

# G&P DIGEST

Newsletter of G&P Professionals Group



## INTRODUCING

G&P Digest, the corporate newsletter of G&P with the purpose to share with others on our recent updates and progress in the engineering industry. We also include highlights on innovative designs and technologies practised in our projects. G&P Digest will be published bi-annually.

This issue of G&P Digest highlights one of the projects undertaken by G&P which is the Platinum Park (Phases 1,2,3&4) at Jalan Stonor, Kuala Lumpur, Malaysia.

## In this Issue:

- Instrumented Maintained Load Test
- Structural Design of Platinum Park (Phase 3)



Issue 1 - July 2010

## CEO's Welcome



Ir. Dr. S.S. Gue

G&P Professionals was founded by Ir. Dr. S.S. Gue, Ir. Y.C. Tan and Ir. S.S. Liew 10 years ago as a geotechnical consultancy firm. Over the years, G&P Professionals has grown to a

one-stop engineering consultancy firm, providing services in different fields of engineering such as geotechnical, structural, hydrological, infrastructures, mechanical and electrical, maritime, highways & transportation, and dams.

Besides growing nationally, such as to Sarawak with G&P Sarawak Sdn Bhd, we have also expanded our services internationally with the establishment of ZED-G&P Sdn Bhd (UK) and NGI-G&P Sdn Bhd (Norway).



# PLATINUM PARK

Naza TTDI is currently embarking on the development of its RM4 billion "jewel in the crown" project, Platinum Park, an iconic mixed integrated development in the Kuala Lumpur City Centre, the city's prime business district. G&P Professionals has been appointed by Naza TTDI as the geotechnical consultant (Phases 1,2,3&4) and structural consultant (Phase 3) for this development.

## FOUNDATION OF PLATINUM PARK (PHASE 3)

Based on the subsurface investigation, the proposed development site is located at the contact boundary of two different formations, where the later Kenny Hill Formation overlying the earlier Kuala Lumpur Limestone.

The proposed Phase 3 development consists of 3-level basement with the depth of the lowest basement about 10.5m below the existing ground level. Bored pile foundation system is adopted to support the building and structure in view of the heavy column loading and relatively shallow competent hard layer below the basement. Due to high groundwater level at the site (approximately 5m below existing ground level), the lowest basement slab will be subjected to temporary uplift forces during basement construction. As a result, tension piles are introduced to resist the uplift forces especially for single compression pile with low imposed column load.

Instrumented preliminary test piles were carried out prior to installation of the working piles to verify the geotechnical parameters assumed in design and also to verify the pile's performance.



Proposed Platinum Park Development Layout Plan

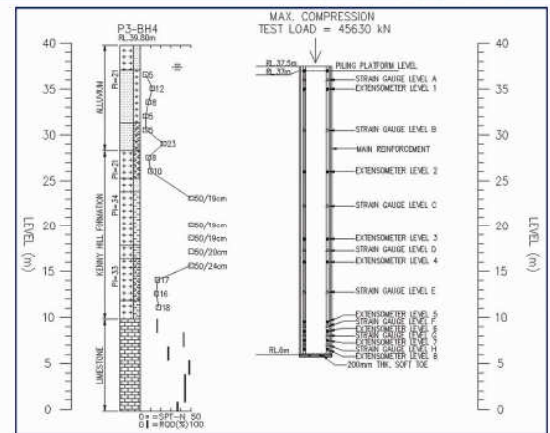
For bored piles, possible saving on reduction of socket length can be achieved if favourable results are obtained from the instrumented preliminary pile test. In addition, other pile verification tests such as low strain dynamic pile test (LSDPT/PIT) and sonic logging test were also carried out to assess the pile's structural integrity and quality control.

## Probably one of the HEAVIEST Maintained Load Tests in TOWN

Three instrumented test piles namely test piles A, B & C have been carried out at site. One of the test piles, which is Test Pile C has a diameter of 1800mm and penetration depth of 31m from piling platform level with 4m rock socket length into limestone of Rock Quality Designation (RQD) from 20% to 85%. A "polystyrene foam soft toe" was installed at the pile base for transferring load to rock socket with minimum load interference from pile base.

A total of 2,494 nos. of concrete blocks have been stacked up for a maximum test load of 4,560 tonnes with the height of approximately 30m above ground. Two rows of 32 nos. of temporary steel pipe piles were driven to support the dead weight of the kentledge system and providing stable platform for pile testing.

The test piles were instrumented with proprietary Global Strain Extensometer technology (Glostrest method) using the access to the pile shaft from the sonic logging tubes. This system uses advanced retrievable pneumatically-anchored extensometers coupled with high-precision spring-loaded vibrating-wire sensor with a simple analytical technique to monitor loads transferred down the shaft and the toe of test piles.



Test Pile C - 1800mm dia. bored pile

It is a post-installation instrument which can accurately measure the relative deformations of anchored segments across the entire pile length.



Instrumented Test Pile C

These test piles mainly utilise the frictional resistance to support the designed capacity of the pile with safety factor of at least 2.0.

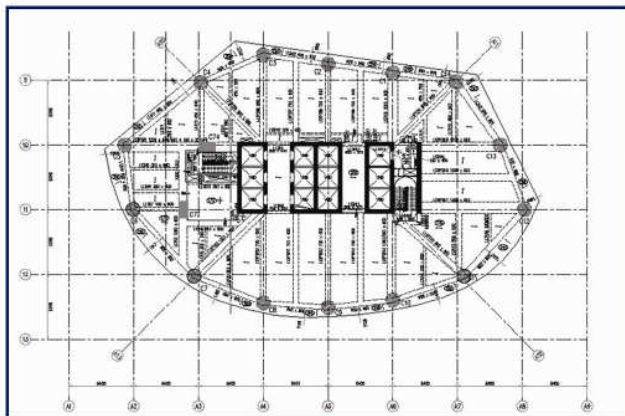
The contribution from mobilised base resistance is generally low within the limit of acceptable settlement, therefore base resistance should not be considered in bored pile design unless proper base cleaning can be carried out.

# STRUCTURAL DESIGN OF PLATINUM PARK (PHASE 3 : 38 Storey Office Tower)

The Phase 3 development comprises of a 50-storey and 38-storey office tower with 9 storey podium and 3-level basement car park. The basement car park, podium floors and tower floors are built of reinforced concrete walls and reinforced concrete frame with columns, beams and post-tensioned beams and slabs.

Technical and cost evaluations of various alternative structural schemes were considered in this project before the optimum structural systems appropriate to the project were finally arrived at. The high rise office tower was designed to have long spanned floors to achieve the desirable column-free space, and the spans are non-continuous between the core and the façade. Post-tensioned beam system was adopted to achieve a shallow floor structure and maintain acceptable deflections.

With shallower structural depth, any height reduction translates directly into savings in all vertical structural, architectural and building services elements, as well as a reduction in building volume with a consequent reduction in cooling loads. Floor system with post-tensioned beams and one way reinforced concrete slab was adopted as this system is the most feasible and cost effective system.

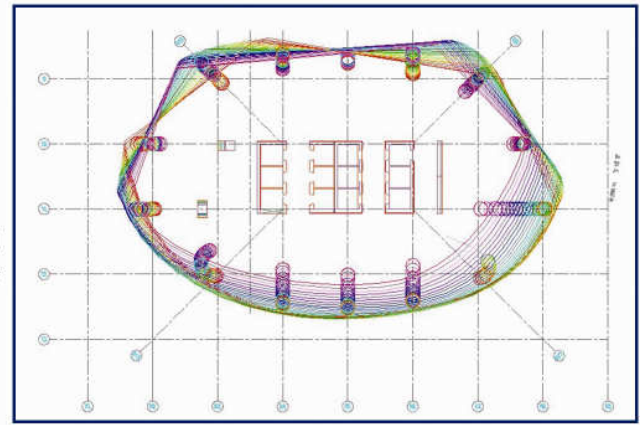


Office Floor Layout Plan

## ETABS ANALYSIS

The structural elements were analysed and designed to withstand the vertical loads (dead and live loads) and lateral forces (wind and notional forces) in

respect of serviceability and strength adequacy. The building was analysed and designed to provide adequate lateral stability and structural adequacy in resisting vertical and lateral force as well as additional moment induced due to gradual twisting of the office's floor plates from lower floors towards the upper floors. The building was designed for the adequacy of strength and serviceability under all possible load combinations.

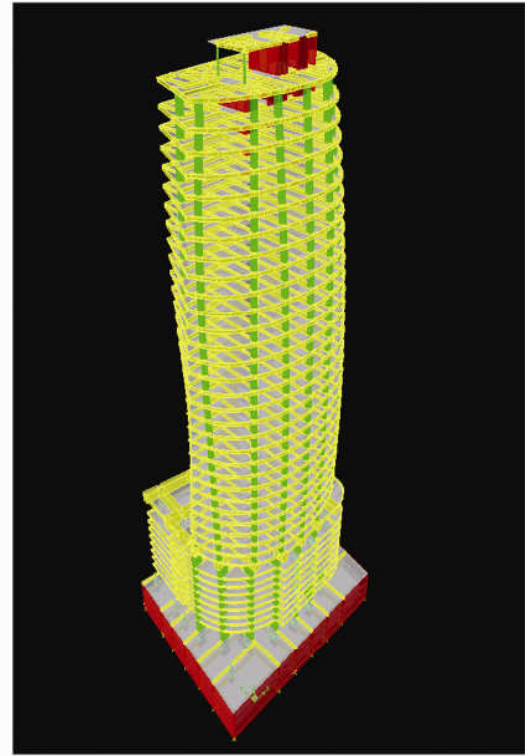


Twisted Office Floor Plate

## THREE DIMENSIONAL MODELLING

A three-dimensional model was created using an engineering software called ETABS for lateral analyses of the building. The concrete core walls and frame interactions constitute the primary lateral load resisting elements. Core walls located around the lift, reinforced concrete columns and floor framings constitute the moment frames.

The floor slabs and beams act as the collector and diaphragm elements for the transfer of lateral loads such as wind loads and notional loads. The structure was analysed for both static and dynamic conditions to ensure that the building's response is within acceptable limits especially with respect to occupants' comfort, i.e. human's response to building motions.



ETABS 3-D Model (38 Storey Office Tower)

Top down construction methodology is adopted to facilitate the sub-structure construction, which involves the installation of diaphragm walls during construction stage and as permanent walls upon completion of the basement. The basement floors which serve as propping to the diaphragm walls, were constructed along with the excavation from the top to the bottom. The advantages of

adopting the top down construction method are to have early commencement of superstructure construction, without waiting for excavation to reach the bottom of basement level, as well as elimination of temporary bracing to the basement retention system.



Perspective View of Platinum Park

# PROJECTS UPDATE:

## Jade Hills, Gamuda



**G&P Professionals is the main infrastructure consultant for approximately 155.5 ha mixed development at Jade Hills, Gamuda.**

The development consists of oriental bungalows, semi-detached homes and garden terraces. The design concept of contemporary lifestyle and lush landscape transforms Jade Hills into a great place to stay.

Stormwater is defined water that originates from a rainfall event. The lakes act as detention pond to reduce peak discharge by temporary storage and gradual release of stormwater runoff by an outlet control structure.

**G&P Professionals is the consultant for flood mitigation project for the lower reaches of Sungai Damansara, commissioned by the Government of Malaysia through Jabatan Pengairan dan Saliran Malaysia (JPS) under the Ninth Malaysia Plan.**

The Project consists of the following flood mitigation works:

- (i) Construction of the RRIM, Subang Airport East (SAE) and Subang Airport South (SAS) flood detention ponds.
- (ii) Removal of bridge constrictions along Sungai Damansara.
- (iii) River protection works for six critical areas that include earth bund, culvert, pumping station and RC flood wall.

## Selangor Flood Mitigation, Sg. Damansara



## NEWS FLASH @ G&P

### The Gold Award of Special Merit from the Association of Consulting Engineers Malaysia (ACEM)

G&P Professionals Group was awarded the Gold Award of Special Merit for the project "Sungai Damansara Flood Mitigation Project" at the biennial ACEM Engineering Awards Competition 2010. Only five companies received awards for the competition. The award presentation ceremony was held at the ACEM's 47th Anniversary Dinner at the Taming Sari Grand Ballroom, The Royale Chulan, Kuala Lumpur.



### Outstanding Performance Award 2009 from Sunrise Berhad

G&P Geotechnics Sdn Bhd and G&P Structures Sdn Bhd received Outstanding Performance Award 2009 separately from Sunrise Berhad at the Sunrise Annual Contractors, Consultants and Suppliers Dinner on 25 February 2010. Only three awards were given to the consultant category in 2009 including an architectural firm.



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