The scope of planning covered in this seminar mainly include:

1. Understanding of the construction detail including the technology and process involved
2. Site facilities and other basic logistic to support the needed construction operations
3. Site layout planning
4. Idea about resources and cost planning
5. Use of method statement in the planning process
6. Highlight of some major planning set-up and their cost implication
7. Other contingency situations and concerns

*Note: program and scheduling as a form of planning will be covered under separate talk.*
Concern 1

Understanding of the construction detail including some special technology and work process involved. There are some other issues to concern when talking about construction detail, such as:

- What type of construction,
  building – commercial, residential, medical, educational, public facilities ..... civil work – site formation, marine works, transportation projects, tunneling ..... 
- Scale of works – project sum ???
- Size of site - ??? m² or ?? hectares
- Contract period/duration of work, can up to 5 - 6 years
- Geotechnical/topographic condition of site, some can be very complicated. Example: site on harbor-side, complicated slope, no easy access like pedestrian street
The Belcher’s, a residential development in Fokfulam Road

The Belcher’s after completion
Construction of Public Estates

Building project incorporating significant amount of site formation work
Reclamation projects

Reclamation projects

Reclamation projects
Marine works

Transportation project, Tuen Mun Station of West Rail
Project of very large-scale, the Festival Walk spanning from site formation up till completion in 54 months covering an area of about 20000m²

Project of very large-scale, construction of the airport terminal building
Construction within a difficult site with sensitive slope and topographic environment, the case of Celestial Height at To Kwa Wan
the case of Celestial Height

The case of Celestial Height
Site adjacent to existing seawall, the redevelopment of the New World Centre, with deep basement

Site with very limited access, located within a pedestrian street
With the understanding of the above situation, then a detail construction planning can be able to prepare with better reliability.

The below elements should have adequate input in order to achieve a reliable construction planning:

• Identify all basic work components within the contract, example: what is the essential works need to be done for a 4-level basement within a congested site?

• List/foresee the major construction process, example: the detail work process for a building project involving large amount of slope-cut (Case example, the Celestial Height)

• Any other associate operation need to be worked together or with close concern with other planning issues? Example: site formation and sub-structure work at the same time by different contractors. Or, partial hand-over situation.

what is the essential works need to be done for a 4-level basement within a congested site?
Construction of basement using Bottom-up approach
- Extension for St Paul Hospital

Basement excavation/support – example: Ho Man tin Residential development
what is the essential works need to be done for a 4-level basement within a congested site?
Below are some very basic work provisions need to be done in case a basement of this nature is to be constructed:
• Ground stabilization provisions
• Cut-off walling provisions
• Lateral soil support provisions
• Excavation arrangement
• Dewatering arrangement
• Spoil removal arrangement
• Basement construction arrangement

The question is: how and to what extent these are to be done?

Can you foresee the major construction process when doing these complicated projects?
HKU Centennial Campus – condition of site before redevelopment
Using of construction techniques. Some advance technologies may be required to tackle some special projects, such as:

- Project involving deep underground or the associated works
- Building involving a great portion of civil elements
- Structural steel or composite structure
- Structure involving very heavy lifting operation
- Super long-span or high headroom structures
- Projects involving multi-disciplinary operations. Example, intelligent building, facilities with highly sensitive E&M or other logistic services ....
- A&A works for properties with high commercial value
- Conversion/preservation of building with high heritage value
- Special plant and industrial facilities
- Other facilities with highly specialized function. Example hospital or even prison, site in restricted area like the airport.
Project involving deep underground involving a great portion of civil elements, the Express Rail Terminus at West Kowloon
Project involving deep underground involving a great portion of civil elements, the Express Rail Terminus at West Kowloon
What message this image gives?
Large-scale basement project involved very complex phasing planning.

What message this image gives?
Construction of basement using Bottom-up approach
- A much complicated case for large area site with multi-phases to speed-up works

July 2010
Working with Structural steel or composite structure
Working with Structural steel or composite structure, with complicated geometry and heavy members.

Chow Tai Fook Centre in Guangzhou
A steel column, 5m x 3m in measure

Structure involving very heavy lifting operation, Super long-span or high headroom,

The case of Hong Kong Convention and Exhibition Center
Other facilities with highly specialized function

Hanger facility for the HK Aircraft Engineering Co. Ltd.
Working with heritage properties
Concern 2

Site facilities and other basic logistic to support the needed construction operations. The followings are some essential facilities for various kind of construction jobs:

For general building works

• Hoarding, work fence, office and workers’ facilities
• Internal site access
• Provisions for temporary working, loading and storage
• Same, but in the form of elevated platform or alike
• Lifting provisions
• Concreting provision
• Safety provisions
• Re-provision these facilities in appropriate stages of work
• Advance works especially for basement, marine or slope works
**Concern 2**

For civil engineering works. Similar to building works but sometimes with the incorporation of the following kinds of special provisions

- Large amount of cutting and/or filling works to provide rooms for temporary access. Example: slope and site formation works
- Provision of barging or ferry service. Example: marine works
- Extra working space for pre-assembly or preparation of prefabricated components
- Temporary storage of large amount of construction materials. Example: precast elements, semi-assembled components, excavated material for disposal or re-use.
- Large amount of power and water supply of temporary nature in remote site/s
- Need of temporary traffic arrangement to facilitate works

**Concern 3 - Site layout planning**

The main concern is to plan and prepare an efficient layout base on the limited space of site to support all the needed construction operations. There are also other features of site layout need to be noted when planning the layout, that is:

- The dynamic nature of site works
- The practicality of site works (satisfy the basic requirement, provide on time, or over-provided)
- Close coordination between frontline and planning which may have a time-lag sometimes more than a year.
- Many of the site layout facilities are to provide/support as work access and/or site safety.
- Delivery/transporting equipment of special nature (e.g. Chiller, transformer, escalator, extremely heavy components)
- Relationship/differences between site layout and temp works
- Layout to fit complicated construction planning, examples: HKCEC-roof erection, Festival Walk site formation, HMT Station
Dynamic nature of site work

An example for a residential project with several critical stages of works within a 24-month time-line
CONSTRUCTION STAGE 2
5TH TO 6TH MONTH

MODIFICATIONS:
- Excavation & Construction
- GFD/GCD Site Office
- GFD Rebar Bending Yard & Steel Casing Equipment Storage
- Podium Complex Construction
- Temporary Platform
- Elevated Deck Construction
- Existing Sau Mau Ping Estate
- Podium Complex Construction
- GCD Steel Yard & Grouting Station
- GBD Rebar Bending Yard
- GBD Site Office
- 40m Jib

CONSTRUCTION STAGE 3
7TH TO 8TH MONTH

MODIFICATIONS:
- Late Cast Structure PG/F - P2/F for Unloading/Rebar Bending
- Podium Complex Construction
- Footbridge Tower 2 Construction
- 60m Jib
- 40m Jib
- 30m Jib (lifting)
- GBD Rebar Bending Yard
- GBD Site Office
- GCD Steel Yard & Grouting Station
- GBD Site Office
- 40m Jib

EXISTING SAU MAU PING ESTATE

PHASE 5
PHASE 3
PHASE 4
PHASE 2
PHASE 1
CONSTRUCTION STAGE 6
15TH to 17TH MONTH

CONSTRUCTION STAGE 7
18TH to 24TH MONTH

SECTION 1 COMPLETED AND HANDED OVER

SAB FINISHING WORKS

SECTION 2 COMPLETED AND HANDED OVER EXCEPT PODIUM ROOF

ACCESS TO PODIUM ROOF VIA CARPARK RAMP

PC FAÇADE STORAGE YARD & UNLOADING AREA FOR SLAB CONSTRUCTION
**Concern 4**

Idea about resources and cost planning

Construction Resources usually refer to human operatives, materials and plants. All these elements involve some kinds of layout support, such as for:

- Human operatives – welfare, accommodation, access and safety
- Materials – access/delivery to the required spot, storage, handling etc.
- Plants – delivering the plant to the spot, accommodation, mounting/dismantling of the plant, powering the plant, movement of the plant, operator access to the plant, choice of equipment and construction methods.

**Cost planning issues**

Provision of these resources having a cost implication. Cost planning needs to be incorporated when concerning these items.

---

**Concern 5**

The use of method statement in construction planning.

The basic information needed to be specified in a method statement should include:

- Purpose and scope of the operation
- Identify the work components involved in the carrying out of the operation
- State clearly the sequence & time-line of all involved works
- State the resources required for works (including the quantity and the time that those resources are needed)
- State the needed facilities/logistic that are required to support the works/operation. Very often the setting up of some kinds of temporary works may be required.
- Other specific requirement needed. Example, engineering inspection, waiting for special permit, handing over of works by other parties etc.
**Concern 6**

Highlight of some major planning set-up that have significant cost implication

- Large-size working platform
- Long distance/difficult access-way required
- Large-scale falsework erection. Example: falsework for long-span/high-headroom in-situ concrete works
- Provision for heavy lifting. Example: erecting and dismantling of large-size tower crane, HKCEC Extension, route 3 (KC) lifting gantry, IFC link bridges
- Power supply for site of mega-size. Example: situation for the site of Terminal building of the Express Rail in West Kowloon.
The temporary access-way for the Tuen Mun Highway Widening Project
Advance work for the Celestial Height Project
Concern 7
Other contingency situations and concerns
Many projects of more complicated nature often have situations out of usual expectation though some kinds of contingency plans may already be incorporated. Examples of these can be:
• Unknown underground obstacles when doing large-scale ground works (Festival Walk, Express Rail Terminus, Admiralty Station of South Island Line)
• Accident, e.g. TBM damaged by flood
• Progress of very complicated work operation cannot cope with other associate works, e.g. IFC project, retrospective outrigger installation and the core wall

Concern 7
Besides possible emergency/contingency situations, there may have some other concerns that need to be taken into account when planning projects of relative complicated nature, for examples.
• Occurring of out-of-control work operation. Examples: ground movement beyond allowable limit
• The delivery of mile-stone equipment that form part of the critical path of project. examples: emergency generator, transformer, ....
• Projects with shifting over arrangement. Examples: the delivery of an advanced/compensating facilities before the removing of the old facilities
Delay caused by the inward moving of the diaphragm wall near the MTR tunnel, the Pioneer Centre Basement construction in early 1990s.

Example: the delivery of an advanced/compensating facilities before the removing of the old facilities, the Wanchai Ferry Pier for the Wanchai Development Phase 2
There are many other challenging examples in the real world. This presentation only provides some highlights to give a wider vision in order to make construction planning more realistic and down to the ground.

Thanks.