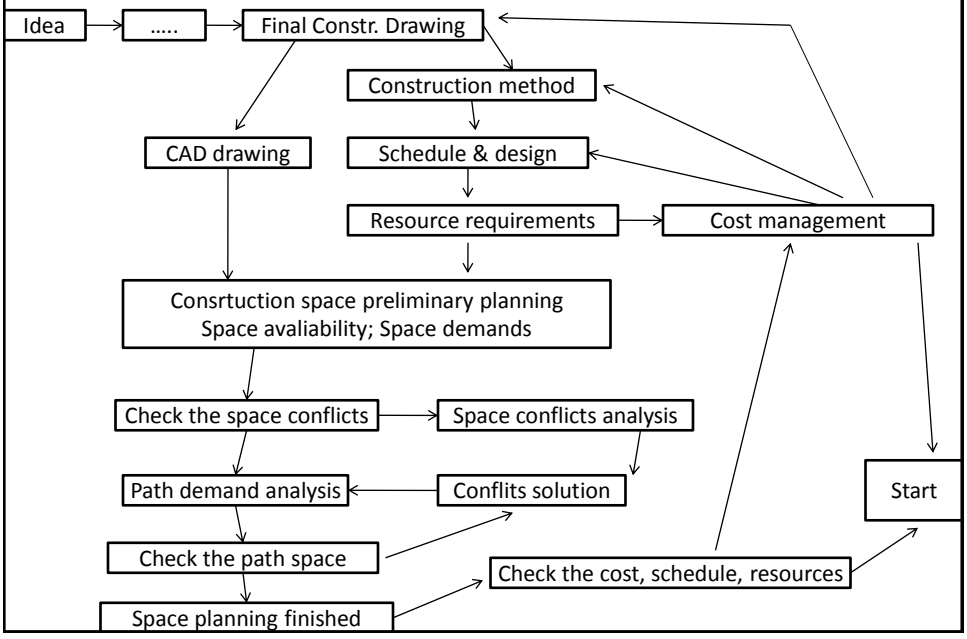
Construction Site Planning

Why do we have to do this?

Who? At what time? With what purpose?

Where is the place of it in the work flow of the building investment?
(if it starts with the idea, …. and ends with the FM



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Is there any difference in CSLP if it is a construction or a reconstruction?

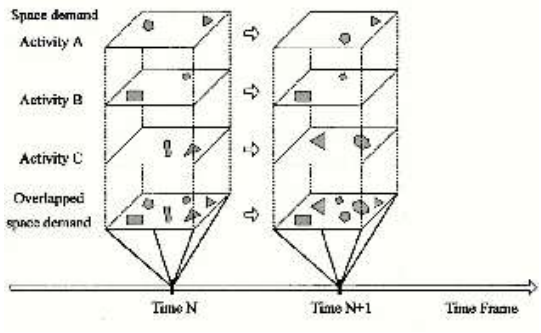
Is the construction site planning a flow or a static design?

The known models

The *site manager's* solution of the problem: ⟶ **First-come-first served**

Researchers: **2 basic methods** according to Moore (1980)

1) place everything (is needed) to everywhere, then choose the best
2) secuence the different type of stuffs by sg (weight, volume, size, cost, shape, …) then arrange them one at a time to their best place



computer-based site layout systems mostly use one of these

-AI (artifficial intelligence) techniques
-Generic algorithm
-Fuzzy logic systems
-Neural Network

How it starts?

1) Know the design **plans**! (function, size, levels, design, structures, materials, sizes, weights)
2) **Check**! Compair the design plans to the environment
3) Know your **possibilities**!
   - *technology & environment advantages and disadvantages*
   - *Building site avaliability vs construction site demands* (size, slopes, infrastructure, etc)
   - *Environmet possibilaties and capabilities* (neighbors, accessibility)
   - *Regional capabilities* (mines, factories, stores, hospitals, etc.)
4) Know what you want to **optimize for**! (cost, time, resourse)
5) **Start**! Technology-Time-Cost-Space
6) **Monitor & change**!

How it starts?

What kind of construction site drawings are exists? Functions?

Construction site map	~Feasibility, just in case, transportation
General construction drawing	**~Feasibility in the site & optimize!**
Detailed construction drawing	~by main structures or technologies
Detailed construction state drawing	~ by main machnines or technologies

How it starts?

Spaces & objects

Space types?

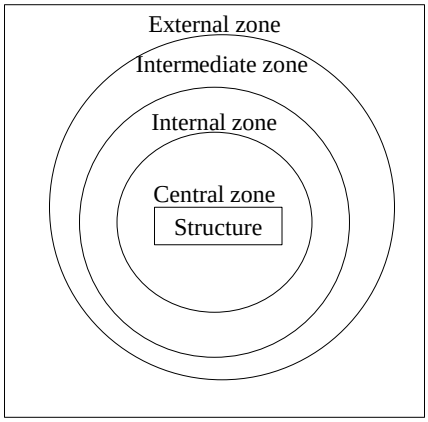
1) *total space*
2) *product space*
3) *installation space*
4) *available space*
5) *required space*

Objects' type?

1) *site objects;*
2) *construction objects;*
3) *constrain objects*

Spaces & objects

Zones:



Central zone:

Structure and it's closest place around (usually tower crane, lifting equipment, scaffolding)

Internal zone:

Uploading places, active depots, like formwork, prefabricated elements, etc)

Intermediate zone:

The tower crane still reaches this zone. Facilities of prefabrication, inactive depots

External zone:

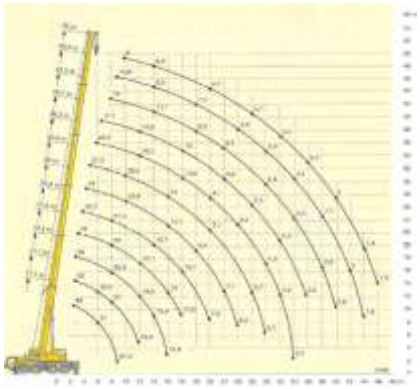
The tower crane does not reaches this zone. Staging buildings, parking places, small machine container, etc

Spaces & objects

Main equipment & machines

Choosing	Choosing	Placing
Crane (tower vs auto crane)	time=cost!!!	size, R, height
Pump vs crane	productivity	NEVER lift above
Etc.		head or road!!

1. ábra TEREX DEMAG AC250-1 típusú autódaruja



Spaces & objects

Material depots

Do we need it? Building in **from truck** or **place in depot**?

Size depends: (could we cut the project to more then 1 part? For decreasing money….)

- The size of the material standard transportation package
- The needed volume of this material (transportation volume, building-in volume, scheduling, costs)
- Is that possible to place one onto the other?
- Replacing the depot, or the material package (cost, resource, time)
- the type of technology

Storage type:

- Attribution of the material (place it in the same position as it was delivered)
- Is it lumpy or bulk?
- Which element of the weather cause bad effect to the material? (wind, sun = UV, temperature, rain)
- the cost of the material (guarding)

Moving & placing To the **final** place, or to a **temporary** place, temporary deposit?

- The cost, time, equipment, manpower of replacing it
- Schedule, resource plan, cost management
- The market (ordering time)

Spaces & objects

Material depots

Do we need it? Building in **from truck** or **place in depot**?







Spaces & objects

Pre-fabrication area

- possibilities:
  - no need
  - nearby the material deposit
  - somewhere else
  - next to the final place
- the crane should reach it?
- size?
- the finished, prefabricated element should not decrease the productivity!
- kind of supply is needed (scaffolding vs steel-beam)

Spaces & objects

Transportation to & on site Streets, roads in the site (temporary or final?)

Types:

transportation

walkways

stop & park

Geometry:

Gradient of the slopes <10% (<15%)

Size:

One track lane: 3,00m (direction)

Two track lane: 5,50-6,00m (direction)

Stop lane: min +2,50m

Turning radius:

~cut the BIGGEST truck's cabin

no revers if it is possible!!!

Material:

compressioned dirt, broken stone, concrete, asphalt, etc

Entrance (decrease the number of it to the minimal (1 for people, 1 for tracks))

Spaces & objects

Staging areas (buildings, containers, facilities), needed space:

Pure area

Covered, closed and heatable! (container: 2,44 x 6,05)

Management office

Documentation and back-up (archivation) office

Meeting room

Toilet (restroom)

Buffet, at least automat

Dressing room

Subcontractor's offices

Medical room

Porter's lodge

Covered, closed! (container: 2,44 x 6,05)

Small machines, hand-tool storage

Material depot (by technologies and by subcontractors)

Covered!

Material depots (by technologies and by subcontractors, if the material is „weather proof" (UV, heat, freeze, rain, wind)

Spaces & objects

Renting or not renting areas

Really necessary?

Cost?

ALL THE USED BUILDINGS MUST STAY USEABLE AROUND THE SITE!

Side walk?	traffic drawing!
One lane?	traffic drawing!
All lanes?	traffic drawing!
Entire road?	Depends, if it is possible-traffic drawing!
Neighbour's area?	-

General construction site layout drawing (M1:100, M1:500)

Floor plan & Section plan

Must mark at least (with dimensions, legend and levels):

Property (own site, entrances, neighbours and their buildings with hights)

Protected stuffes on the site (building, tree, etc)

Roads near by the site (directions, widths, turning radius, gradiation of slopes, materials, entrances)

The main structure (exists and under constr.)

Place of the main equipments and machines (tower crane, auto crane (with stops), pump (with stops), temporary track, needed structures as scaffoldong, parking lots, etc)

Main depots and working space (of the main technologies (pre-erecting on the site) (steel, timber, scaffolding, waste, etc)

Temporary and final roads, streets on the site (entrances, parking lots, directions, materials, sizes, radiuses)

Main facilities and staging buildings (management, social container, medical room, restroom)

Infrastructures (incoming places, temporary and final places, around the site, electricity high and low voltage, levels and directions & water)

Guarding system (fences, gates, rooms for the guard, etc)

Detailed construction state drawing (M1:100, M1:50)

By technology (example: sequential plan for placing the prefabricated columns)

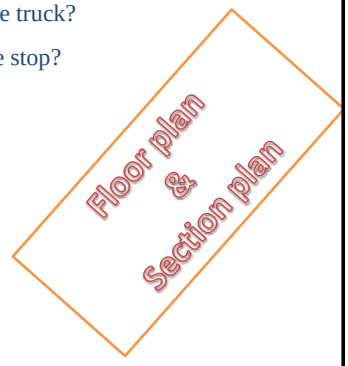
Each column will be lift up where from?

Will be temporary depot be or place it from the truck?

Where and how many times will the autocrane stop?

etc.

or **By a period of time** (example: structural work)



Example:

1) Hall

2) Corvin project, monolit structural construction & brick laying

3) Flat roof waterproofing work (resource-machine-time-cost)

Step by step for homework:

I. Exists:

1) own territory & neighbours, roads

2) property existing & protected buildings, trees, etc

3) Building that is needed to be built

II. Design:

4) Place of the main equipments and machines (tower crane, auto crane (with stops), pump (with stops), temporary track, needed structures as scaffoldong, parking lots, etc)

5) Main depots and working space (of the main technologies (pre-erecting on the site) (steel, timber, scaffolding, waste, etc)

6) Temporary and final roads, streets on the site (entrances, parking lots, directions, materials, sizes, radiuses)

7) Main facilities and staging buildings (management, social container, medical room, restroom)

8) Infrastructures (incomings, temporary and final places, around the site, electricity high and low voltage, levels and directions & water)

9) Guarding system (fences, gates, rooms for the guard, etc)

III. Monitor, control & change