

T OPIC SCHEDULE

		LECTURE	PRACTICAL
week	Date	Topics	Topics
4.		Building materials and their applications: WOOD	

Today's Lecture: Building materials: Natural and processed wood

I. Natural (organic) wood:

The construction activity of the settled societies was largely dependent on the materials available in the area. Probably the first building materials were the available plants: branches of trees, straw, reeds, palm leaves, grass, which were mainly bound by cords, also made of fibres of organic plants. In the northern forest areas log-cabins were soon introduced using wood for walls, floors and roofs.

The first and most influential building material in the use of mankind. Timber is a collective name for all kinds of woods, in the European region traditionally referring to pine, birch, oak etc. Wood is a versatile and widely used, earlier abundantly available natural material. During the ages mankind exhausted a lot of important wood supply regions thereby wood is now mostly used where there is no equivalent artificial material at hand (decoration, natural quality etc.).

Wood is preferred for its ease of use and handling, light weight, strength, heat and noise insulation and beautiful aging. The disadvantages of wood use are its relative scarceness, fire hazard, insect damage potential, short lifespan and lately: expense. Structures made of wood are traditionally limited in size and endurance, therefore long lasting and enduring public buildings are preferably made of stone. Wood remains an important structural material for roof constructions.

a) Physical Properties: eg.: Density: 600-700 kg/m³ (must learn)

Wood has different **strength properties** parallel and perpendicular to the grain, Tensile, bending and compressive strength are greatest parallel to the grain, whereas shear strength is greatest perpendicular to the grain.

Because its nature, wood tends to absorb moisture from the air and lose it when the relative humidity is low: the maximum amount of **embedded moisture** a cell can hold, is known as the fibre saturation point (it is about a 30 %) Before use for structural purposes, wood has to be seasoned by natural air or by artificial drying. Timber is classified dry when the moisture content is 19-22 %, and green, when it is above 22 %.

The causes of **timber deterioration** are (must learn):

- decay /fungus/
- attack /insects/
- weathering /atmosphere/
- fire /better than steel!/

Thus wood has to be treated with preservatives, typically through applications such as brushing or pressure impregnation.

b) Types: softwood (pine, cedar..) hardwood (oak, walnut...)

c) Manufactured building construction elements (typical sizes) must learn :

Beam	15 cm /15 cm ...10cm/10cm
Board	2,5cm ... 5 cm / 15 cm ... 20 cm
Plank	5 cm / 12 cm
Batten, slate	2,5cm 3 cm / 5 cm

II. Processed wood (typical materials, must learn names and description)

Thermowood boards and battens	Heating process change the moisture absorption of wood
Fibreboard	Board of bonded wooden fibre
Plywood	Where the grain of the succeeding ply runs crosswise to each other
Laminated board	Boards of bonded wooden fibreboards
Laminated beam	Beams of bonded wooden boards

Bond is made with resins.

APPLICATIONS FIELDS OF ORGANIC WOOD (WHERE WE USE IT) – simplified must learn list

1. Load bearing and supporting constructions
 - 1.1. Load bearing frame of building
 - 1.2. Load bearing and supporting frame of pitched roof construction
 - 1.3. Intermediate load bearing slab
2. Doors and windows
 - 2.1. Built-in frame
 - 2.2. Casement frame
 - 2.3. Door leaf
3. Coverings
 - 3.1. Floor covering (parquet..)
 - 3.2. Wall covering

Soft wood:

/Coniferous/

- spruce
- fir
- pine
- larch
- stone pine
- yew
- cedar
- redwood

Hard woods:

/Deciduous/

- oak
- maple
- beech
- poplar
- elm
- walnut
- aspen
- ash
- linden
- willow
- alder

Soft wood can be grouped as:

- yard lumber
- structural lumber
- factory lumber, shop lumber

The sequence represents an increase in quality.

The grade may be squared, or used as gum pole log.

The sawn lumber is called rough lumber or it may be dressed by a planing machine on one or all sides, when it is called dressed lumber.

The worked lumber is matched, shiplapped or patterned.

Scantling wood is also classified according to nominal sizes:

	thickness	width
<u>strips</u>	2" / 5 cm/	6" / 15 cm/
boards	2" "	6" "
plank	2" "	5" 12 cm
<u>dimensions</u>	2" 5 cm	
/framing, joists, planks, rafters, stud/		

timbers

5" /12 cm/

/beams,
stringers,
posts,
caps,
sills,
girders,
purlins/

Smaller than strips:

Fillet D13
Batten D12
Shavings D14
Chippings D15
Saw dust D16

Hardwood is mainly used for interior trimming, moulding, steps, doors, windows, and flooring.

Processed wood is recently more sought after:

- plywood /where the grain of the succeeding ply runs crosswise to each other/ D17-22
- blockboard D24 - battenboard D25
- laminboard D23

Particle boards:

- chipboard
- hardboard
- fibreboard
- softboard

Bond is made with phenol and/or formaldehyde resins.

The causes of timber deterioration are:

- decay /fungus/
- attack /insects
- weathering /atmosphere/

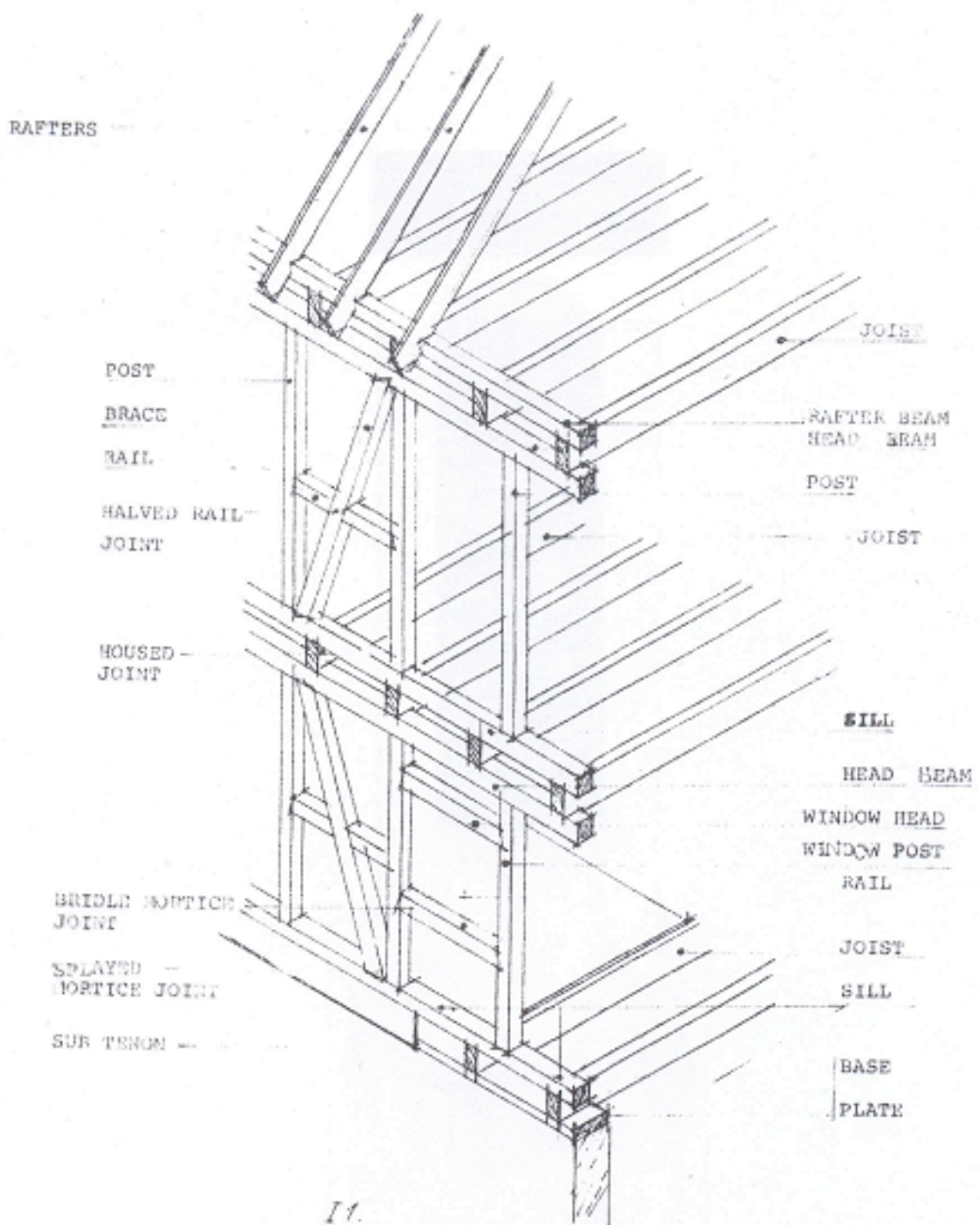
Thus they have to be treated with preservative /xilamon, xiladecor/.

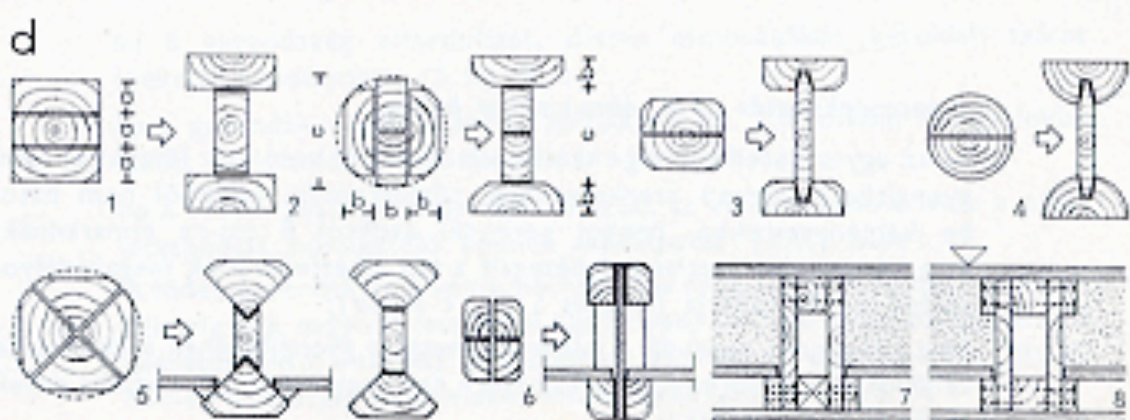
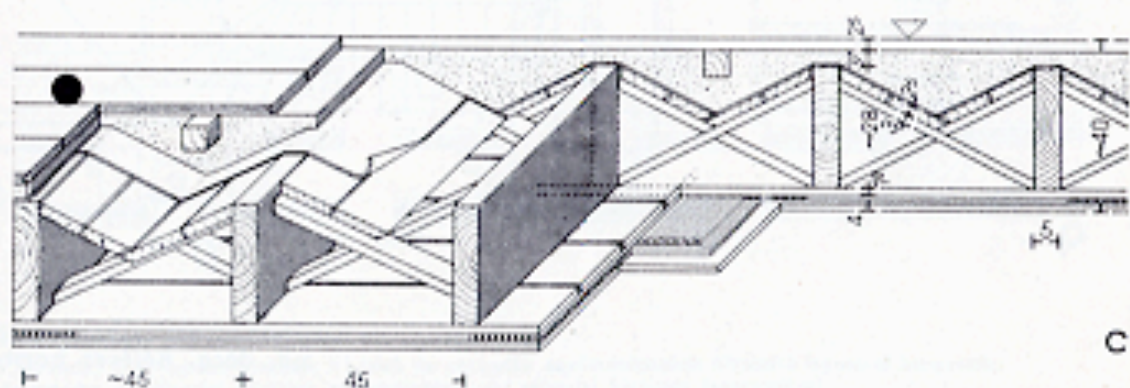
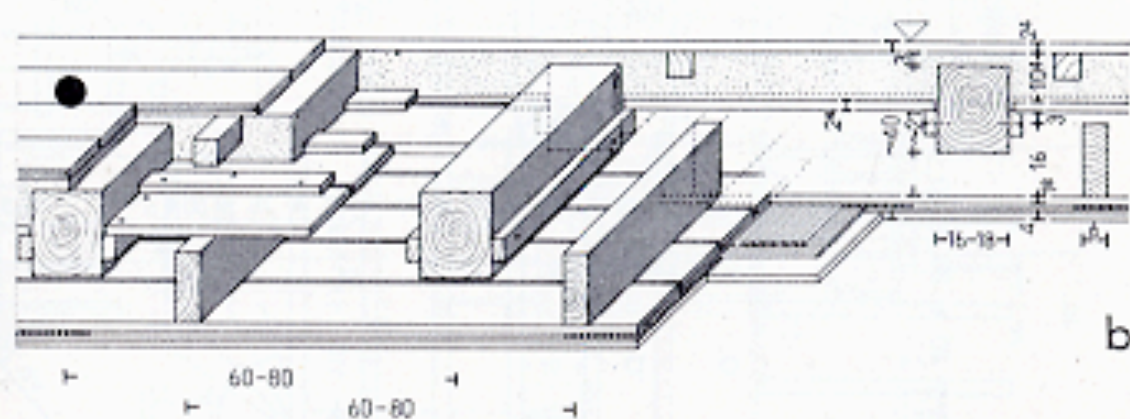
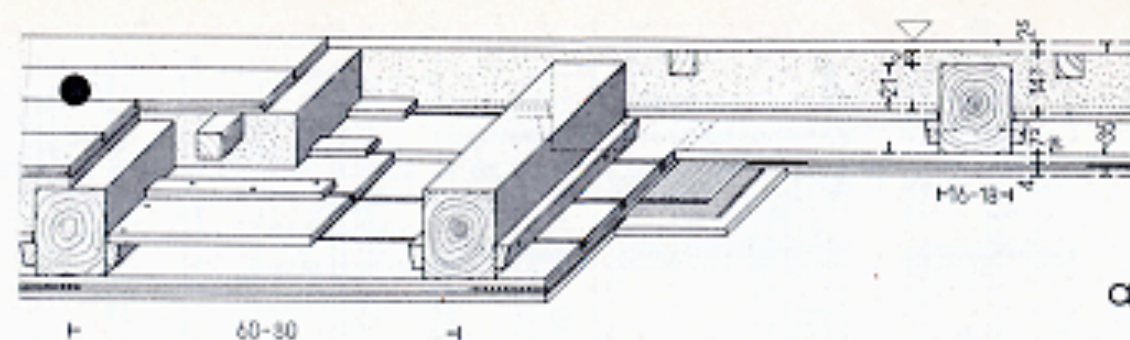
Method of application is by brushing or pressure impregnation. In the tropical areas, bamboo gained a leading role with its excellent properties. ^{D7,8}

The joints are mainly made by binding and knotting termed: "rigging"

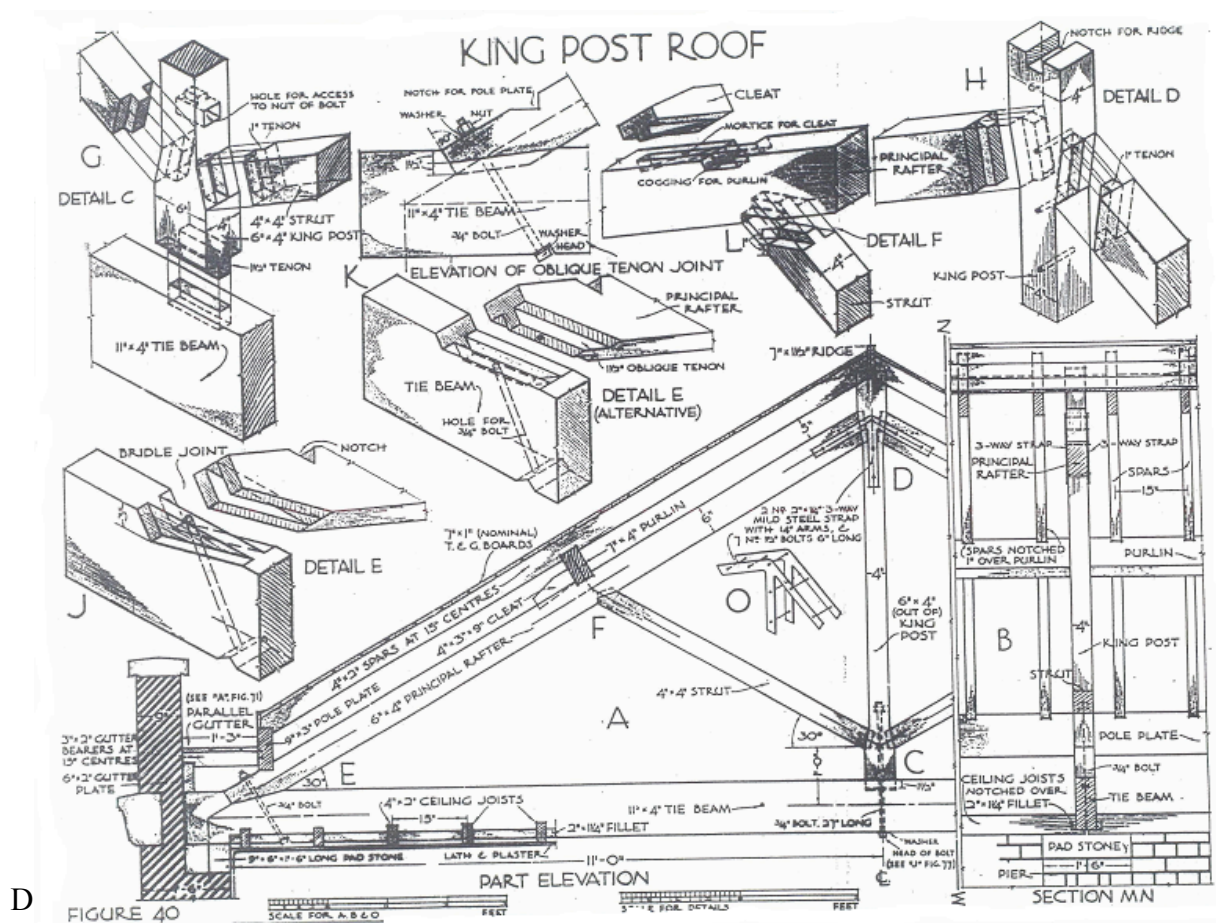
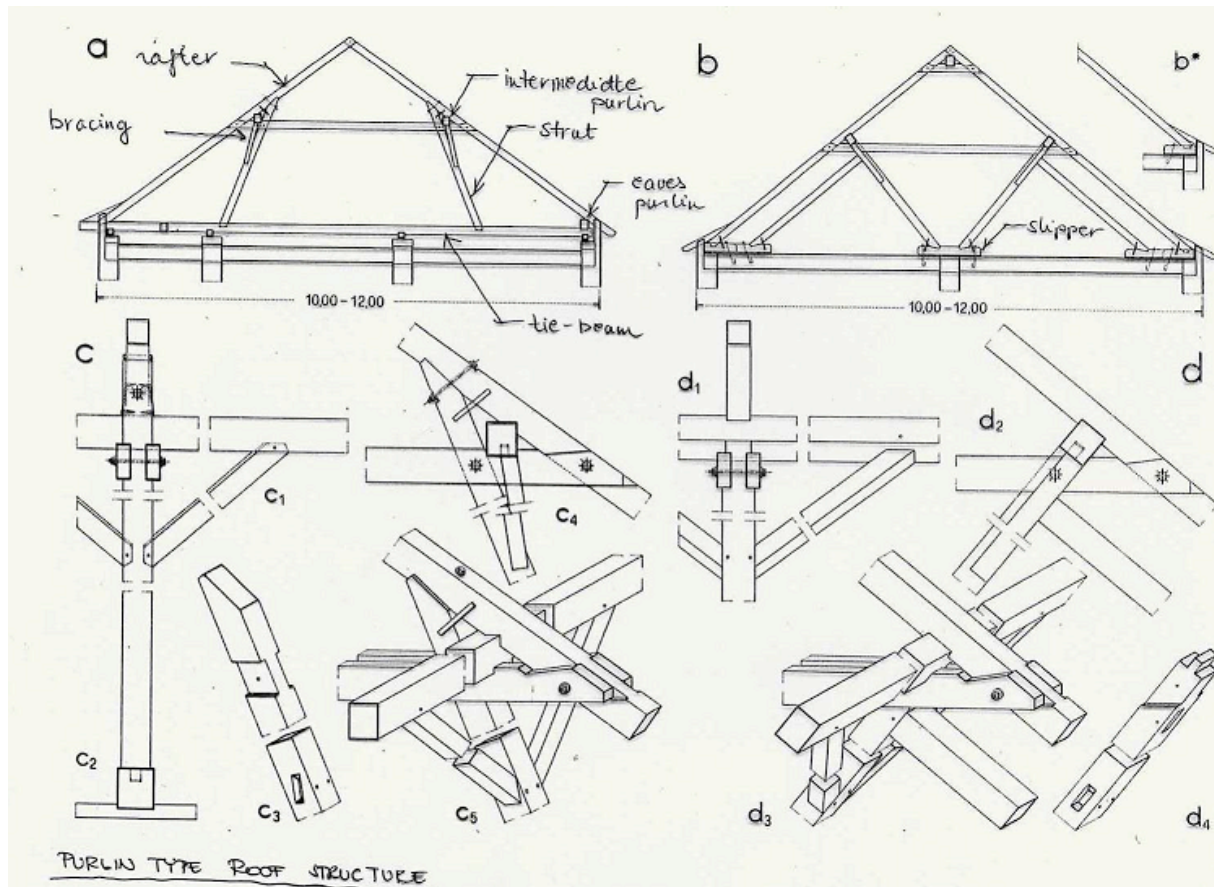
TIMBER

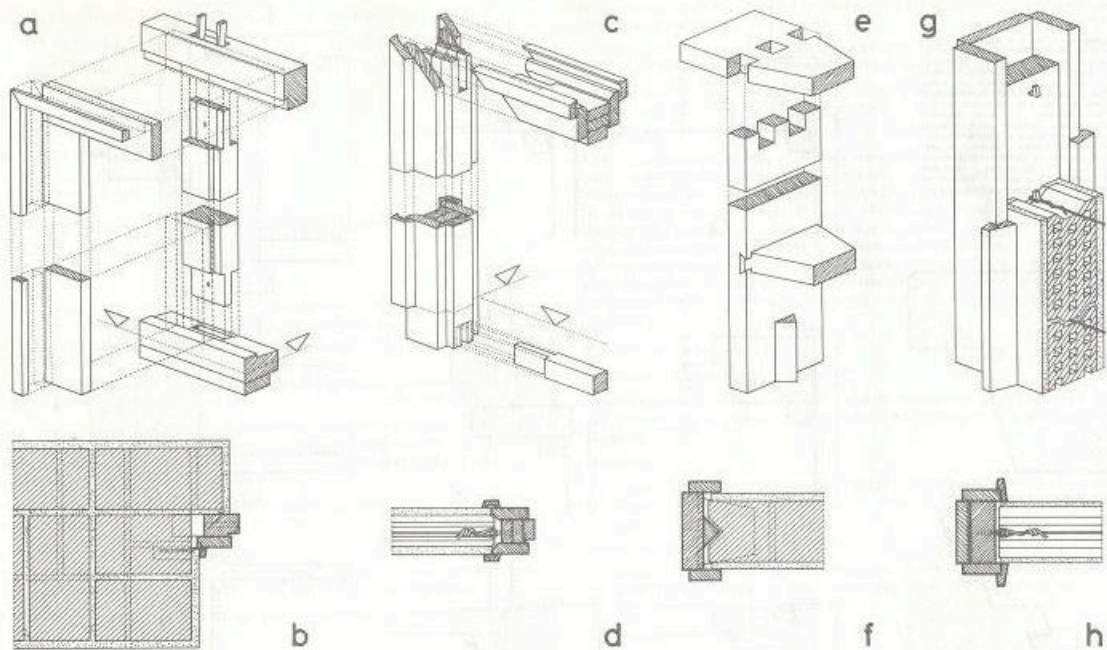
LOADBEARING FRAME





ROOF SUPPORTING SYSTEM

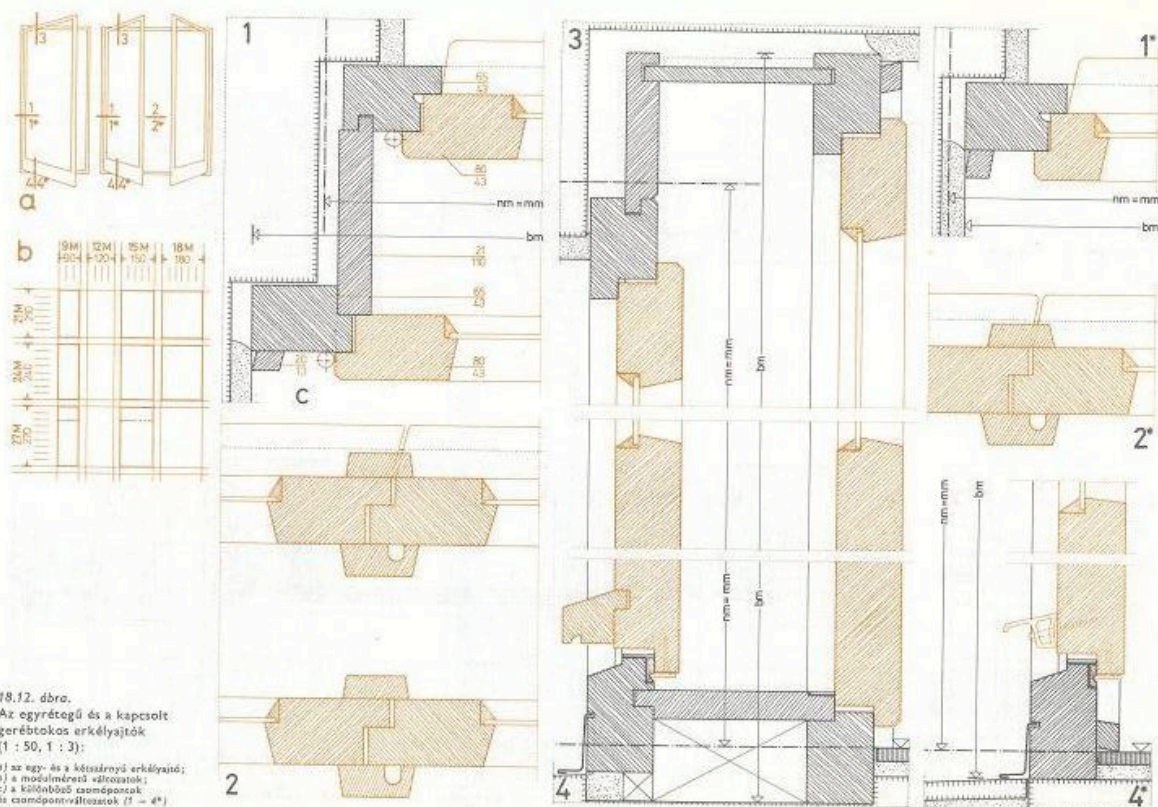




17.24. ábra.

A fatok összeépítése és beépítése:

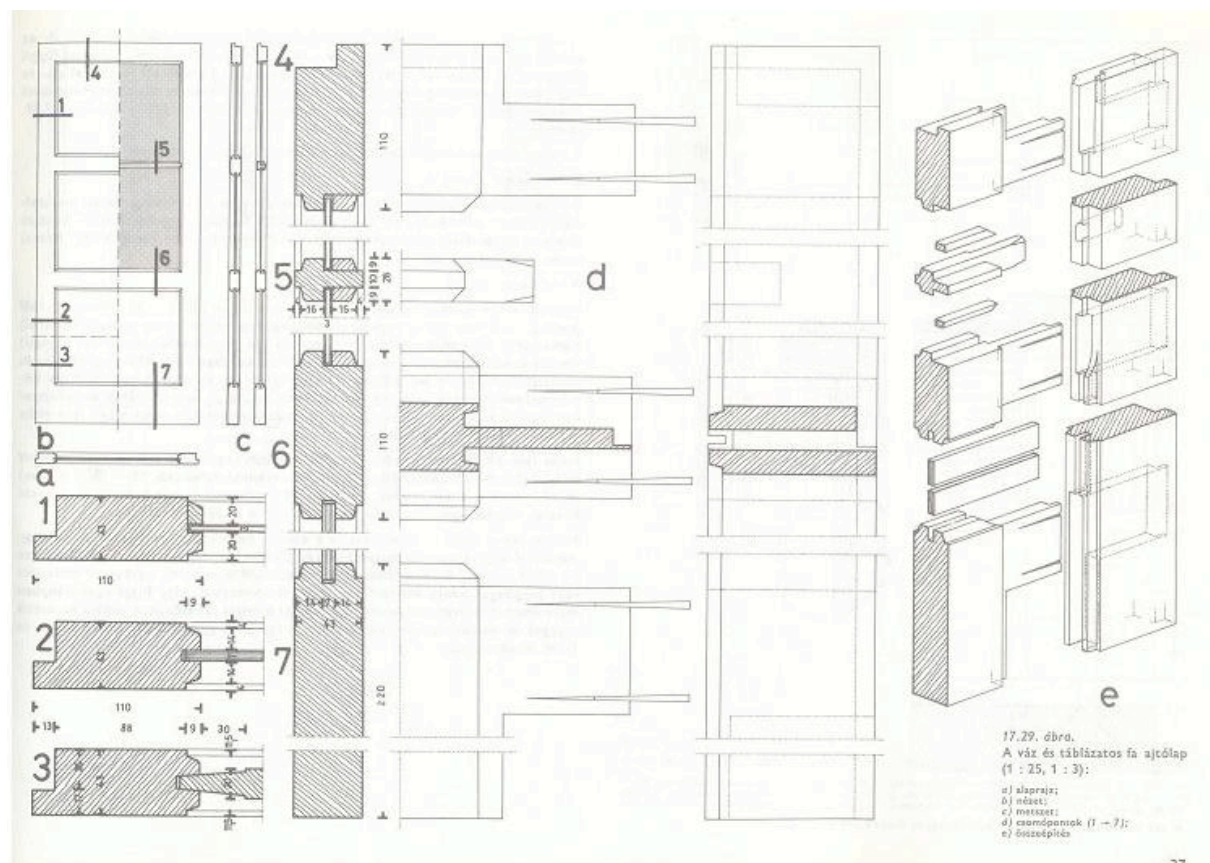
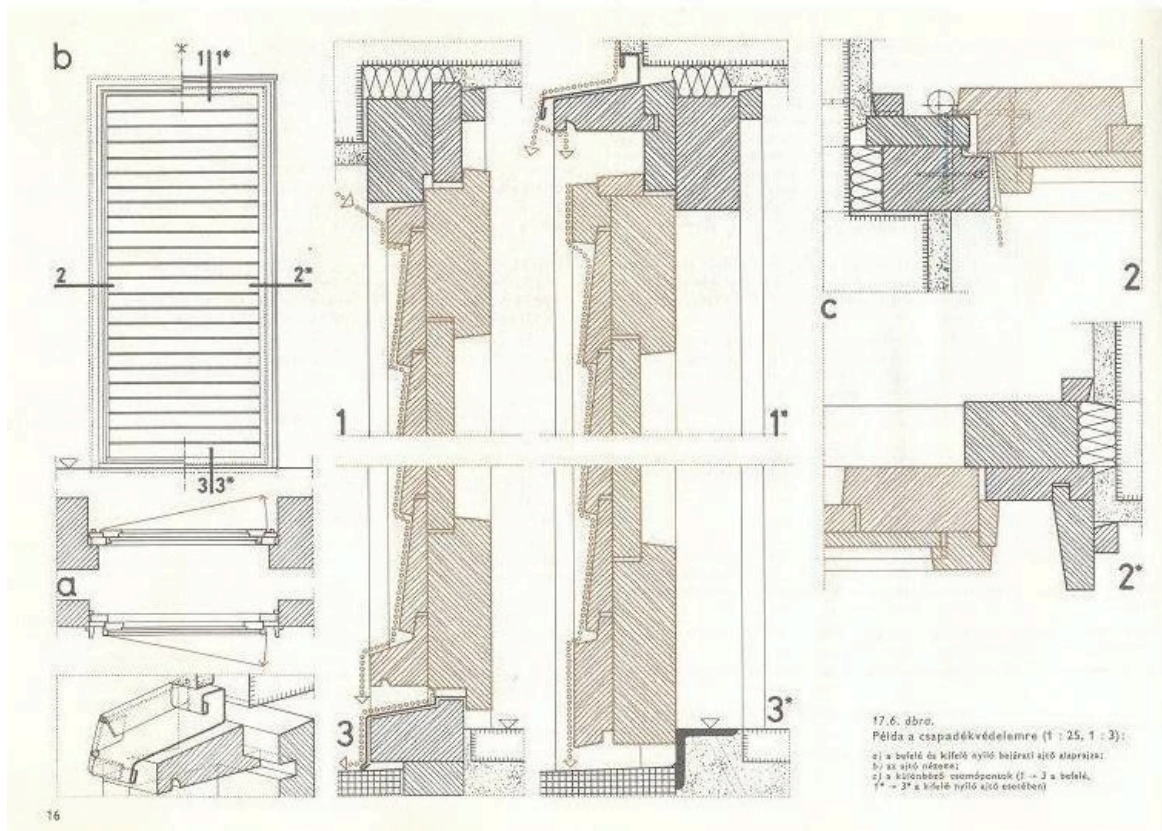
a) a gerébtok összeépítése; b) a gerébtok beépítése; c) a hevedertok összeépítése; d) a hevedertok beépítése; e) a pallótok összeépítése; f) a pallótok beépítése; g) h) a borított hevedertok beépítése

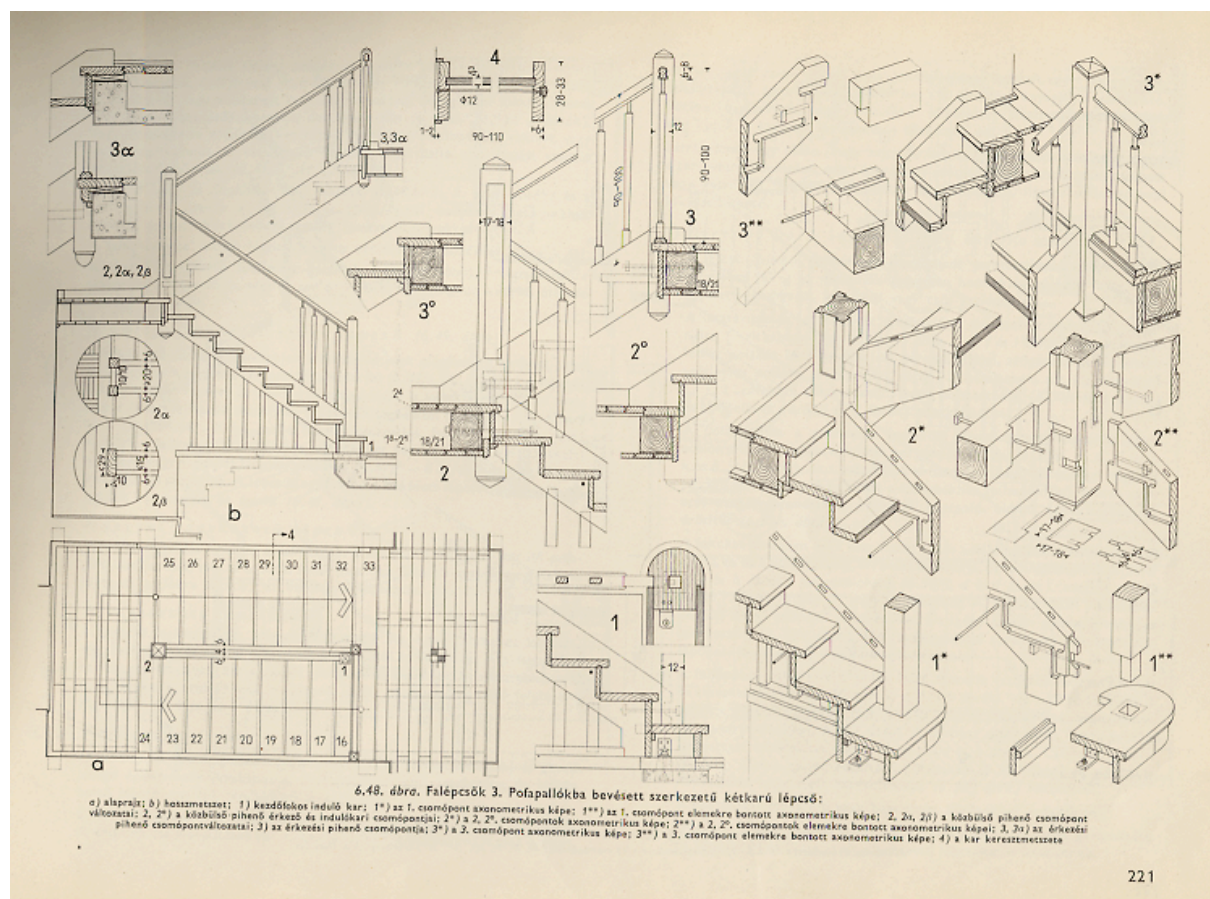


18.12. ábra.

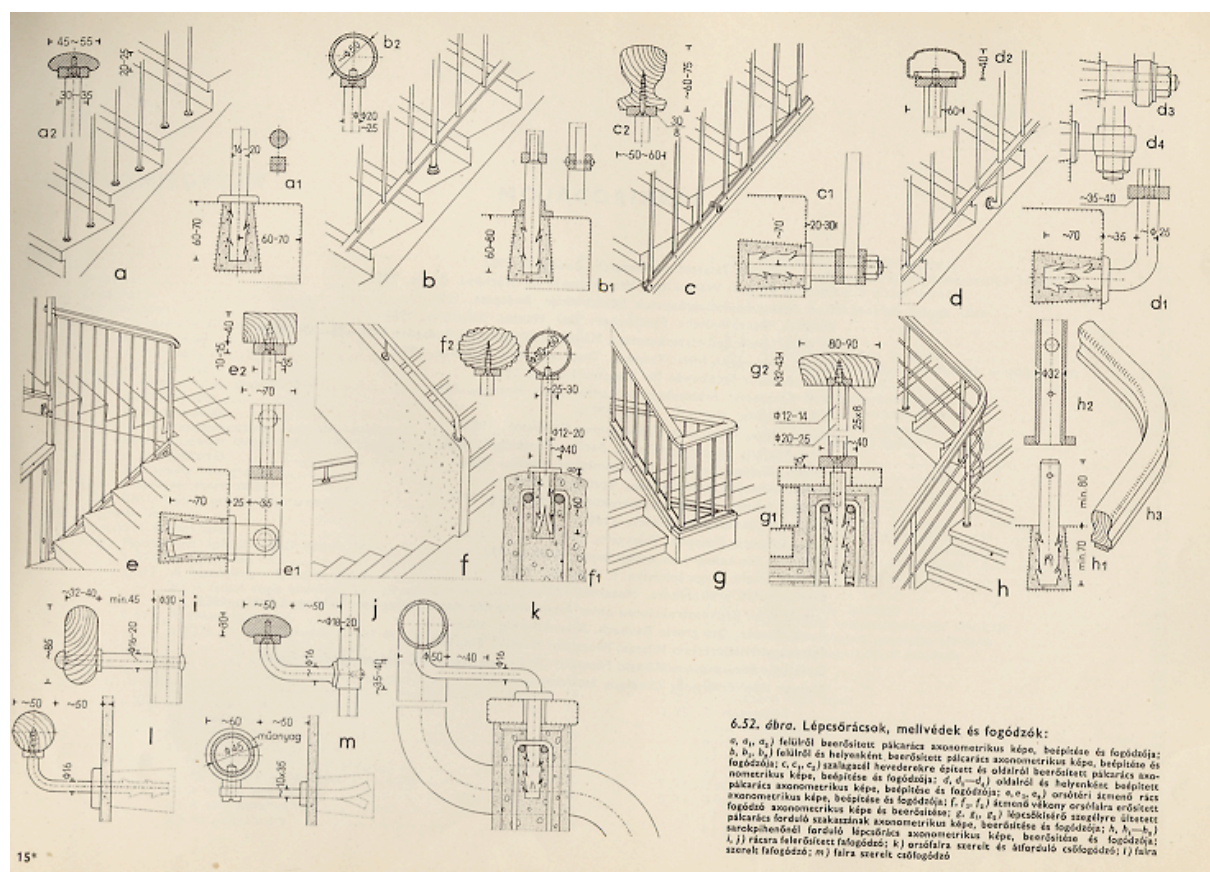
Az egyrétegű és a kapcsolt gerébtokos erkélyajtók (1 : 50, 1 : 3):

a) az egy- és a kétszárnyú erkélyajtók;
b) a modulméretű változatok;
c) a különböző csomópontok és csomópont-változatok (1 = 4*)





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FLOOR COVERING

