

Sem 2 15/16

1) (a) Lift core areas are constructed two to three stories ahead of the external floor using slipform or jumpform method
 columns are constructed using metal framework
 Beams & slabs constructed using table forms to speed up the construction.
 Internal floors is concreted in one operation whereas the external floors are concreted in several operations with suitable construction joint in between.

(b) For heavy built up area, balanced cantilever is widely adopted:

- it eliminate support scaffolds, which are expensive and can be a hazard when they are unstable in case of sudden flood
- over navigable highways or waterways, support scaffolds are not permitted or severely restricted. Cantilever method eliminate such problems.
- construction may proceed from pylon piers & structure is self supporting at all stages
- no obstruction to traffic flow below bridge under construction

(c) Dispersion of Activities:

- construction dispersed among many temp locations - manufacturing activities performed at fixed locations.
 ↳ difficult to implement A & R

Service life:

- construction project has a long service life - manufacturing str. product: short to medium
 ↳ need higher attributes of jobs to be performed by robots

complexity of tasks:

- construction project req high degree of manual skills - manufacturing: simplified tasks.
 ↳ design of A & R is complicated

work environment:

- construction: harsh environment - manufacturing: tasks performed adjusted to human needs.
 ↳ robots need to withstand such conditions

2) (ai) Bring about the wider use of labour-savings construction methods & technologies that can help reduce the demand for manpower on site.

(a ii) A performance-based system with flexible characteristics that help ^{builders} to adopt the most cost-effective solution to meet the constructability requirement. Constructability work assessed in areas of:

- 1) Structural works
- 2) Architectural, mechanical, electrical & plumbing (AMEP) works
- 3) Site practices

(a iii) Structural System

Wall System

Other buildable features

(b i) Breaking up the construction process into manufacturing activities, and executing the manufacturing & work installation works as concurrent/advance activities.

(b ii) Handling :

- handling stresses in precast members
- lifting devices built into components consider shear / bursting stresses

Standardisation :

- precast members standardised in shape & size (↓ production cost)
- simplify handling & delivery & sorting

method of manufacture :

- ensure simple dismantling & re-assembling within acceptable tolerances
- provide facilities to secure fixings

transportation :

- consider stacking procedure : horizontal / vertical on vehicle height, width & load restrictions on public roads.

erection :

- consider stability of precast members components during erection.

Objectives :	Performance indicator	monitored by :	freq. of measurement	reviewed
To conduct daily tool box meeting for workers before starting work	no. of feedback given by the workers	site engineer	monthly	PM
To ensure accident frequency rate & accident severity rate to be 10% below national avg	no. of training sessions for workers	site engineer	monthly	PM
	no. of training sessions for sub-contractors	site engineer	monthly	PM
	no. of incidents / accidents per week	site engineer	monthly	PM
To restrict noise within permissible level	no. of feedback by the residents	site engineer	weekly	PM
	no. of checks on the noise level per week	WHSO	weekly	site engineer
To implement monthly rewards for the best performing sub-contractor on occupation health & safety matters	no. of awards rewarded to sub-contractors	WHSO	monthly	GM

PM - project manager

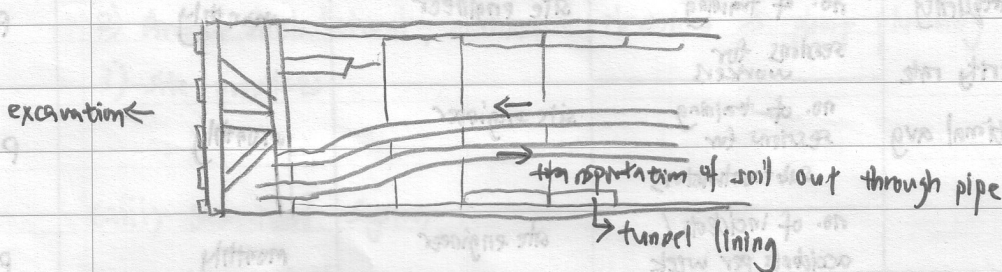
GM - general manager

WHSO - workplace health & safety officer

(a)

4) Tunnel Boring Machine (TBM) - slurry Type

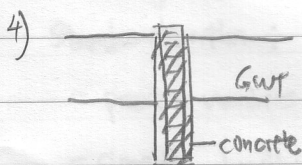
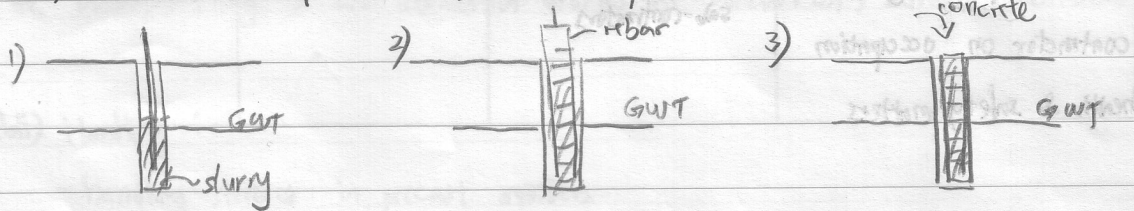
- 1) Pump water & bentonite slurry through the pipe into the tunnel front & excavation chamber
- 2) Cutter chamber is filled with pressurized slurry mix to stabilise the face of the tunnel
- 3) Cut the soil at the tunnel face by rotating the cutter head (tunnel lining)
- 4) Soil transportation by pumping through pipe.



(b)

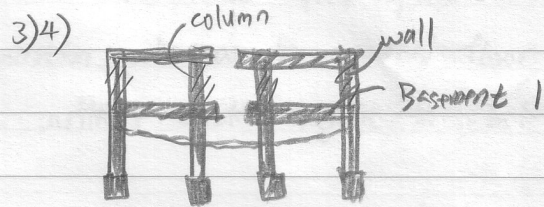
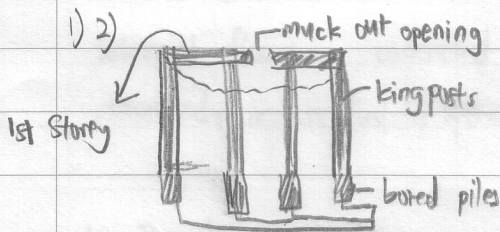
(i) wet method is used because GWT is ^{above} at the depth of the basement.

- 1) Drill to a full depth of slurry.
- 2) Place rebar (using deformed rebar to have a greater bond between concrete & rebar)
- 3) Concrete is then placed into the drill hole.
- 4) concrete bored pile wall is then completed.



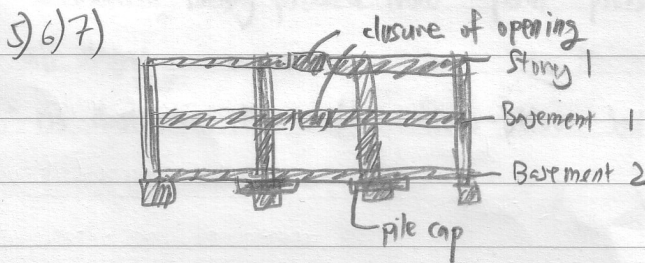
(bii) top-down construction

- 1) After bored piles wall are installed, excavate to certain depth to construct the 1st story.
- 2) construct 1st story (install kingposts first) with conventional formwork & leaving mucking out opening.



~~3) construct Basement 1 & ex~~

- 3) excavate to basement 1 & construct basement 1
- 4) construct B1-story 1 column & wall.



- 5) Excavate to Basement 2
- 6) construct basement 2 & pile cap. Construct column & wall between B1 & B2
- 7) closure of mucking out opening.

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