

# TECHNOLOGIES OF PITCHED ROOFS

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## Technologies of pitched roofs

- Pitched roof: is a roof for which one or more roof surfaces is pitched more than 10 degrees.
- Processes of construction:
  - Construction of loadbearing structure - carpentry
  - Covering, waterproofing
  - Placing insulation
  - Sheet metal works (tinworks)
- Requirements
  - Loadbearing capacity
  - Frost resistance
  - Waterproofing, thermal insulation

# Carpentry

## Carpentry

- A carpenter is a skilled craftsperson who works with timber to construct, install and maintain buildings, furniture, and other objects.
- Carpentry: construction of timber frames (house framing, roof framing) and other wooden objects.



# Carpentry

## □ Materials:

- Timber
- Glued laminated timber (GLT)
- Cross-laminated timber (CLT)
- Plywood
- Etc.



## □ Storing

- Timber: on a covered place (moisture!)
- Metal: small elements in boxes (closed, covered place)



# Carpentry

## □ Technologies

- Traditional: on site timber construction with traditional woodworking joints
- Modern: prefabricated timber construction with „nontraditional“ woodworking joints (e.g. metal connectors, metal plates, nails or screws)



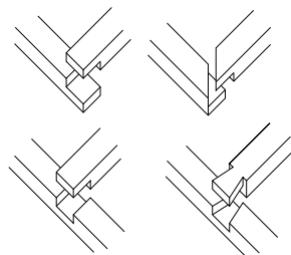
# Carpentry

- Modern technology
  - Prefabricated wooden trusses, nailed plate joints



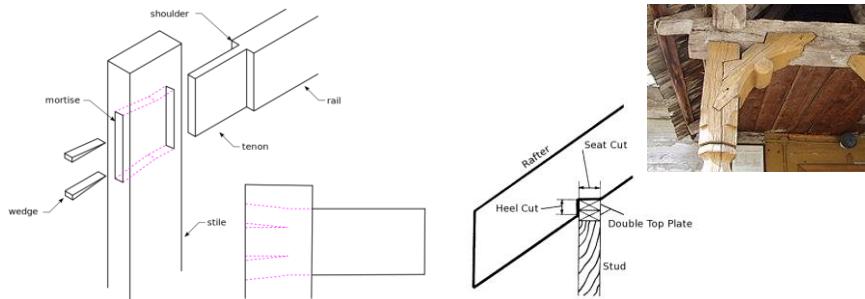
# Carpentry

- Traditional technology – traditional woodworking joints
  - Lap joints: one piece of wood will overlap another.
  - Dovetail joint: a form of box joint where the fingers are locked together by diagonal cuts.



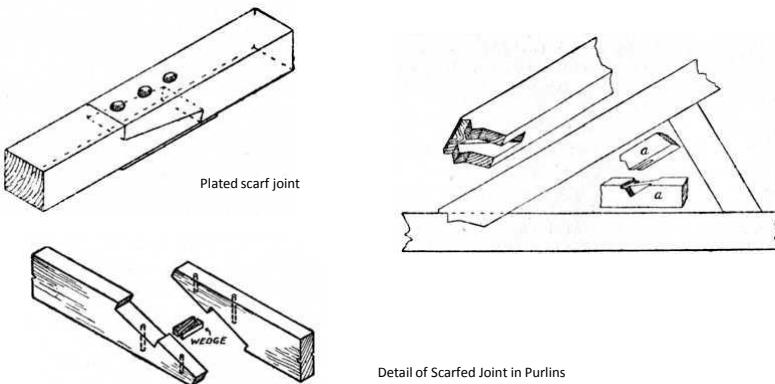
# Carpentry

- Traditional technology – traditional woodworking joints
  - Mortise and tenon: a stub (the tenon) will fit tightly into a hole cut for it (the mortise)
  - Birdsmouth joint: a V-shaped cut in the rafter connects the rafter to the wall-plate.



# Carpentry

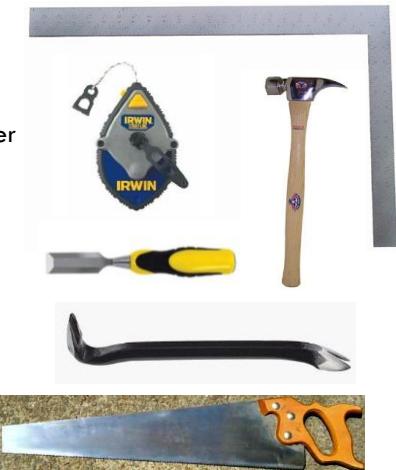
- Traditional technology – traditional woodworking joints



# Carpentry

□ Tools

- Carpenter's (spirit) level
- Framing square, speed Square
- Curved claw hammer, framing hammer
- Crosscut saw
- Tape measure
- Chalk line, chalk line clamp
- Chisel
- Carpenter's pencil
- Utility knife
- Nail puller



# Carpentry

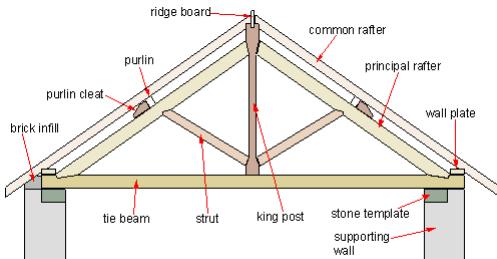
□ Work activities

- Checking the existing constructions (walls, slabs) and plans
- Laying out
- Layout and cut a common rafter pattern
- Setting the primary loadbearing structures
- Setting purlins, ridge board
- Placing rafters

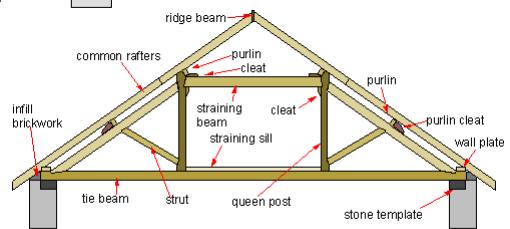
□ Storing materials

- Timber: storing in a covered place
- Metal connecting elements: usually in boxes
- Tools: closed container

# Carpentry



Traditional King Post Roof Truss



Traditional Queen Post Roof Truss

## Roof covering

## Roof covering

### □ Materials

- Thatch (wheat straw)
- Ceramic tiles (terracotta tiles)
- Concrete tiles
- Shingles (wood, bith./asphalt)
- Metal (galvanised steel, copper, cink)
- Slate (stone)



## Roof covering

### □ Accessories

- Extra pieces for gables, ventilation, snow-stop
- System can contain materials for valleys, ridges, etc.



# Roof covering

## □ Work activities

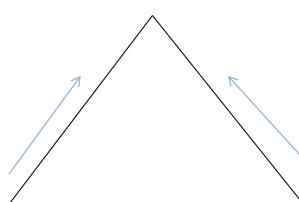
- Checking the existing constructions and plans
- Waterproofing
- Placing the counterbattens and the battens
- Sheet metal works
- Placing skylights
- Roof covering – planned measures vs. element size



# Roof covering

## □ Roof covering

- Use whole pieces if possible
- Distance between battens depends on the unit size
- Overlapping 6-8 cm
- Starting at the eaves
- Working symmetrically (loads!)
- Cut pieces and side pieces have to be fastened with nails or wires



## Roof covering

### □ Roof covering with tiles



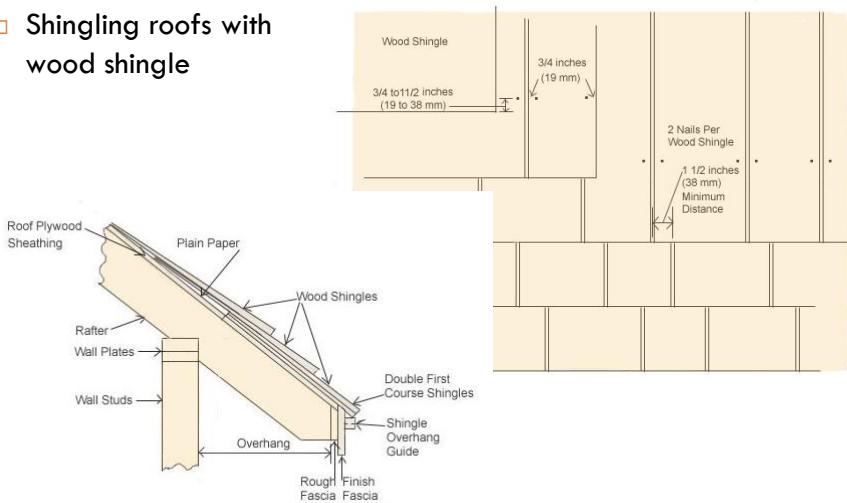
## Roof covering

### □ Shingling roofs with slate and thatch



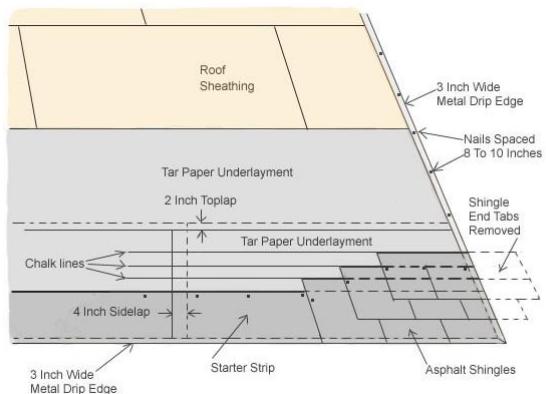
## Roof covering

### □ Shingling roofs with wood shingle



## Roof covering

### □ Shingling roofs with bituminous (asphalt) shingle



## Roof coverings

- Material storage on the roof



## Sheet metal works

## Sheet metal works

- Sheet metal works on the roof:

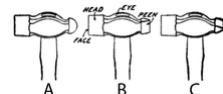
- Flashings by the gable
- The eaves and gutter
- Flashings by the chimneys
- Etc.



## Sheet metal works

- Sheet metal works on the roof: tools

- Snips, shears, pliers, hammers



## Sheet metal works

- Sheet metal works on the roof:
  - Metal roof coverings: tin, galvanised steel, corrugated iron, copper, cink – metal sheets or small elements



## Sheet metal works

- Sheet metal works on the roof:
  - Metal roof coverings:  
installing metal sheets



## Useful links

- <http://en.wikipedia.org/wiki/Carpentry>
- [http://en.wikipedia.org/wiki/Woodworking\\_joints](http://en.wikipedia.org/wiki/Woodworking_joints)
- [http://en.wikipedia.org/wiki/Roof\\_construction](http://en.wikipedia.org/wiki/Roof_construction)
- [http://en.wikipedia.org/wiki/List\\_of\\_commercially\\_available\\_roofing\\_material](http://en.wikipedia.org/wiki/List_of_commercially_available_roofing_material)
- <http://www.carpentry-pro-framer.com/index.html>
- <http://www.builderbill-diy-help.com/roof-glossary.html>
- <http://www.basiccarpentrytechniques.com>
- [http://en.wikipedia.org/wiki/Sheet\\_metal](http://en.wikipedia.org/wiki/Sheet_metal)