

Chapter II Tin Chung Court incident - Background and management structure

Background

2.1 Tin Chung Court was part of the Tin Shui Wai Area 31 Phase 1 development, which was incorporated into the Hong Kong Housing Authority (HA)'s Public Housing Development Programme in June 1993. The project aimed to provide 1,920 housing units in six 41-storey Concord building blocks, a primary school and a secondary school by June 1999. The domestic developments in Phase 1 were subsequently named Tin Chung Court (TCC). In this Report the term "TCC" stands for the domestic developments in Phase 1 only, the layout of which is shown in **Appendix 3**.

2.2 Listed as a fast track project by the Housing Department (HD) in 1994, the piling works of TCC were scheduled for tender in May 1996 and completion in July 1997. To expedite the project, standard designs of building blocks were adopted. Concord 1 Option 1 blocks were used in the case of TCC. According to HD's practice, for projects of standard-design building blocks, formal approval of their design is not required, as the architectural and structural requirements are known and the loading schedule is available. The tender paper on TCC piling works, which recommended the award of the Contract to the lowest tenderer, Franki Contractors Ltd. (renamed B+B Construction Co. Ltd. (Franki (B+B)) in March 1997), was endorsed by HA's Building Committee (BC) on 22 August 1996 under the "straightforward papers" approval procedure¹ without discussion.

2.3 The piling works for TCC commenced on 12 September 1996 and were completed on 6 July 1997 as scheduled. The chronology of important activities of the project is set out in **Appendix 4**.

¹ The "straightforward papers" approval procedure was introduced in July 1996. Under the procedure, where the matters to be considered by BC were regarded by HD as non-controversial, they were classified as straightforward items that required no discussion by BC unless requested by a BC member at least one day before the relevant meeting.

2.4 In August 1999, the Consultant Architect of the project, Hsin Yieh Architects & Associates Ltd. (HYA), reported uneven foundation settlement at Wings 2 and 4 of Block 1. HA appointed C M Wong & Associates Ltd. (CMW) to conduct an independent investigation into the structural adequacy of the foundations and the effect of foundation settlement on the superstructures in Phases 1, 2 and 3, Tin Shui Wai Area 31. According to the findings of CMW, based on the monitoring readings up to 15 November 1999, the projected long-term overall uneven settlement revealed a magnitude of 1 in 200 for Block 1, 1 in 353 for Block 2, and 1 in 388 for Block 4. The projected long-term localized uneven settlement was 1 in 242 for Wing 2 of Block 2 and 1 in 304 for Wing 1 of Block 4. The readings in respect of Block 1 and Wing 2 of Block 2 exceeded HA's permissible differential settlement ratio of 1 in 300². Restoration and strengthening works for Block 1, and strengthening works for Blocks 2 and 4 were recommended by CMW.

2.5 In January 2000, in response to a request by the HA-appointed Investigation Panel on Accountability in the case of Tin Chung Court, Tin Shui Wai, CMW undertook a desk-top study on the as-built piling records contained in the Registered Structural Engineer (RSE) Report for the project. The study concluded that the actual pile lengths of 60.3% piles in Block 1 were shorter than the pile lengths calculated from the cut off and pile toe levels as shown in the as-built piling records. Acting on behalf of HA, Johnson Stokes & Master (JSM) appointed CMW in May 2000 as an expert witness in relation to legal proceedings regarding the TCC case. For the purpose of instituting legal actions, JSM instructed CMW on 28 September 2000 to co-ordinate investigatory works to ascertain the founding depths of a number of piles at Blocks 1 and 2. From November 2000 to November 2001, 30 piles of Blocks 1 and 2 were drilled to establish their founding depths and 80 piles were excavated to expose their upper sections and connection to the pile caps. The results of drilling works showed that the lengths of 28 piles were shorter than those as recorded in the as-built piling records. Of the 80 piles excavated, 78 were found to have a satisfactory connection with the pile cap but two were

² Under the Specification, the relative settlement of piles should not exceed 1 in 300 times the distance between the centre lines of the piles. In other words, if the magnitude of relative settlement between two adjacent piles is shown to be 1/299 or more of the distance between their centre lines, it would exceed the permitted limit of 1/300.

found to have defects in the exposed lengths. These two piles were then drilled to their founding depths and their lengths were found to be shorter than those as recorded in the as-built piling records. In summary, the lengths of a total of 30 piles were found to be shorter than their recorded lengths as shown in **Appendix 5**.

2.6 On 12 October 2001, ICAC charged five employees of Franki (B+B), one employee of the Geotechnical Sub-consultant and three site staff employed by HYA on behalf of HD for conspiracy to defraud, corruption, and using false documents.

2.7 The charge against one of the employees of Franki (B+B) was withdrawn on 21 June 2002. Another employee of Franki (B+B) was acquitted on 2 June 2003. On 17 October 2003, one employee of Franki (B+B) and one site staff of HYA were convicted of conspiracy to defraud. The other five defendants were found not guilty. On 31 October 2003 the two convicted defendants were each sentenced to seven years' imprisonment. They have respectively lodged an appeal against both conviction and sentence. At the time of finalization of the Report, their appeals have not yet been heard.

2.8 In April 2002 strengthening works for Block 2 were completed. Restoration and strengthening works for Block 1 were completed in June 2003. In view of public concern about the circumstances leading to uneven settlement of some of the TCC blocks, the Select Committee gave special attention to the design and construction process, in particular the safeguards and control mechanisms in ensuring quality in the process, as well as the inter-relationship among the various parties concerned in their supervision of the works and verification of the designs in ensuring safety of the foundations.

Management structure for the project

2.9 TCC was one of the 22 housing projects outsourced to architect-led multi-disciplinary consultants between October 1995 and June 1996, shortly after HD anticipated that some 70,000 units would have to be produced each year in 1999/2000 and 2000/01. According to the Quality Management

System of the Housing Department Works Group, the full normal services provided by architect-led multi-disciplinary consultants in an outsourced project cover the following stages of works:

- Work Stage A - Inception
- Work Stage B - Feasibility Study
- Work Stage C - Outline Schematic Proposals
- Work Stage D - Project Design
- Work Stage E - Contract Documents
- Work Stage F - Building Construction

For the TCC project, HD was responsible for the outline schematic proposals, planning and budget, i.e., Work Stages A to C, whereas Work Stages D to F (excluding the design and construction drawings for standard-design building blocks) were outsourced to HYA, the Consultant Architect.

Project management prior to the appointment of the Consultant Architect

2.10 Up to and including the Outline Schematic Proposals Stage of the project, TCC was under the management of a chief architect of HD, who was the Design Team Leader responsible for the preparation of the master layout plan and the development budgets in the client brief, control plan and project estimates. The Design Team was multi-disciplinary, comprising an architect, a structural engineer, a geotechnical engineer, a civil engineer, a building services engineer and a quantity surveyor. It was responsible for the initial design work which referred to the overall layout of the blocks based on the findings of the preliminary site investigations. The client brief, control plan, scheme design, project budgets and estimates were submitted to, revised and approved by BC during the period from September 1995 to March 1996.

2.11 Prior to the appointment of the Consultant Architect, the Geotechnical Engineering Section of HD was responsible for identifying the geotechnical constraints of the site and providing geotechnical advice and design parameters during the course of developing the overall architectural layout. Acer Consultants (Far East) Ltd. (Acer) was engaged by HD to conduct a geotechnical assessment study on TCC, alongside with other phases

of Tin Shui Wai Area 31. The study was conducted in two phases: first between July and November 1994 and second between January and March 1995. In late 1995, Acer was commissioned by HA again to undertake foundation studies for the housing developments in various phases of Tin Shui Wai Area 31 and compiled a Foundation Advice Report (Acer Report) for Phase 1. The Acer Report was dated February 1996.

Project management after the appointment of the Consultant Architect

Liaison Team of Housing Department

2.12 The Consultant Architect, once appointed, was placed under the supervision of a Director's Representative (DR) from HD, who was responsible for overseeing the achievement of HA's requirements for completion of the project with regard to the requirements of the client brief, to budget and to time. A liaison team of HD, comprising liaison officers of various disciplines, including the architectural and structural engineering disciplines, assisted DR in managing the Consultant Architect and its sub-consultants. The section heads of the disciplines concerned were responsible for assisting DR in overseeing the liaison officers for this purpose. On matters related to architectural design and resources for the project, liaison with the consultant architect was undertaken by a liaison senior architect (LSA) and a liaison architect (LA). As regards structural engineering matters, liaison with the consultant architect was undertaken by a liaison structural engineer (LSE), under the supervision of a liaison senior structural engineer (LSSE) who reported to a chief structural engineer (CSE). The officers appointed to the above positions are as follows:

➤ *DR:*

Mr YUEN Tze-chu was DR1/TCC (May to October 1996)

Mr HO Sau-him was DR2/TCC (November 1996 to November 1997)

➤ *Architectural discipline:*

Mr HO Sau-him was the Chief Architect (June 1996 to November 1997)

Mrs Rosa HO LOK So-fun was LSA1 (April to October 1996)

Ms Rosman WAI Chui-chi was LSA2 (November 1996 to July 1997)

Mr LI Kar-fai was LA (March 1996 to August 1997)

➤ *Structural engineering discipline :*

Mr David LEE Sai-cheung was CSE1/TCC

(February 1996 to March 1997)

Mr Walter LEE Kin-sun was LSSE1/TCC (March 1996 to April 1997)

Mr Francis LEE Kam-chuen was LSSE2/TCC

(April to November 1997),

doubled up as CSE2/TCC (mid-April to November 1997)

Mr TANG Kwok-wah was LSE1/TCC (March 1996 to early April 1997)

Mr Simon LEUNG She-wing was LSE2/TCC (April to November 1997)

2.13 Under HD's consultant management system, the performance of the consultant architect was assessed by LA/TCC and countersigned by LSA/TCC. The performance of the Structural Sub-consultant was assessed by HYA and countersigned by LSSE/TCC. The performance of Franki (B+B) was assessed by the Structural Sub-consultant, countersigned by the Consultant Architect and endorsed by CSE/TCC.

Consultant Architect

2.14 On 15 February 1996, BC approved the appointment of HYA as the Consultant Architect of the TCC project. The Consultancy Agreement was signed on 2 August 1996. By virtue of the appointment, it was intended that HYA should operate as if it were an extension of HD's in-house staff. It took over the project from the Project Design Stage after the first consultant liaison meeting was held with HD on 4 March 1996. HYA was required to follow the same procedures adopted by HD for its in-house projects. HYA assigned Mr Conrad CHENG Yuk-keg as the Project Director.

2.15 Under the Consultancy Agreement, HYA was required to line up other sub-consultants from the relevant disciplines to deliver the required services. Details of the structural sub-consultancy and building services sub-consultancy had to be submitted to HD prior to the award of the consultancy contract. The consultant fee of \$26.29 million payable by HD to HYA included the fees for the Structural Sub-consultant and the Geotechnical Sub-consultant. HD recommended a fee of \$7.54 million and \$2 million for structural and geotechnical sub-consultancy services respectively.

Structural Sub-consultant

2.16 HYA used its in-house structural team to provide structural services for the project. HYA assigned its staff Mr Chezy TANG Wai-chau as the Project Structural Director (PSD/TCC) and Mr Frederick CHUNG Lap-tak as Project Structural Engineer (PSE/TCC). PSE/TCC reported to PSD/TCC and Mr Conrad CHENG of HYA on structural and management aspects of the project respectively.

Geotechnical Sub-consultant

2.17 In August 1996, HYA engaged Joseph Chow & Partners Ltd. (JMK) as its Geotechnical Sub-consultant at a fee of \$630,000. Prior to BC's approval of its appointment as the Consultant Architect, HYA, as early as December 1995, had obtained JMK's agreement to be the Geotechnical Sub-consultant for the TCC project. JMK assigned two members of its staff as Project Director and Project Geotechnical Engineer respectively for the job. JMK compiled two foundation advice reports on the site (JMK Reports), including a draft report dated 29 August 1996 and the final report dated 12 September 1996.

Resident site staff

2.18 Under the Consultancy Agreement, HYA was responsible for supervision of the project. Site inspection for the purpose of the Agreement was to be carried out by a team of site supervisory staff appointed by HYA on behalf of HD. As explained in paragraph 3.51 in Chapter III of the First

Report, the site staff for in-house projects were deployed by the Chief Technical Officer Unit of HD under the architectural discipline. As the TCC was an outsourced project, its site staff did not come from the internal pool of Inspector of Works or Clerk of Works grades. HYA was required under the Consultancy Agreement to appoint a suitably qualified team of resident site staff to carry out site inspection. The full staff costs were reimbursed by HA, while HYA was paid an administrative fee calculated at 7% of staff on-cost for recruiting, appointing and managing the site staff.

2.19 The size of the site staff establishment was determined by the consultant in consultation with HD's Liaison Team and in accordance with guidelines laid down by HD. On 27 May 1996, HYA proposed a team of site staff comprising one resident engineer (RE), one Assistant Clerk of Works (ACW) and two Works Supervisors (WSs). Mr TO Man-kum, ACW/TCC, reported duty on 12 September 1996 when the Contract commenced. The two WSs/TCC, namely Mr LAU Kuen-fai and Mr LAU Sai-man, reported duty in early October 1996. The appointment procedure of the RE, however, took six months to complete. Mr CHING Siu-fai, RE/TCC, assumed duty on 28 November 1996, after the Contract had started for more than two months. The resident site staff were under the supervision of HYA.

The Contractor's Team

2.20 The key employees of the Contractor, Franki (B+B) involved in the project included a contracts manager and two consecutive quality control engineers (QCE). Mr Clement LEE Tze-loong was the Contracts Manager and Mr Kelvin WONG Shun-wah took up the post of QCE since 21 November 1996. The Contractor was required to appoint a RSE to certify the design of the works. In the case of TCC, Franki (B+B) appointed its own staff, Mr LO Kwan-shing, as the RSE.

2.21 Franki (B+B) appointed a QCE for the TCC project as required under the Contract to ensure that all materials and tests comply with the Specification. The QCE was required to inspect work, and to certify that it was done in accordance with the Specification. There was no project manager for the project, but a full-time site agent was deployed by Franki (B+B) to the

site to take care of the day-to-day operation. When technical problems were encountered and could not be resolved at site, the site agent would consult QCE/TCC who would, if necessary, consult RSE/TCC. Where questions involving design arose, RSE/TCC would handle them and make decisions. The Select Committee notes that in some other projects, the RSE is commissioned by the contractor on a project basis and is not an employee of the contractor. In the case of TCC, however, both RSE/TCC, and QCE/TCC were the staff of Franki (B+B).

2.22 An organization chart showing the key personnel of Franki (B+B), the liaison team of HD, HYA, JMK and the site staff responsible for the TCC project is in **Appendix 6**.

Issues relating to the appointment of HYA's resident site staff

2.23 Whilst the recruitment and engagement of the resident site staff were carried out by HYA, there was a certain degree of control over the appointments by HD staff. The qualifications of the site staff for the TCC project were generally in line with those applicable for appointment to their respective ranks, yet the entire team had not had any experience with precast prestressed concrete piles (PPC piles) prior to their taking up of the respective posts for the TCC project. RE/TCC had two and a half years' pre-qualified experience only in design of foundations. ACW/TCC had worked for a piling project for just a few months and was appointed to the rank for the first time. The two Ws/TCC had no piling experience at all and one of them, WSII/TCC, was a fresh school leaver.

2.24 One of the reasons for deploying a resident engineer was the complex ground conditions of the Tin Shui Wai site. RE/TCC was expected to lead the site staff concerned in supervising the execution of works by Franki (B+B). The ability of the candidates in discharging this duty should logically be the paramount consideration in the selection process. This, however, did not appear to be the case. Mr CHING was selected so as to obviate the need to award incremental credits to a more suitable candidate.

2.25 Mr CHING assumed duty on 28 November 1996, two months after the piling works had commenced. HYA was reminded of the need to deploy a resident engineer to a remote site or a site of complex ground conditions as early as in May 1996. There was exchange of correspondence on HYA's resident site staff proposal between May and July 1996. HYA was asked to substantiate its proposed establishment and submit the proposed qualifications and experience of the site staff and the relevant budget estimates.

2.26 On 9 July 1996, HYA submitted with justifications its proposed resident site staff establishment and budget for both the piling and superstructure works of TCC to LSA1/TCC, who looked after the overall budget for the project. Thereafter, another series of internal minutes were exchanged in August 1996 between LSA1/TCC and the structural engineers concerning the deployment of resident engineer. The explanation given by LSA1/TCC to the Select Committee for such protracted internal communication was that, since HD had yet to establish a policy about deployment of resident engineers for consultant projects in Tin Shui Wai then, guidelines had to be worked out to ensure the adoption of a consistent approach for different projects at foundation and building construction stages. It was not until 14 September 1996, i.e., four months after HYA submitted its proposal, that a decision was made by HD that resident engineers should be appointed for TCC as well as other consultant projects in Tin Shui Wai. It took, however, another three weeks for the Personnel Section of HD to confirm that Mr CHING's qualifications were in order and another three weeks to confirm the salary to be offered. By the time Mr CHING reported duty on 28 November 1996, over 85% of the piles for Block 1 and over 65% of those for Block 2 had been driven to final set. The lengthy process for the recruitment of RE/TCC is set out in **Appendix 7**.