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
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

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

Plated scarf joint

Detail of Scarfed Joint in Purlins
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

- **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

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)

- **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

- Shingling roofs with slate and thatch
Roof covering

- Shingling roofs with wood shingle

- Shingling roofs with bithumenous (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://www.basiccarpentrytechniques.com