

TECHNOLOGIES IN THE  
CONSTRUCTION PROCESS  
ASPECTS OF SELECTING THE  
TECHNOLOGIES  
TIME-SEQUENCE OF  
THE CONSTRUCTION WORKS

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BUTE – Faculty of Architecture  
Department of construction technology  
and management

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Basics of construction

0

**Aspects of selecting the technologies**

**Technologies in the construction process**

**Time-sequence of the construction works**

**INTRODUCTION**

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## TECHNOLOGY

DEF:

**Construction technology** is the sum of **all work processes** of a work activity.

The **know-how** of the construction.

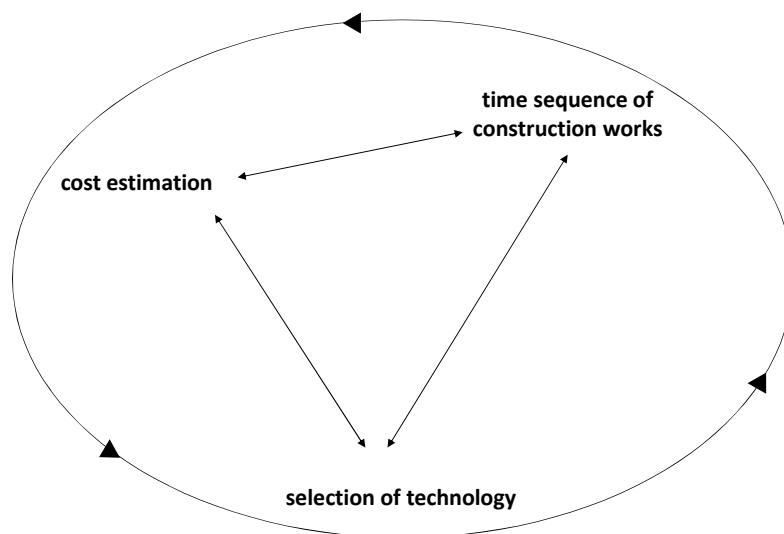
SELECTING THE TECHNOLOGIES

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## SELECTING THE TECHNOLOGIES

influencing factors



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## ASPECTS OF SELECTION

SELECTING THE TECHNOLOGIES

- technical circumstances
- cost
- required time -> cost
- workability / viability
  
- requirements in equipment / tools = What tools /equipments are at the contractor's immediate service? / What has to be hired?

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## COST ESTIMATION

SELECTING THE TECHNOLOGIES

- cost of the technology
- costs of the materials used
- cost of the time
- additional costs

e.g. - scaffolding

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## TIME ESTIMATION

SELECTING THE TECHNOLOGIES

- time of the work activity
- required time of the technology
- costs depending on time

e.g. – AAC / clay block

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## THE PHASE OF THE PLANNING

SELECTING THE TECHNOLOGIES

workability / viability

- workable / viable details
- optimal choices of technology based on local human sources
- details considering the expected (expectable) accuracy of the local construction industry

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## Technologies in the construction process

- construction of substructures
- construction of superstructures
- finishing works (+ electric wiring and building installation works)
- gardening, etc.

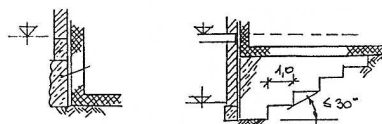
## Harmonizing foundation levels

### Influencing factors

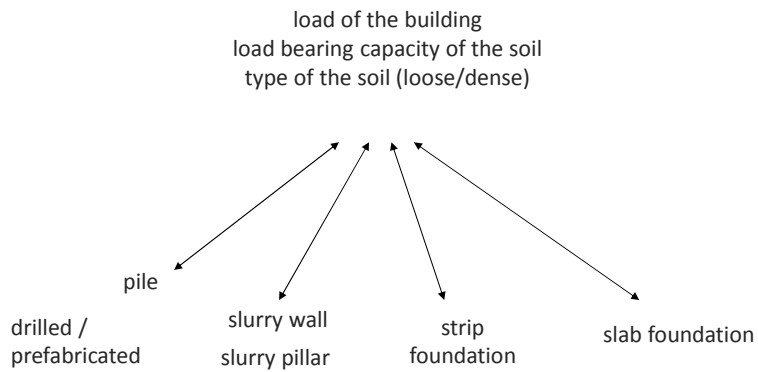
- necessary depth of excavation pit
- foundation level of the neighboring buildings
- foundation level of the constructed building
- characteristics of the soil

### Options

- placing subsequent strip foundation under an existing building
- slurry wall
- jet grouting
- injecting
- pile-wall



## Selecting foundation type



## Monolithic reinforced concrete structures selecting technology

### Vertical structures (wall, pillar)

- reinforcement
- formwork
- concrete placement

### horizontal structures (slab)

- formwork
- reinforcement
- concrete placement



work  
sequence

### Drilled piles, slurry wall

- concrete placement
- reinforcement



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## Monolithic reinforced concrete structures selecting technology

Concrete supply

influencing factors:  
cost, time, owned equipments, required quality, etc...



transport concrete



In-situ concrete

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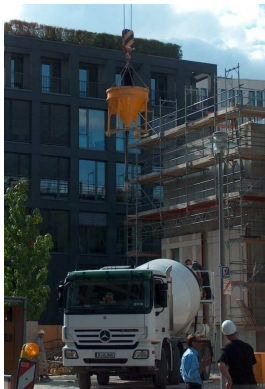
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## Monolithic reinforced concrete structures selecting technology

Concrete placement

influencing factors

scale of the concrete work



with concreting bucket



with concreting pump

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### Monolithic reinforced concrete structures selecting technology

Formwork system – for horizontal structures



modular tables (pre-assembled)



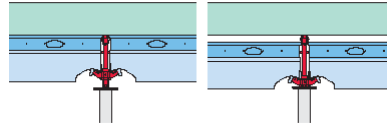
panelized slab drophead formwork system



girder slab formwork

work speed  $\leftrightarrow$  flexibility

work speed  $\leftrightarrow$  flexibility



TECHNOLOGIES IN CONSTRUCTION

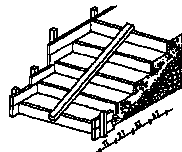
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### Monolithic reinforced concrete structures selecting technology

Formwork system – special solutions for horizontal structures



variations of the systems



special heights

TECHNOLOGIES IN CONSTRUCTION



**Monolithic reinforced concrete structures  
selecting technology**

Formwork system – for vertical structures

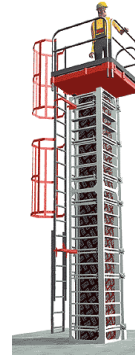


girder wall formwork system

(single faced <-> double faced)



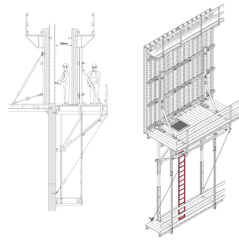
metal panel formwork wall formwork system



pillar formwork

**Monolithic reinforced concrete structures  
selecting technology**

Formwork system – special solutions for vertical structures

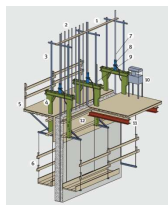


climbing wall formwork system



self climbing systems

No crane is needed!



sliding formworks



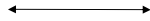
circular wall formworks

**Masonry**

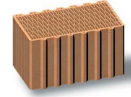
Bricks and blocks - materials



AAC\*block



clay blocks



high accuracy clay blocks



ceramic bricks - facade bricks



lime-sand bricks and blocks

\*autoclaved aerated concrete / porobeton

**Masonry**

Steps of technology

- set up the first course (dimensions, water level, etc.)
- laying the second, third, etc. courses
- jointing / grouting
- ▲Surface

Surface treatment (depending on the accuracy)

Brick surface

cleaning the surface  
finishing the joints

high accurate clay blocks, AAC blocks → thin plaster layer + undercoat + painting (coating)

clay blocks → 1,5cm plaster + undercoat + painting (coating)

joints

recessed /raked

flush

half-round



## Masonry

Wall types



brick walls



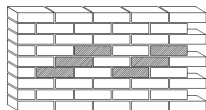
block walls

single or multi unit course

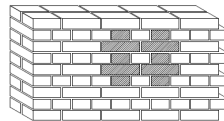


single unit courses

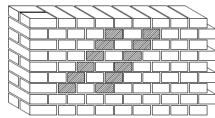
## Masonry – Brick wall bond types



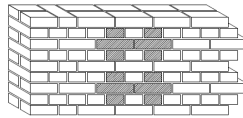
stretched /running bond



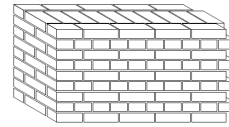
English bond



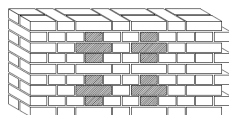
heading bond



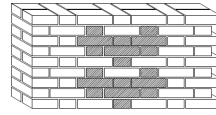
crossbond



wider walls



Dutch bond



Flamish (Polish) bond

## Carpentry

### Material

- timber
- glued laminated timber (GLT)
- cross laminated timber (CLT)
- plywood
- etc.



### technology



## Carpentry

### Structure types

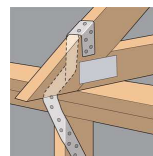
#### traditional structure

- timber (rafters, beams, planks, battens)
- traditional timber joints (+wrought iron)
- in-situ (on site)



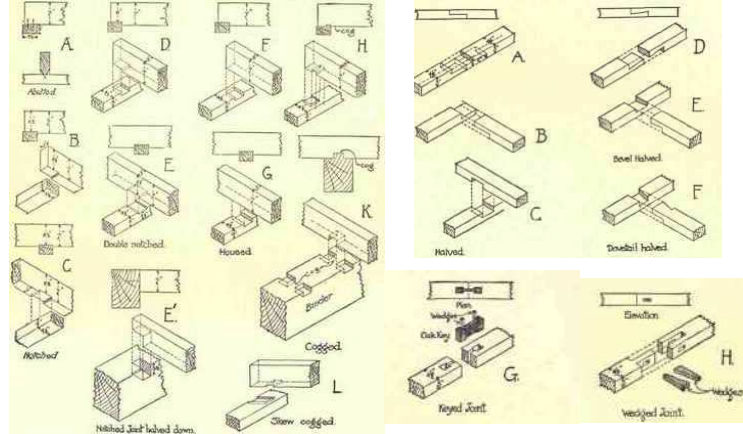
#### modern structures

- different materials (timber and/or modern ones)
- different joints – mainly with screws, nails, metal sheets, etc.
- partially or totally prefabricated



**Carpentry**

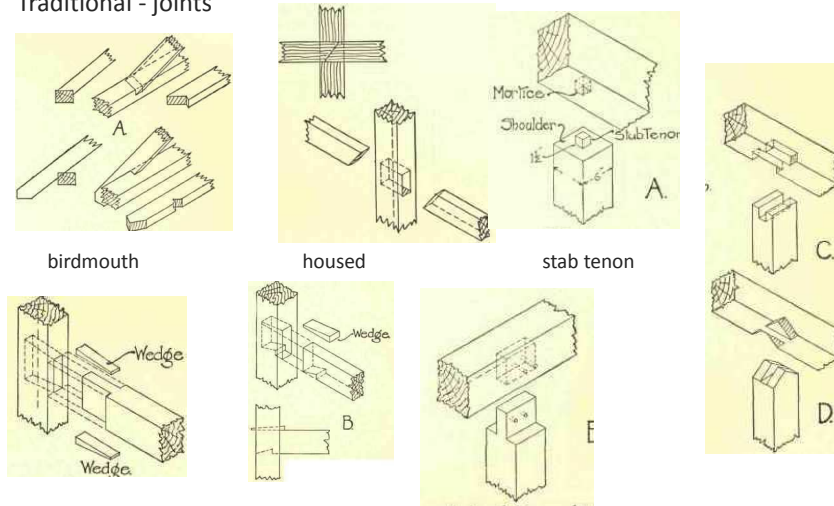
Traditional - joints



notched, double notched, housed, cogged, saw cogged, halved, bevelled halved, dovetailed halved, keyed, wedged

**Carpentry**

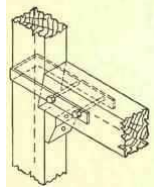
Traditional - joints



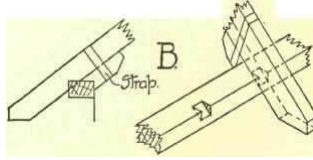
birdmouth, housed, stab tenon, wedged tenon, wedged, tenon- mortised, bridled

**Carpentry**

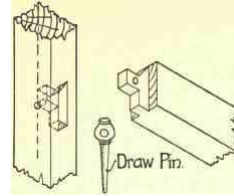
Traditional – advanced joints



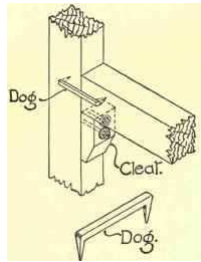
cleated (with strap)



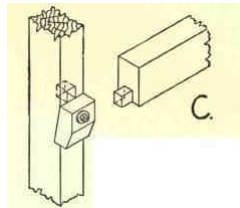
mounted with metal (wrought iron) elements



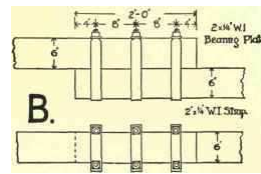
tusk tenoned



cleated (with dog)



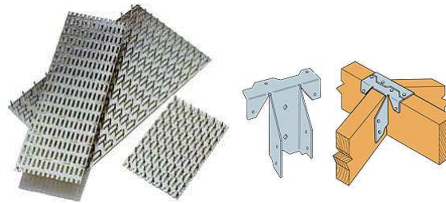
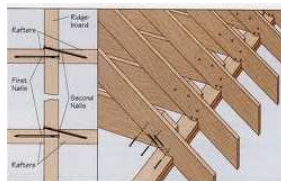
cleated (with stub tenon)



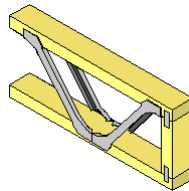
strapped, lapped

**Carpentry**

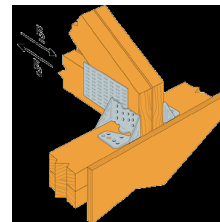
Modern joints



gang nail plates



posi-struts



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## WORK ACTIVITY

DEF: Basic element of the construction. Closed technological interval.

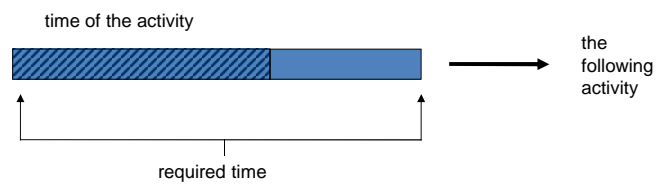
- during an unbroken interval
- one trade
- at the same place

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## The time of the construction activity



TIME-SEQUENCE

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### Time-sequence of the construction works

TIME-SEQUENCE



of a certain construction

depends on various things – there are many possibilities

IMPORTANT = the technical feasibility of the sequence

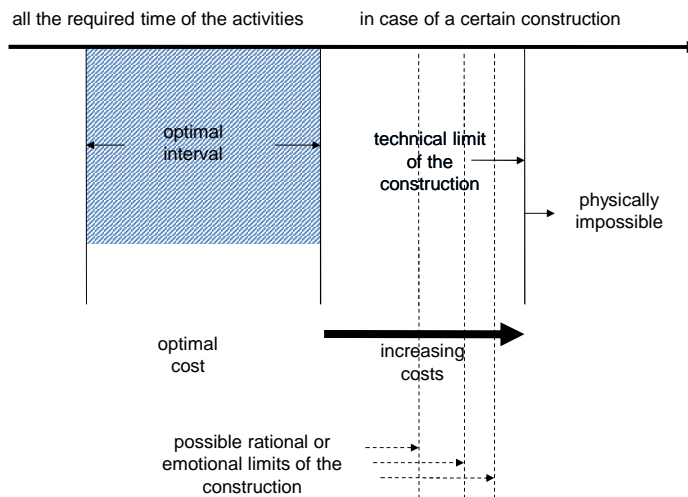
- interior plaster – fitting windows – exterior plaster
- fitting windows – exterior plaster – interior plaster
- exterior plaster – fitting windows – interior plaster
- interior plaster – exterior plaster – fitting windows

DEF.: TIME SEQUENCE = The right order of the activities.

3

### Total time of the construction

TIME-SEQUENCE





**S****SOURCES**

<http://www.peri-usa.com/products.cfm> 2010-10-26

[http://en.wikipedia.org/wiki/Autoclaved\\_aerated\\_concrete](http://en.wikipedia.org/wiki/Autoclaved_aerated_concrete) 2010-10-26

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Smiths C. R. – Anders K. C.:Principals and practices of heavy construction, Prentice-Hall, Englewood Cliffs, New Jersey, 1986. p.401

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