

香港房屋委員會

Quality Housing : Partnering for Change

Effectiveness of Quality Reform for Piling Works



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Effectiveness of Quality Reform for Piling Works

Background

- After discovery of a series of piling problems in September 1999, HA launched 50 Quality Housing Initiatives in March 2000 to enhance built quality on all fronts.
- Implemented a set of quality reform and enhancement measures to improve piling quality, covering ground investigation, foundation design, construction specification, contract arrangement, supervision and acceptance of works upon completion.
- Since implementation of these reform measures, we have completed 80 piling contracts. The reform measures have proven effective in assuring piling quality and boosting public confidence.

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Key Reform Measures for Piling Works

1. Strengthening Risk Management

- More comprehensive ground investigations conducted to minimise risk of encountering unanticipated complex ground conditions (UCGC) and associated variation in works.
- Foundation works designed by engineers from Housing Department instead of contractors to avert the risks borne by contractors for encountering UCGC.



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Key Reform Measures for Piling Works

1. Strengthening Risk Management

- Set up Foundation Advisory Panel to examine risks involved in foundation works at design stage for each project.
- Lengthen contract periods by one to three months to allow sufficient time for contractors to adapt to new procedures, having regard to individual project conditions.
- Suitably reduce the amount of liquidated damages for project delay as a result of contractors' own problems to promote equitable risk-sharing between HA and contractors.

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Key Reform Measures for Piling Works

2. Strengthening Site Inspection and Acceptance Requirements of Piling Works

- Revise specification in contracts to enhance process control on piling works and to ensure all completed piles fully meet contract requirements.
- Deploy resident engineers to all piling sites to strengthen site supervision.



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Key Reform Measures for Piling Works

2. Strengthening Site Inspection and Acceptance Requirements of Piling Works

- Carry out more comprehensive quality control tests for all large diameter bored piles, including :
 - a. After boring, perform "Ultrasonic Echo Wave test" to check size and verticality of bored hole to ensure compliance with design requirements.



Ultrasonic Echo Wave Test



Ultrasonic Echo Wave Test Results

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Key Reform Measures for Piling Works

2. Strengthening Site Inspection and Acceptance Requirements of Piling Works

b. Before concreting, check water sample after cleaning of pile shaft to ensure thorough removal of excavated materials and prevent their embedment at pile base that would affect pile bearing capacity.



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Key Reform Measures for Piling Works

2. Strengthening Site Inspection and Acceptance Requirements of Piling Works

c. After concreting, perform "Sonic Coring test" to check integrity of pile concrete.



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Key Reform Measures for Piling Works

2. Strengthening Site Inspection and Acceptance Requirements of Piling Works

d. After concreting, carry out "Interface Confirmatory Coring Test" to check quality of interface between pile base and bedrock to ensure pile founding directly on bedrock.



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Key Reform Measures for Piling Works

2. Strengthening Site Inspection and Acceptance Requirements of Piling Works

- Employ testing contractors directly to conduct final pile acceptance tests to enhance their reliability.



Full Coring Test for Bored Piles Loading Test for Driven Piles

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Key Reform Measures for Piling Works

3. Strengthening Contractors' Own Capability in Management & Supervision

- Restrict subcontracting of principal piling activities to **one layer** to strengthen contractors' capability in **supervising the works** and controlling performance of their piling subcontractors.
- Implement **Piling Contractors Performance Assessment Scoring System (PilingPASS)** to enhance objectivity in assessing contractors' performance.

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Key Reform Measures for Piling Works

4. Reinforcing Independent Building Control

- Established **Independent Checking Unit**, which reports directly to Director of Housing, to implement regulatory control and checking with scope and procedures consistent with those adopted by Buildings Department.

5. Strengthening the Management of HA's List of Piling & Ground Investigation Contractors

- Established HA's own lists of **piling contractors** and **ground investigation contractors** to tighten control over staff qualification, level of supervision, and equipment requirements for both types of contractors.

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Key Reform Measures for Piling Works

6. Fostering a Partnering Culture

- Conduct **partnering workshops** at commencement stage of piling contracts to establish a mechanism to resolve future technical problems expeditiously in order to build mutual trust and enhance collaboration with contractors.

7. Avoiding and Resolving Disputes

- Introduce **Dispute Resolution Advisor (DRAd) system** to reinforce partnering culture, rationalise dispute resolution procedures to avoid disputes and ensure resolution of any dispute within specified timeframe.



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Effectiveness of Quality Reform

1. Quality Assurance

- Since the launch of reform measures in March 2000, we have completed **80** piling contracts. With strengthened site supervision, more comprehensive in-process checking and final pile acceptance tests, all these **80** contracts have fully complied with **specification** and **statutory requirements**.

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2. Improvements in Other Crucial Aspects

- Of **80** completed piling contracts, **50** commenced after the launch of quality reform. As they could fully adopt reform measures already implemented, apart from assured piling quality, noticeable improvements in the following crucial aspects have been observed :
 - a. Control on Variations and Budgets
 - b. Completion Time
 - c. Control on Subcontracting
 - d. Enhancing Contractors' Performance
 - e. Fostering a Partnering Culture, Avoiding and Resolving Disputes

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Effectiveness of Quality Reform

a. Control on Variations and Budgets

- More comprehensive ground investigations have effectively minimised variations in works during construction stage. Only **one contract** has marginally exceeded contract sums among these **50** contracts.

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b. Completion Time

- Among **28** contracts commenced at initial stage of implementation of reform measures, **9** contracts could not be completed on time due to delays in works of contractors.
- For works began after mid-2004, all **22** contracts completed on time, **8** of them even slightly ahead schedule.
- Indicate that all parties involved could better manage construction time after familiarising themselves with operation of reform measures.

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c. Control on Subcontracting

- All **50** contracts have complied with one-layer subcontracting restriction, **46** (over **90%**) of them did not subcontract any of their principal piling activities. Hence, contractors can better control progress of works and piling quality.

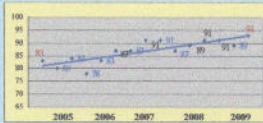
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d. Enhancing Contractors' Performance

- By implementing **PilingPASS**, we could more effectively control performance of contractors and facilitate their improvement. On the whole, performance of contractors has consistently improved in all aspects as shown by steadily improving score trend over the past few years.

Quarterly Project Scores in PilingPASS
2005-2009 (QPS)



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e. Fostering a Partnering Culture, Avoiding and Resolving Disputes

- Through conducting **partnering workshops** and implementing **DRAd system**, we have built mutual trust with contractors to expeditiously resolve problems encountered during construction and avoided disputes.
- So far, no disputes have arisen for all completed piling contracts adopting **DRAd system**.

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Way Forward

- We have launched various reform measures to improve piling quality of public housing and achieved good progress and results.
- Industry has recognised HA's practice and performed to specified requirements as shown by proven track record over past nine years.
- We will continue to enhance effectiveness of quality reform and work in collaboration with stakeholders to assure continuous improvement in built quality.



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