Construction of the International Finance Centre, Phase II
This seminar will cover the following areas regarding the construction of the IFC II

1. Background of the project
2. Foundation system
3. Construction of the 88-storey tower block
4. Construction of the podium structure
5. Basement construction
Some Background
Information about IFC II
North East Tower

One IFC

Suite Hotel

400-Module 6 Star Hotel

IFC Mall
Layout of the overall International Finance Centre Development and its Neighbourhood
The project can be dated back to 1996, by the time the foundation work was awarded to Aoki Corporation, the main contractor for the construction of the MTR Hong Kong Station, as part of the overall Station’s contract.

The contract originally included the carrying out of the foundation works for a 88-storey office tower, on which:

- 72 bored piles of size 3m diameter were to be constructed,
- the cut-off system using diaphragm walls around the entire site,
- bored piles for the podium structure and
- barrettes for a hotel building at the west end of the site.
However, due to economical reasons after 1997, the project had been suspended for a short while. The project resumed in early 2000 upon the finalizing of a supplementary agreement on the revised amount of land premium with the Government.
Foundation System
As an alternative design, the Aoki team proposed the concept of building a 61.5m internal diameter cofferdam, lined with 1.5m thick diaphragm wall panels, to facilitate the excavation and construction of a raft foundation founded on bedrock for the entire office tower.

Majority of the diaphragm wall panels were excavated by the hydrofraise, or the reverse circulation trench cutting machine. Average depth of the panels was about 55m, with the toe grouted and installed with shear pins to ensure their stability.
As the excavation proceeded, a capping beam at the top of the cofferdam and 3 ring beams were provided as stiffening elements to the diaphragm wall panels. The excavation extended down to the bedrock, averaged about 40m from the ground level.

The initial excavation was relatively straightforward for merely cutting through reclaimed sand filling layers. However, the later stage of excavation was much difficult and time consuming for it involved the cutting into partially and slightly decomposed granite layers. The whole excavation process down to the formation level at –32mPD, took about 12 month to complete.
Immediate from the top of the formation surface, a 6.5m-deep heavily reinforced slab served as the raft for the entire building tower, with a volume of about 17,000 cu metres of concrete, was constructed. Starter provision for the core wall and gusseted base for the installation of the mega-columns were also provided here to receive the construction of the upper structures.
Forming the 62m dia cofferdam
Excavation within the cofferdam shaft
Final stage of reclamation and general foundation to the Hong Kong Station and IFC Phase I & II (1995)
General foundation to the Hong Kong Station and IFC Phase I & II (1996)
Start constructing the 62m cofferdam shaft in early 1997. However, works soon suspended in late 1997 due to other reasons.
Overview of the Central Reclamation with the Hong Kong and IFC developments
Construction of the 88-storey Tower Block
Areas to be highlighted

• Construction of the core wall within the 62m cofferdam
• The mega columns
• Using the Climb Form to construct the core wall
• Construction of the outrigger system on 6-7/F
• Construction of the outrigger system on 32/F
• Construction of the building frame
• Forming the mega column using the Climb Form
• General Fitting out
a) Construction of the core wall within the 62m cofferdam
Construction of the core wall inside the cofferdam as seen in July 2000
Construction of the core wall inside the cofferdam as seen in August 2000
Construction of the core wall inside the cofferdam as seen in October 2000
Forming the slab around the core wall inside the cofferdam shaft
b) The mega columns
Cycle 1
(29-07-00)
Cycle 2
(20-07-00)
Cycle 3
(09-07-00)
(17-07-00)
(13-07-00)
(27-07-00)
B5
B4
B3M
B3
B2
B1
LG
G
1/F
2/F
3/F
4/F
6/F
Raft Foundation Completed on 25-03-2000
All Mega Column Plinth Completed on 14-06-2000
Pour 1
(30-04-00)
Pour 2
(16-04-00)
(03-06-00) - C1
(06-07-00) - C1
(30-06-00) - C2
(30-06-00) - C3
(03-06-00) - C3
(26-06-00) - C1
(25-03-00)
The plinth and the base plate for the mega column
Erection of the column from the base
c) Using the Climb Form to construct the core wall
Erecting the Climb Form from the Ground level as seen in February 2001
Operation of the Climb Form from the Ground level to the 1/F as seen in March 2001
Formwork detail as seen from an elevated position
General Formwork layout showing the various shaft positions
Formwork operation detail as seen on the deck
Formwork operation detail – the external and internal jack systems
Inside structure inside the core wall to be formed using in-situ method by the using of timber form and aluminium form
Detail formwork arrangement to form the interior wall and slab inside the core wall
d) Construction of the outrigger system on 6-7/F
Detail of a typical set of belt truss and joist-type outrigger located on the 6/F to 7/F
Detail of the completed outrigger system on 6/F and the building frame on top
e) Construction of the outrigger system on 32/F
Junction detail of the column head and the outrigger bearing-support

Deck on 32/F before the erection of the outrigger
Gradual extending of the belt truss and outrigger
Column head junction with the bearing-support in position
The anchor framing embedded into the core wall
Gradual completion of the outrigger systems
Anchor frame before embedding with outer layer of reinforced concrete
Embedment of the anchor frame concrete on the core wall soon to complete
The completed outrigger and belt truss system on 32/F
The bearing support of the outrigger and the column articulation detail
Compare similar systems used in Cheung Kong Center
Outrigger in Cheung Kong Center
f) Construction of the building frame
Erection of the floor beams to form the building frame
Connecting shear stud to the floor beams to provide bonding between beams and RC slab

Forming the composite slab
g) Forming the Mega Columns using the Climb Form
Junction detail of the mega column and the slab
Erection of the Climb Form specially designed for the forming of the composite column
The column form in a closed position
The column form in an opened position ready for lifting
Compare the composite column with Cheung Kong Center
h) General Fitting-out
Fitting out work in the lift lobby at the centre of the core wall
Forming services cubicles using the hardy wall system
Forming the stairs using in-situ and modulated methods
Detail of the modulated stair system and the in-situ method to cast the landing platform
Basement Construction
Areas to be highlighted

• The ground slab as the separating plate
• The excavation process
• Constructing the basement structure
• The forming of the vehicular ramp
The ground slab as the separating plate

Forming the ground floor slab as the first separating plate before the top-down excavation process
Forming the remaining portion of the ground slab after a suspension of about 2 years as seen in early 2000
The excavation process

Muck opening provided on the ground slab for the removal of spoil
Excavation inside the basement
Excavation down to the formation level with pile head exposed
The use of a material hoist for the removal of spoil from the basement interior
Constructing the basement structure

Construct the basement in a “double Bit” manner
Forming the basement slab and encasing the stanchion to form the column
Basement structure around the muck opening soon to complete, slab will be reinstated afterward
The forming of the vehicular ramp

The shaft lined by diaphragm wall forming the vehicular ramp into the basement carpark. The ramp serves also as an dump access during the basement excavation process.
Forming the circular ramp
Completing the ramp for temporary spoil removal purposes
Construction of the Podium
Approximate phasing sequence in constructing the podium

Legend:
- A-Frame

To be completed on 13-04-01
To be completed on 18-03-01
To be completed on 09-03-01
To be completed on 04-04-01
To be completed on 16-01-01
To be completed on 02-03-01
To be completed on 06-05-01
Commencement of the podium structure starting from the Ground slab at + 5.6m
Overview of the podium structure
Formwork detail in the construction of the podium
Podium structure joining to the Tower Block
Layout of the landscaping roof
One of the 3 glazed roof features on the roof garden