp proof?

tack ceiling? + plaster board over ceiling?

wall plaster + wood applied to eg brick, then plaster between, smooth with lathe

Plaster and tanking??

Plaster Vs plasterboard Lath and plaster for interior walls

1 and 3 putty and 3 lime 2 fine sand is finish

Filler can use polyfiller? Easy to sand.

Chalk and lime Vs Sand and lime Lime and chalk more modern. Can do in one go?

Perlite can be base for lime?? Distemper is animal glue lime wash alternative

Types of paint. Silica paint?

Floating coat Vs finishing coat for plaster

Should we have breathable not external walls?

painting walls, removing paint

Distemper/lime wash

Blown plaster on notes. Applies brick and lathe differently? Mesh plaster for reinforcement

plastering — — lime — gypsum plaster — gypsum plasterboard — mesh lime  
 — mesh gypsum — cement render — hardwall — — interior wall lathe new —  
 — — — — — interior wall lathe repair — — — — —  
 exterior wall inside face brick new — — — — — exterior wall inside  
 face repair brick — — — — — interior wall brick new — — — — —  
 — — — — — interior wall brick repair — — — — — ceiling lathe  
 new — — — — — ceiling lathe repair — — — — —

Notes on techniques below Meshing gypsum plasterboard + aka drywall + variants exist like soundproof or insulated

Lime Vs fibre lime Fibres reduce future cracks?

Fine lime putty, fine lime sand Lime wash not on ours at least dining room  
 Animal glue instead

Only external walls need to breathe?

Parting wall not sure if need to breathe?

### 1.1.15 home engineering: doors and windows, ventilation and insulation

External wall insulation Other wall insulation?

Draft proofing doors Draft proofing letterbox Loft insulation / loft hatch Cavity wall insulation Inner wall insulation

loft ventilation

Subfloor ventilation

how to insulate walls, existing walls. insulate floors, ceilings, existing floors  
 ceilings ventilation grilles/ventilation strips

Window types. Flush mount

Escutcheon for keys Windows, double glazing Window trickle vent

### 1.1.16 home engineering: decoration

On decorating, how to sand and wash wall Sand first? Can wash with sugar water?

Painting

To make primer mix with water Emulsion paint: add 10Mix these in the tray

Sanding walls before painting: sandpaper Vs sand block Vs orbital

Step 1 sweep up dirt Sugar water on floor. Mix water with sugar water with ratio on packet. In bucket.other bucket of clean water. Normal sponge. Wear gloves + Scrubbing with sugar water + [Optional: use special scraper to remove any paint] + Rub with steel wool 0000 + Wipe with damp wet cloth Do this plank by plank. Part of plank. Use as little liquid as possible Brush with grain

Step 2 When dried Decant beeswax turp thing into mini bucket pot Use 3" brush Brush along Easier than cleaning because just one thing Leave for 6 hours Can then do second one

Step 3 Buff floor

lining paper for painting on Mist coat paint is simply watered-down emulsion paint, Polyvinyl acetate primer, or PVA primer

emulsion paint matt paint is type of emulsion paint

painting + do ceiling before + do prime then 2 layers + can make primer from 10+ masking tape on things + cutting in when painting

Courning

Thermal lining for curtains Sealing gaps and cracks in floorboards

architraves

ceiling tiles

wallpaper

Wallpaper lining goes under wallaper between skirting board and floor: scotia or quadrant

Skirting boards

### 1.1.17 home engineering: sort

second fit carpentry:

roof truss + framework of timbers to support roof

wallplate roof binders, roof bracing,

roof dormers roof: fascia, soffit roof: undercloaking, verges roof: felt and batten  
 roof roof: tiles and slates, ridge/hip tiles, valley tiles, fibreglass/lead tiles roof:  
 flashings, skirtings roof: painting/stain fascias, barges

upstands, gullies

carpentry: first fix

floor screed protective hardboard/cardboard laid on screed

### 1.1.18 home engineering: electrics

running electric cables: fish tape; fishing rods, crawl space

carcass wiring backplates for sockets

how electricity goes across floors, how it goes up floors

electric meter

electronics in home. ring circuit vs radial circuit.

fuses, breakers

electric wiring: + consumer units + bonding? + electrical reading on sockets  
 not acceptable? + fuse board + power over wifi?

### 1.1.19 home engineering: basic water

how to Remove air from hot water pipes? cold water? just run, or?

Attaching lino / lvt to floor and making waterproof on notes. Inc attaching to  
 bath?

waste pipe sizes, material

to what extent does mains pressure vary? how does going higher affect? how  
 does adding more taps affect?

gate valve?

why have cold water tank vs mains pressure? resilience to changes in mains  
 pressure/supply downside: space for storage, pressure is gravity and can be  
 lower, water from cold water tank not potable

material for water pipes, lead, copper, steel. hard water, soft water

overflow pipes above tank?

pipe tee direct cylinder?, indirect cylinder

water pipe sizes on main. do they change as get further/split? water pipe sizes  
 on gravity. do they change as get further/split? how water pipes are transmitted  
 across floors migrating from direct to indirect, and visa versa, impact on pipes?

if want to work on pipes, how to remove all water? just turn off input and wait, or something else?

mains water supply

inside stop valve (aka stopcock, aka stop tap). can turn with valve. can replace with SureStop, changes with switch instead. can also add aladdin valves on live hot or water pipes to make them valves can do freezing and clamping as short term solutions

toilets

outside stop valve (responsibility of water company)

water systems and drainage systems rising main: thing which takes water to up each floor

water systems: indirect vs direct. + indirect: water splits and goes to drinking water (usually on ground floor) and cistern in roof. cold water tank. + direct: water goes direct to each thing

dishwasher (generally take in cold water, water out) washing machine (generally takes in cold water and heats up itself, water out) dryer (no water in, but water out)

adjusting taps if gravity vs mains pressure

home maintenance: ceramic stuff: bleach; limescale remover

blocked pipes

water meter

### 1.1.20 home engineering: gas for hot water/heating

Deck mounted taps Vs wall mounted taps Thermostatic mixer

vent pipes

underfloor heating (UTH)

flue can't be next to door, window, gutter

Fire place, hearth, flue, hearth stone? Fireplaces on multiple floors Blocking fireplaces from animals, rain?

system boilers use unvented hot water cylinder

vented hot water cylinder vs unvented

if cold water storage tank, that feeds into boiler

with cold water storage tank, cold water from there, and hot water, is not potable means that for any sink which uses mains water, eg kitchen, can't have mixer

what sort of boilers require condenser output, require flue output, where does each need to go to

boiler return pipe dipped return

two port and three port valves to control temperature and heat flow

pumped heating and gravity circulation vs fully pumped system. (cold water falls by gravity, hot water rises)

capping off gas

gas fire

immersion heater

gravity rad?? what is

if working on hot water/gas, how to ensure pipes are empty? turn off mains and then?

electric boiler

sink unit

bath/shower

showers + electric shower. takes in cold water, heats it up using electricity. no need for hot water input/boiler. weak water flow? + mixer shower. mixes hot and cold water. requires boiler. can have stronger water flow. does not need electricity + power shower. requires hot and cold water. requires boiler. requires electricity

gas in; flue out? condenser out? gas meter

boiler types: + electric boiler + gas boiler + gas condensation boiler + heat pump boiler table of how they vary: requirement of cold water tank (none?) requirement of hot water tank, output pressure, what waste is (flue/vent stuff for gas related) (most of these criteria aren't boiler specific maybe?? eg can have gas using gravity or combi)

airing cupboards

how hot water pressure is affected by boiler types + hot water in other stuff (inc adjusting eg showers if gravity vs mains pressure, and power showers)

what's difference in capacity between combi boiler and condenser boiler and system boiler?

+ conventional boiler: heats a hot water cylinder. water taken from hot water cylinder as needed. also heats radiator pipes, but these are on a separate circuit + combi boiler: heats water on demand, no hot water cylinder or cold water tank. if more demanded than can produce, no storage to go back on. single circuit for hot water and heating, which means one heating thing which swaps

between heating radiator circuit and water for use in eg shower + heat pumps / electric boilers can replace gas in both cases

then thing on different styles types + system boiler + combi boiler + back boiler + traditional boiler

single vs double radiators. twice as much capacity? radiators powerflush + reflectors make them more efficient. can install between radiator and wall + radiator water is in closed circuit. if air is trapped in system, can bleed radiator to free space. water can be added to increase pressure + radiators have a circulating pump to make the water circulate around. electrically powered + underfloor heating can use circuits like radiator circuit, but can also use heat pump stuff?