

## **CHAPTER 4**

### **Highways Department**

<b>Management of highway maintenance contracts</b>
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**Audit Commission  
Hong Kong  
22 October 2005**

*This audit review was carried out under a set of guidelines tabled in the Provisional Legislative Council by the Chairman of the Public Accounts Committee on 11 February 1998. The guidelines were agreed between the Public Accounts Committee and the Director of Audit and accepted by the Government of the Hong Kong Special Administrative Region.*

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# MANAGEMENT OF HIGHWAY MAINTENANCE CONTRACTS

## Contents

	<b>Paragraph</b>
<b>PART 1: INTRODUCTION</b>	1.1
Background	1.2 – 1.5
Audit review	1.6 – 1.7
Acknowledgement	1.8
 <b>PART 2: FOLLOW-UP ACTION ON SUBSTANDARD WORKS</b>	 2.1
Controls over maintenance contract works	2.2
Three cases of substandard works	2.3 – 2.12
Tightened control procedures	2.13
<i>Audit observations</i>	2.14 – 2.17
<i>Audit recommendations</i>	2.18
Response from the Administration	2.19
 <b>PART 3: QUALITY ASSURANCE AND SITE SUPERVISION MEASURES</b>	 3.1
Subcontracting	3.2 – 3.10
<i>Audit observations</i>	3.11
<i>Audit recommendations</i>	3.12 – 3.13
Response from the Administration	3.14 – 3.15
Laboratory test of bituminous materials	3.16 – 3.23
<i>Audit observations</i>	3.24 – 3.26
<i>Audit recommendations</i>	3.27
Response from the Administration	3.28

	<b>Paragraph</b>
Hidden works	3.29 – 3.37
<i><b>Audit observations</b></i>	3.38 – 3.39
<i><b>Audit recommendations</b></i>	3.40
Response from the Administration	3.41
Night works	3.42 – 3.48
<i><b>Audit observations</b></i>	3.49
<i><b>Audit recommendations</b></i>	3.50
Response from the Administration	3.51
 <b>PART 4: ADMINISTRATION OF TENDER DOCUMENTS</b>	 4.1
Procedures for letting term maintenance contracts	4.2 – 4.3
Tender preparation for Contract A	4.4 – 4.6
Errors found in the Schedule of Rates	4.7 – 4.10
Cause of the errors	4.11
Key findings of the Investigation Panel	4.12 – 4.15
<i><b>Audit observations</b></i>	4.16 – 4.23
<i><b>Audit recommendations</b></i>	4.24 – 4.25
Response from the Administration	4.26 – 4.27
 <b>PART 5: CONTROLS OVER INTERIM PAYMENTS</b>	 5.1
Payments for works	5.2 – 5.5
Concern over excessive interim payments	5.6
Audit check	5.7 – 5.10
<i><b>Audit observations</b></i>	5.11
<i><b>Audit recommendations</b></i>	5.12
Response from the Administration	5.13

	<b>Page</b>
<b>Appendices</b>	
A : Simplified organisation chart of the HyD	49
B : Management structure of a Regional Office	50
C : Term maintenance contracts examined by Audit	51
D : Chronology of key events for Contract A	52
E : Acronyms and abbreviations	53



## **PART 1: INTRODUCTION**

1.1 This PART describes the background to the audit and outlines the audit objectives and scope.

### **Background**

1.2 The Highways Department (HyD) is responsible for the maintenance of public roads, including road furniture and roadside slopes. There are about 1,900 kilometres of different types of roads under maintenance by the HyD. The HyD aims to maintain the integrity of the road network with particular emphasis on safety and serviceability.

1.3 The HyD lets out term contracts through competitive tendering to carry out road maintenance works. These term maintenance contracts usually last for three to eight years. Since April 2005, the HyD has been administering 14 term maintenance contracts. Of the 14 contracts, 11 are for road maintenance on a geographical basis and 3 are for the maintenance of public lighting systems. The expenditure under the 14 contracts is about \$800 million a year.

1.4 The two Regional Offices of the HyD (i.e. Urban and New Territories Regional Offices — Note 1) are responsible for administering the 11 term maintenance contracts for roads within their respective designated geographical areas. The Lighting Division of the HyD is responsible for administering the three term maintenance contracts for public lighting systems. A simplified organisation chart of the HyD and the management structure of a Regional Office are at Appendices A and B respectively.

1.5 The Environment, Transport and Works Bureau (ETWB) Contractor Management Handbook and Technical Circulars, and the Civil Engineering and Development Department Project Administration Handbook provide general guidelines on the administration of term maintenance contracts. The HyD has also issued a Maintenance Administration Handbook and various departmental instructions to provide specific guidelines on supervising highway maintenance works.

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**Note 1:** *Before the reorganisation of the HyD in February 2004, there were three Regional Offices, namely the Hong Kong Region, Kowloon Region and New Territories Region.*

## **Audit review**

1.6 The Audit Commission (Audit) recently conducted a review of term maintenance contracts managed by the HyD (see Appendix C for a list of contracts examined). Audit noted that in recent years, there had been three cases of substandard works in the HyD term maintenance contracts which aroused public concern. Audit reviewed the HyD follow-up action on these three cases, and the implementation of quality assurance and site supervision measures for the ensuing contracts. In the course of the review, Audit noted that there were errors in the contract rates of one of the term maintenance contracts (i.e. Contract A, awarded in 2004). Audit also looked into the incident as part of the audit review.

1.7 The audit review has found that there is scope for improvement in administering term maintenance contracts. The audit findings are presented in this Report in the following order:

- (a) follow-up action on the three cases of substandard works (PART 2);
- (b) quality assurance and site supervision measures (PART 3);
- (c) administration of tender documents (PART 4); and
- (d) controls over interim payments (PART 5).

## **Acknowledgement**

1.8 Audit would like to acknowledge with gratitude the full cooperation of the staff of the HyD during the audit.



## **PART 2: FOLLOW-UP ACTION ON SUBSTANDARD WORKS**

2.1 This PART examines the HyD follow-up action on three cases of substandard works found in its term maintenance contracts from 2001 to 2003.

### **Controls over maintenance contract works**

2.2 Term contractors are responsible for ensuring that their maintenance works are carried out with good workmanship and in accordance with the contract specifications. On top of this, the HyD has several levels of supervision and surprise audit checks. They are summarised below:

- (a) ***Day-to-day supervision.*** Works Supervisors (WSs), under the direction of Inspectors of Works (IOWs), are primarily responsible for the site supervision of maintenance works. They are guided in their work by the HyD Maintenance Administration Handbook and various departmental instructions. The IOWs are responsible for conducting site audits to check the site supervision work carried out by the WSs. The site checks/audits carried out by the WSs and the IOWs are subject to further monitoring by their supervisors (Engineers and Chief Technical Officers);
- (b) ***Technical audit.*** The HyD Contract Advisory Unit is responsible for carrying out technical audits on term maintenance contracts. These technical audits are essentially independent document checks on the extent of compliance with the laid down procedures/requirements by the concerned maintenance staff. The audits are carried out at half-yearly intervals;
- (c) ***Prevention-of-substandard-works audit.*** The Contract Advisory Unit is also responsible for carrying out prevention-of-substandard-works audits (hereinafter referred to as PoSW audits) on both capital and maintenance works contracts as required by Works Bureau Technical Circular No. 4/2002. These PoSW audits are independent physical checks on critical site activities of works contracts including the testing of end products. In accordance with an instruction issued by the Director of Highways in 1999, works contracts lasting more than nine months should be audited at least once during the contract period. Hence, there will be at least one PoSW audit for each term maintenance contract which usually lasts for three years or more; and

- (d) ***Quality assurance check.*** The HyD Research and Development Division is responsible for carrying out quality assurance checks on term maintenance contracts. It checks on site the progress and quality of works done by the maintenance contractors and assesses whether site supervisory staff of the Regional Offices are performing their supervisory role properly and consistently up to the required standard.

### **Three cases of substandard works**

2.3 From 2001 to 2003, there were press reports on cases of substandard works in some of the HyD term maintenance contracts. The PoSW audit of the HyD found one of the cases. The Independent Commission Against Corruption (ICAC)'s investigations revealed two other cases. The three cases are summarised in paragraphs 2.4 to 2.12.

#### ***Case 1: Substandard slope reinforcement works***

2.4 ***Soil nail works.*** Reinforcement bars (commonly known as soil nails) are often used in landslip preventive works for highway slopes. (Photograph 1 shows an example of soil nail installation works.) The use of soil nail is a relatively simple and fast method of slope works. However, once the soil nails have been installed, it would be difficult to verify their quality. Proper supervision of the soil nail works is therefore of paramount importance. In 2001 when Case 1 came to light, the HyD Maintenance Administration Handbook then in force required the Ws to supervise essential operations throughout the course of works. However, the Handbook also said that less essential operations should be spot checked at a frequency commensurate with the importance of the works.

**Photograph 1**

**An example of soil nail installation works**



*Source: HyD records*

2.5 **PoSW audit.** In January 2001, the HyD Contract Advisory Unit carried out a PoSW audit on the soil nail works of a term maintenance contract at Ping Ting Road in Wong Tai Sin. The works involved the installation of 330 soil nails. The PoSW audit revealed that two of the soil nails being installed were substandard, measuring 5 metres instead of the specified length of 10 metres. Of the 55 holes drilled for installing soil nails, 52 were also found to be shorter than the specified length of 10 metres, only measuring 5 metres to 5.8 metres.

2.6 **Other substandard works involving the same maintenance contract.** In May 2001, acting upon a complaint concerning soil nail works, the HyD found that substandard soil nails were used for the slope works at Fei Ngo Shan Road in Kwun Tong. The HyD also found a third incident of substandard soil nails in Yan Wing Street in Yau Tong. After ascertaining that all three incidents of substandard slope works (in Wong Tai Sin, Kwun Tong and Yau Tong) were associated with the same subcontractor, the contractor disengaged him.

***Case 2: Substandard wall panel replacement works of the Aberdeen Tunnel***

2.7 ***Panel replacement works.*** The Aberdeen Tunnel was opened to traffic in 1983. At that time, 19,000 pieces of lining panels containing asbestos were fixed inside the two tubes of the Tunnel for insulation and sound absorption purposes. In 1996, the use of asbestos was banned due to its health hazard. In 1997, the HyD decided to replace the panels in the Tunnel with asbestos-free ones. Because of the large number of panels involved, the HyD gave priority to replacing the damaged ones. The HyD issued works orders under two term maintenance contracts for the panel replacement works. Photograph 2 shows the panel replacement works in the Aberdeen Tunnel.

**Photograph 2**

**Panel replacement works in the Aberdeen Tunnel**



*Source: HyD records*

2.8 ***Fraudulent claims.*** Between April 1997 and late 2001, the HyD issued works orders under the two term maintenance contracts to replace about 3,000 damaged panels. However, a subcontractor of these two contracts repainted/repaired some of the damaged panels and claimed full payment for their replacement. In 2002, the ICAC found that the claims were fraudulent. As part of the ICAC investigation, some panels were sample checked to ascertain whether they had been repainted or replaced. The results were as follows:

- (a) one test checking of five panels showed that two of them (40%) were not replaced; and
- (b) another test checking of 35 panels showed that 30 of them (86%) were not replaced.

In September 2003, the subcontractor and one WS of the HyD were convicted of conspiracy to defraud the Government.

### ***Case 3: Substandard road resurfacing works***

2.9 ***Road resurfacing works procedures.*** Road resurfacing using bituminous materials is a common type of road maintenance works. The HyD internal guidelines require the WSs to supervise the entire resurfacing process to ensure that the works done are up to the standard. The supervision duties include:

- (a) measuring the depth to ascertain whether a contractor has milled the old road surface to the required depth;
- (b) supervising the laying and compaction of the bituminous materials to ensure that these are carried out in accordance with the contract specifications; and
- (c) selecting the locations for taking samples (Note 2) of the as-laid bituminous materials for testing by the Public Works Laboratory.

2.10 ***Action on non-compliance.*** If the test results of the samples show that the specified air void content has not been complied with, additional samples are taken again under the supervision of the HyD staff. (Photograph 3 shows the taking of a sample from an as-laid bituminous road.) If the additional samples also fail the test, the contractor is normally required to re-execute the works at his own cost. However, as an alternative, the contractor may be allowed to offer contract payment deduction in return for the acceptance of the substandard works by the HyD. The HyD assesses whether it is in the public interest to accept the contractor's offer, taking into consideration such factors as road traffic conditions and the degree of non-compliance.

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**Note 2:** *The samples are tested for their air void content. Non-compliance with the specified air void content may undermine the long-term performance of the bituminous materials.*

### Photograph 3

#### Taking of a sample from an as-laid bituminous road



Source: HyD records

2.11 **ICAC investigation.** From 1999 to 2003, a subcontractor carried out a large number of road resurfacing works under six HyD term maintenance contracts. The ICAC investigation of 2003 found that the subcontractor had taken samples without the HyD supervision, thus enabling the substitution of substandard samples with bogus ones (which could pass the laboratory test). In this way, substandard works were passed as being up to the standard to avoid rectification works or contract payment deduction. In November 2004, two partners and one foreman of the subcontractor were convicted of conspiracy to defraud the Government.

2.12 **HyD review.** In 2003, the HyD reviewed the site supervision procedures relating to road resurfacing works. **According to Works Bureau Technical Circular No. 14/2000, the Engineer's staff at the appropriate level are required to supervise the taking of samples and the delivery to the Public Works Laboratory.** The review found that the WSs supervised most of the taking of samples and their delivery. For other cases without supervision, the WSs might have been committed to other urgent works. The HyD sample checked some of the works orders carried out by the subcontractor. In one of the works orders checked, the HyD found that the WS concerned did not carry out full time supervision of the laying and compaction of bituminous materials.



## **Tightened control procedures**

2.13 In the light of the three cases of substandard works, the HyD had reviewed and tightened the relevant control procedures. The additional control procedures implemented from 2001 to 2005 include:

### ***For soil nail works***

- (a) **amending the Maintenance Administration Handbook to require full time supervision of soil nail works. The WSs are required to witness the insertion of soil nails into the drilled holes to facilitate the checking of the length of the soil nails.** They have to record the details of checking in a site checklist developed for such purpose;
- (b) requiring supervisors (Engineers/Chief Technical Officers) to conduct site visits at least once a week to monitor the frequency and quality of the site checking carried out by their subordinate staff;
- (c) requiring the Regional Offices to inform the Contract Advisory Unit whenever they issue a soil nail works order so that a surprise audit may be arranged. The Contract Advisory Unit should carry out at least one PoSW audit on each soil nail works order;

### ***For tunnel maintenance works***

- (d) setting up a proper location reference system in all government tunnels to facilitate supervisory staff to identify the exact location of maintenance works;
- (e) keeping of maintenance history for tunnel works to provide information for the HyD to detect irregularities such as repeated replacement of some wall panels within a short period of time;
- (f) reminding supervisory staff of the importance of strict compliance with the supervision requirement;
- (g) stepping up the PoSW audit on tunnel works by the Contract Advisory Unit;

### ***For bituminous works***

- (h) **amending the Maintenance Administration Handbook to require full time supervision of the taking of samples and the delivery to the Public Works Laboratory. If the WS concerned is unable to meet the supervision requirement due to heavy workload, he should report to his supervisor who has to prioritise the work accordingly;**

- (i) issuing instructions on the safe custody of test samples to prevent tampering;
- (j) holding a refresher course annually to regularly remind the WSs of the importance of strict compliance with the supervision requirement; and
- (k) stepping up the PoSW audit on bituminous works by the Contract Advisory Unit, including the taking of samples to verify the quality.

## **Audit observations**

### ***Post-implementation review***

2.14 In response to the three recent cases of substandard works, the HyD has tightened its controls over maintenance works by introducing a number of supervision requirements and quality assurance measures. These new control procedures, especially those relating to full time supervision of essential operations, would increase the supervisory staff's workload. How effective the supervisory staff have complied with the new control procedures and at the same time coped with the increased workload is an important management issue. **There is a need to carry out a post-implementation review to ascertain whether the intended control purposes have been achieved and that such achievement is not at the expense of other important work.** Audit noted that so far only the Contract Advisory Unit had reviewed the implementation of some of these new procedures in its technical audit. However, such technical audit was not a replacement for a full scale post-implementation review because the audit:

- (a) mainly focused on whether the supervisory staff had complied with the new control procedures without reviewing whether the compliance was achieved at the expense of other important work; and
- (b) did not cover the implementation of some new control procedures (e.g. the WSs' full time supervision of essential operations mentioned in paras. 2.13 (a) and (h), and the supervisory site check by the Engineers/Chief Technical Officers in para. 2.13(b)).

### ***Regulating action***

2.15 Audit noted that regulating action had been taken against the contractors involved in two of the three cases of substandard works. Details are summarised as follows:

- (a) **Case 1.** In 2001, the HyD issued a warning letter and an adverse performance report to the contractor. This was because the substandard works reflected that the contractor had not paid sufficient attention to his subcontractor's slope works;



- (b) **Case 2.** On account of the suspected misconduct of the contractor involved in the panel replacement works, in late 2003, the ETWB contemplated imposing on the contractor mandatory suspension from tendering for government contracts in accordance with the Contractor Management Handbook. Subsequently, with legal advice, the ETWB accepted the contractor's application for voluntary suspension with effect from November 2003, pending the outcome of the ICAC investigation. In July 2004, the ETWB uplifted the voluntary suspension after the court ruled that there was no prima facie case against the contractor; and
- (c) **Case 3.** The fact that two partners of the subcontractor concerned were convicted of conspiracy to defraud the Government by falsified samples reflected the subcontractor's poor integrity. In accordance with the Contractor Management Handbook, regulating action may be taken against a contractor on account of the poor integrity of the subcontractor, unless the subcontractor's misconduct is not within the contractor's control. However, the HyD informed Audit that, although there were non-compliant test samples, they were within the normal range of results expected under the constrained conditions of executing resurfacing works in heavily used roads. There were no findings pointing to the fault of the contractors. There was also nothing to suggest that it was within the power of a reasonably prudent contractor to prevent the deliberate fraud by the subcontractor. The ETWB added that there was insufficient evidence indicating that the contractors were involved in the conspiracy and no senior executive or staff of the contractors had been charged. Therefore, no regulating action on this ground had been taken.

### ***Recovery of cost***

2.16 In 2001, the contractor involved in Case 1 carried out remedial slope works at his own cost. **However, for Case 2, there is a need to speed up action to recover the cost and damages from the contractor concerned as the fraudulent claims were found some three years ago in 2002.** In July 2005, the HyD issued a letter to the contractor concerned indicating its intention of recovering the full payment for works orders involving fraudulent claims. However, the assessment of the Government's losses and damages due to the fraud was still in progress.

2.17 As for Case 3, the HyD had agreed with the contractors concerned on an arrangement of contract payment deduction for the defective works. In view of the falsification of samples by the subcontractor, in 2003 the HyD verified the reliability of the test results of the subcontractor's road resurfacing works of the preceding 12 months. For this purpose, the HyD took 269 samples from the subcontractor's works (irrespective of whether the works had passed or failed test results). According to the court findings, the subcontractor's conspiracy to defraud the Government ran from November 1999 to April 2003. The test results during this period could have been affected by the falsified samples. Moreover, it was the passed test results (rather than the failed test results) which were more likely to have been affected by the subcontractor's falsified samples. **Audit**

considers that in handling similar fraudulent cases in future, the HyD should verify the test results as far as records are available, with particular emphasis on the test results most likely to have been affected by fraud.

### **Audit recommendations**

2.18      **Audit has *recommended* that the Director of Highways should:**

- (a)      **conduct a post-implementation review of the new control procedures against substandard works (see para. 2.14);**
- (b)      **speed up the action to recover from the contractor concerned the cost and damages arising from the substandard panel replacement works (see para. 2.16); and**
- (c)      **for test results involving fraud, verify the test results as far as records are available and with particular emphasis on those most likely to have been affected, with a view to recovering the relevant cost from the contractors concerned (see para. 2.17).**

### **Response from the Administration**

2.19      The **Director of Highways** agrees with the audit recommendations. As regards the HyD verification of the reliability of the test results for the subcontractor's works, he has said that the 269 samples (see para. 2.17) taken for the verification represented 14.3% of the total passed samples. The HyD also re-inspected the service conditions of the resurfaced roads. The HyD found no evidence to suggest falsification in the tests with passed results. Although the subject subcontractor had a higher percentage of non-compliant samples in respect of air void content (see para. 3.17), it does not necessarily imply that he had falsified all test results.

## **PART 3: QUALITY ASSURANCE AND SITE SUPERVISION MEASURES**

3.1 This PART examines the HyD efforts in implementing quality assurance and site supervision measures for term maintenance contracts.

### **Subcontracting**

3.2 Subcontracting is a common practice in the construction industry. Because of the different skills involved in a works contract and the fluctuating workload, the employment of subcontractors for providing labour and specialist service is a cost-effective means to deliver the works. However, in the absence of proper management, subcontracting could have an adverse impact on the quality of works. This is especially so for multi-layered subcontracting where often there are no formal contracts between the main contractor and the subcontractors. On the one hand, the main contractor is not in a position to exercise adequate direct supervision and control over the bottom-tier subcontractors' works. On the other hand, the bottom-tier subcontractors, with a much reduced profit margin, may take chances by cutting corners to save cost at the expense of quality.

3.3 In all three cases of substandard works mentioned in PART 2, the perpetrators were the subcontractors. In Case 2 (see paras. 2.7 and 2.8), the subcontractor was at the bottom tier of a multi-layered subcontracting chain. The control problems over the subcontracting activities revealed in these cases are summarised below:

- (a) ***Lack of subcontracting information.*** A basic requirement in managing the subcontracting activities is to obtain up-to-date information of the subcontracting arrangements under the contract. While the Conditions of Contract empower the HyD to collect such information from the main contractor, this right is not always exercised as exemplified in Case 3 (see paras. 2.9 to 2.12). At the time of the ICAC investigation in 2003, the HyD did not have full particulars of all the subcontractors working under its term maintenance contracts; and
- (b) ***Inadequate supervision of specialist works.*** One safeguard for ensuring contractors' technical competence for carrying out some specialist works is that only contractors on the relevant approved list are invited to tender. In Case 1 (see paras. 2.4 to 2.6), only the main contractor was a specialist contractor under the Landslip Preventive/Remedial Works to Slopes/Retaining Walls category. The subcontractor carrying out the soil nail works was not an approved specialist contractor. The main contractor should have closely

supervised the subcontractor's works. However, in May 2001, the main contractor admitted to the HyD that his quality assurance system, with emphasis on documentation (instead of physical check), had failed to detect the subcontractor's substandard works.

### ***Implementation of Subcontractor Management Plan***

3.4 In December 2002, the ETWB promulgated Technical Circular (Works) No. 47/2002 requiring public works contractors to prepare Subcontractor Management Plans (SMPs). This is to augment the existing contractual provisions empowering the Engineer for the Contract to require full particulars of any subcontractors employed on the works, and to order the removal of any subcontractors. The main objective is to enable the works departments to strengthen control over the contractors through enhancing the transparency of their monitoring of subcontractors and their accountability to the Government.

3.5 Apart from introducing the SMP arrangements, the ETWB has introduced special contract provisions requiring contractors to ensure that their subcontractors would not further subcontract wholly the works assigned to them. Contractors have to employ their own staff to supervise their subcontractors. Non-compliance with the new requirements will be reflected in the assessment of the contractors' performance and regulating action may be taken against them.

### ***Audit check***

3.6 Since ETWB Technical Circular (Works) No. 47/2002 took effect in January 2003, the SMP arrangements have been incorporated into seven HyD maintenance contracts (four awarded in 2004 and three in 2005). Audit has checked five of these contracts to see if there is room for improvement in implementing the requirements in this technical circular. The audit findings are summarised in paragraphs 3.7 to 3.10.

3.7 ***Verifying SMP information.*** In a review of the implementation of the SMP arrangements, in November 2004, the ETWB asked the works departments to report on the number of internal audits conducted to check the SMPs up to October 2004. In response, the HyD reported that internal audits had been conducted on four term maintenance contracts with the SMP arrangements. In May and June 2005, Audit asked the HyD

whether it had checked the four contracts for compliance with the following two requirements in ETWB Technical Circular (Works) No. 47/2002:

- (a) the first requirement concerned the contractor's approach to encourage his subcontractors to adopt written contracts in their subcontracting; and
- (b) the second one concerned the contractor's approach to demand his subcontractors to submit written declarations of no "hidden" subcontracting of works.

**In June 2005, the HyD informed Audit that based on a recent check on Contract A, written contracts for some subcontracted works were not ready for inspection. Moreover, some declarations of no "hidden" subcontracting of works were not properly completed and not ready for inspection.** For the other three contracts (Contracts D, E and F) with the SMP arrangements, no written subcontracts were available because there was only one tier of subcontracting (unlike Contract A with two tiers of subcontracting). The HyD monitored the contractors' compliance with the SMP arrangements through meetings and review of the available documents. However, from the control point of view, adopting written contracts and demanding declaration of no "hidden" subcontracting of works should be equally applicable to all tiers of subcontracting known to a contractor.

**3.8 Subcontractor's qualification for specialist works.** According to the contract provisions, if a contractor is not on the Government's approved list of specialist contractors for specialist works, he should enter into a subcontract with another contractor (i.e. his subcontractor) on the approved list. **Audit found that some subcontractors named in the SMPs of Contracts A, C and F for executing specialist works were not on the approved list of specialist contractors (see Table 1).**

Table 1

**Subcontractors' qualification for specialist works**

Contract	Type of specialist works required in contract	Whether on the approved list for the required works	
		Main contractor	Sub-contractor
Contracts A and F	Specialised operations for highway structures: Classes 1 to 5	No	No
	Structural steelwork	No	No
	Pre-stressed concrete works for highway structures	No	No
	Supply and installation of bearings for highway structures	No	No
Contract C	Specialised operations for highway structures: Classes 2 to 4	No	No

Source: HyD records

In accordance with the requirements of ETWB Technical Circular (Works) No. 47/2002, a contractor should submit an updated SMP on a quarterly basis. **For Contracts A and C, the contractors concerned submitted the same subcontractors' information as shown in Table 1 in their SMPs for both the first and second quarters of 2005.**

3.9 For Contracts A and F, the HyD had not instructed the specialist works. However, for Contract C, the HyD had issued a works order for specialist works (Class 5) in May 2005 before the contractor confirmed the appointment of an approved subcontractor for the specialist works in July 2005. The sequence of events concerning the appointment of specialist subcontractors for Contract C is summarised in Table 2.

Table 2

**Appointment of specialist subcontractors for Contract C**

Date	Event
11.4.2005	The contractor of Contract C submitted an SMP for the first quarter of 2005. The subcontractor named in the SMP for executing specialist works (Classes 2 to 4) was not on the approved list. Although the contractor was not on the approved list for specialist works (Class 5), he did not name any specialist subcontractor for executing such works.
4.5.2005	The HyD reminded the contractor to submit proposal for an approved subcontractor for specialist works (Class 5).
31.5.2005	<b>The HyD issued a works order instructing the contractor to carry out specialist works (Class 5) on or before 10 October 2005 (Note 1).</b>
4.7.2005	The contractor submitted an SMP for the second quarter of 2005 with the same subcontractor's information as that in the previous quarter. The subcontractor named in the SMP for the specialist works (Classes 2 to 4) was not on the approved list. No subcontractor was named for specialist works (Class 5) (Note 2).
20.7.2005	<b>The contractor informed the HyD of his appointment of approved subcontractors for specialist works (Classes 2 to 5) in accordance with the contract requirement (Note 3).</b>
2.8.2005	The HyD acknowledged the contractor's appointment of the approved subcontractors for specialist works (Classes 2 to 5) and reminded the contractor to reflect the information in the next quarterly submission of SMP.

Source: HyD records

*Note 1: The HyD informed Audit in August 2005 that the specialist works had not commenced before the HyD's acceptance of the contractor's appointment of the approved specialist subcontractor.*

*Note 2: The HyD informed Audit in August 2005 that its staff had verbally asked the contractor to update the subcontractors' names and to resubmit the SMP.*

*Note 3: The contractor should notify the Engineer for the Contract in writing of the engagement of an approved subcontractor for specialist works within seven days of the date of the relevant subcontract.*

3.10 ***Submission of updated SMP.*** As mentioned in paragraph 3.8, a contractor should submit an updated SMP on a quarterly basis. The contractor of Contract F failed to submit an updated SMP for the third quarter of 2004 (due in October 2004). Upon the HyD reminder, the contractor submitted the required SMP in December 2004. However, the HyD did not issue a written warning to the contractor as required by ETWB Technical Circular (Works) No. 47/2002.

### **Audit observations**

3.11 The audit findings in paragraphs 3.7 to 3.10 have highlighted that there is room for improvement in implementing the SMP arrangements, as follows:

- (a) as regards the requirements of encouraging the use of written contracts and demanding declaration of no “hidden” subcontracting of works, there is a need to clarify that such requirements should be equally applicable to all tiers of subcontracting known to a contractor. There should be regular checking of the veracity of such information reported in the SMPs. In this connection, Audit understands that the ETWB is considering measures to improve the implementation of the SMPs in three major areas, namely timely submission, quality and site verification. An interdepartmental working group has been set up to study improvement proposals, including:
  - (i) compiling a standard checklist;
  - (ii) beefing up the regular internal audit to check the quality of the SMPs, compliance with the SMPs by contractors and the overall compliance with ETWB Technical Circular (Works) No. 47/2002;
  - (iii) developing contract provisions to enable Architects/Engineers to obtain documentary proof from contractors for verifying compliance with the SMPs; and
  - (iv) developing a payment scheme for SMPs for inclusion in contract documents. The proposed scheme is to remunerate contractors on undertaking SMP-related activities, such as the employment of designated personnel for subcontracting coordination, the submission of SMPs and the quarterly updating;
- (b) for any SMP not indicating the use of approved subcontractors, there is a need to require the contractor concerned to furnish information on the use of approved specialist subcontractors in the next quarterly SMP submission (see para. 3.8). Audit understands that there is also a contractual requirement for the contractor to notify the HyD within seven days of his appointment of approved subcontractors. The HyD has relied on this contractual requirement as a further control over the use of approved subcontractors. **However, it is prudent to**



**request the contractor to confirm his appointment of approved specialist subcontractors before issuing a works order for specialist works (see para. 3.9); and**

- (c) there is a need to strictly enforce the ETWB requirements regarding the submission of information in the SMPs. Regulating action should be taken against any non-compliant case (see para. 3.10).

### **Audit recommendations**

**3.12 Audit has *recommended* that the Secretary for the Environment, Transport and Works should take forward the proposed measures to improve the implementation of the SMPs (see para. 3.11(a)).**

**3.13 Audit has *recommended* that the Director of Highways should:**

- (a) **for any SMP not indicating the use of approved subcontractors for executing specialist works, require the contractor concerned to furnish information on the use of approved specialist subcontractors in the next SMP submission (see para. 3.11(b));**
- (b) **request a contractor to confirm the appointment of approved specialist subcontractors before issuing a works order for specialist works (see para. 3.11(b)); and**
- (c) **strictly enforce the ETWB's laid down requirements regarding the submission of information in the SMPs and take regulating action against any non-compliant case (see para. 3.11(c)).**

### **Response from the Administration**

**3.14** The **Secretary for the Environment, Transport and Works** has no objection to the audit recommendation in paragraph 3.12. She has said that the recommendation aligns with the ETWB review since November 2004 on improving the effectiveness of the SMP. The ETWB formulated proposals in June 2005 and is now in the process of developing the details.

**3.15** The **Director of Highways** agrees with the audit recommendations in paragraph 3.13.

## Laboratory test of bituminous materials

3.16 Road resurfacing using bituminous materials is a common type of maintenance works. As mentioned in paragraph 2.9, the as-laid bituminous materials have to be tested for air void content (see Note 2 to para. 2.9(c)) to see if they comply with the contract specification. Road maintenance works are sometimes carried out under very constrained conditions. Firstly, the road may need to be reopened to traffic shortly after the works. Secondly, the poor condition of some road bases may cause difficulties in compaction of the bituminous materials. Contractors may use such constrained conditions as an excuse for not meeting the specification and dispute their liability. However, the contractors' workmanship may also be a contributing factor of non-compliance with the specified air void content. In accordance with the HyD procedures, the Engineer for the Contract has to consider all relevant factors before deciding on the question of liability.

### *Contractor's non-compliant rate*

3.17 **HyD review.** In 2003, after the ICAC case of substandard road resurfacing works (i.e. Case 3 — see paras. 2.9 to 2.12) came to light, the HyD reviewed the laboratory test results of the bituminous resurfacing works carried out by the subject subcontractor vis-à-vis other subcontractors. The HyD found that the subject subcontractor, who was engaged under six term maintenance contracts, carried out about 62% of the HyD road resurfacing works in 2002-03. The laboratory test results showed that 19.5% of samples taken from the subject subcontractor's resurfacing works failed the air-void-content test (hereinafter referred to as sample failure rate), before taking into account the effect of bogus test samples. According to the HyD, the average sample failure rate of all other subcontractors was 4.1%. In accordance with the laid down procedures, the HyD has to assess whether a contractor (and/or his subcontractor) should be held liable for the failed samples (see para. 3.16). Based on the assessment results, it is possible to work out the portion of the sample failure rate for which the contractor is responsible (hereinafter referred to as the contractor's non-compliant rate).

3.18 **Audit review.** Audit reviewed some air-void-content test results of bituminous works under four term maintenance contracts for 2004-05 to ascertain the sample failure rates. As shown in Table 3, there were large variances in the sample failure rates of the four contracts which warranted further investigation. For this purpose, the HyD needs to make use of its assessment of the liability of the failed samples to work out the contractors' non-compliant rates.

Table 3

## Sample failure rates of bituminous works of four contracts

Regional Office	Contract	Test certificates reviewed	Test samples involved	Failed samples	Sample failure rate
			(a)	(b)	(b)/(a)×100%
		(No.)	(No.)	(No.)	(%)
New Territories	Contract A (High speed roads)	215	891	46	5.2%
New Territories	Contract B (High speed roads)	41	164	28	17.1%
Urban (Kowloon)	Contract E (Local roads)	35	140	6	4.3%
Urban (Hong Kong)	Contract G (Local roads)	16	96	37	38.5%

Source: HyD records

### Arrangement for accepting unremedied defects

3.19 For contracts tendered before October 2001, there was no contract provision for accepting unremedied defects in a contractor's works. If the defects were relatively minor, the contractor could enter into a supplementary agreement with the Government on a case-by-case basis for dealing with the defective works. In October 2001, the then Works Bureau introduced a new contract condition empowering the Engineer for the Contract to accept unremedied defects if a deduction in contract payment would be made to compensate for the Government's loss.

3.20 Before adopting the new contract condition, the HyD had drawn on the experience of Australia. There was a provision in the Australian contracts that the payment to a contractor would be reduced to a fixed proportion specified in the contract if there was non-compliance in his bituminous works. **However, the non-compliant works would only be accepted if the contractor undertook to prevent recurrence.**

3.21 After incorporating the new contract condition in its term maintenance contracts, the HyD issued instructions to its staff to ensure a consistent approach in handling non-compliant cases in bituminous works. The HyD also laid down guidelines on the levels of contract payment deduction, which depended on the degree of deviation from the air void

content specified in a contract (Note 3). The acceptance of the non-compliant bituminous works has to be approved by an officer at the Directorate D2 level or above.

3.22 **Audit review.** Of the two contracts found with higher sample failure rates of bituminous works mentioned in Table 3 (see para. 3.18), Audit selected Contract B for examining the HyD follow-up action. Audit found that out of 32 cases of follow-up action, the contractor readily offered contract payment deduction for 22 cases without giving any explanation for the sample failure. In these 22 cases, the HyD accepted the contractor's offer in return for releasing his liability to remedy the non-compliant works. Audit selected 10 contract payment deduction cases for analysing the extent of non-compliance. The results, as summarised in Table 4, show that in 3 of the 10 contract payment deduction cases (highlighted), the defective area was more than one third of the total area of the works.

**Table 4**  
**Extent of defective area in non-compliant cases (Contract B)**

Works order	Area laid	Defective area	Percentage of defective area
	(a)	(b)	(b)/(a)×100%
	(m <sup>2</sup> )	(m <sup>2</sup> )	(%)
1	155	155	100%
2	195	98	50%
3	3,600	1,320	37%
4	3,100	838	27%
5	665	166	25%
6	1,350	320	24%
7	250	60	24%
8	1,900	414	22%
9	3,360	305	9%
10	11,048	518	5%

Source: HyD records

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**Note 3:** Commencing from April 2005, the HyD has increased the levels of contract payment deduction for non-compliant bituminous works of term maintenance contracts.

***Safe custody of test samples from bituminous works***

3.23 Following the ICAC case of substandard road resurfacing works (i.e. Case 3 — see paras. 2.9 to 2.12), the HyD issued instructions on the safe custody of test samples to prevent tampering (see para. 2.13(i)). One of the requirements promulgated is that the WSS should arrange for the delivery of samples for laboratory testing as soon as practicable. The responsible IOW should also satisfy himself that the delivery of samples has been made within a reasonable period. Based on a test check of four term maintenance contracts for 2004-05, Audit found that 40% of the samples took two to four weeks to be delivered for laboratory testing, and 9% even took more than four weeks. The results are summarised in Table 5.

**Table 5****Time lapse before delivery of samples for laboratory testing**

<b>Time lapse</b>	<b>Number of deliveries</b>				<b>Sub-total</b>	<b>Percentage of total</b>
	<b>Contract A</b>	<b>Contract B</b>	<b>Contract E</b>	<b>Contract G</b>		
	<b>(a)</b>	<b>(b)</b>	<b>(c)</b>	<b>(d)</b>	<b>(e) = (a) + (b) + (c) + (d)</b>	<b>(g) = (e)/(f) × 100%</b>
	<b>(No.)</b>	<b>(No.)</b>	<b>(No.)</b>	<b>(No.)</b>	<b>(No.)</b>	<b>(%)</b>
Up to 2 weeks	95	16	33	12	<b>156</b>	<b>51%</b>
More than 2 and up to 4 weeks	96	22	1	3	<b>122</b>	<b>40%</b>
More than 4 weeks	24	3	1	1	<b>29</b>	<b>9%</b>
<b>(f) Total</b>					<b>307</b>	<b>100%</b>

Source: HyD records

**Audit observations*****Contractor's non-compliant rate***

3.24 In accordance with the laid down procedures, the HyD has to assess the liability of the failed samples in bituminous works. Based on the assessment results, it is possible to work out the contractors' non-compliant rates. Statistics on the contractors' non-compliant rates are useful for management information purpose (see paras. 3.17 and 3.18). With the

implementation of the SMP arrangements, information on subcontractors is more readily available. The monitoring of non-compliant rates can be extended to the subcontractors' level.

### ***Arrangement for accepting unremedied defects***

3.25 For bituminous works with failed samples, the HyD may order re-execution of the works or deduct the contract payment in return for accepting the unremedied defects. In deciding on the course of action, the HyD has to take into account factors such as the traffic condition and the condition of the road bases. To prevent the alternative of accepting unremedied defects from being abused, there is a need to critically review a contractor's proposal in respect of the works. Factors such as the contractor's non-compliant rate (see para. 3.24) and the extent of non-compliance (e.g. the defective area as mentioned in para. 3.22) should also be taken into consideration before accepting his proposal.

### ***Safe custody of test samples from bituminous works***

3.26 The HyD internal instruction required test samples from bituminous works to be delivered for laboratory testing as soon as practicable to prevent tampering. However, Table 5 in paragraph 3.23 shows that, for 49% of the samples delivered for laboratory testing, there was a time lapse of more than two weeks before delivery. **There is scope for speeding up the delivery of samples for laboratory testing.**

## **Audit recommendations**

3.27 **Audit has recommended that the Director of Highways should:**

- (a) **compile statistics on non-compliant rates of bituminous works with breakdown by contractor/subcontractor for management information purpose;**
- (b) **critically review the justification of a contractor's offer of contract payment deduction before accepting unremedied defects in bituminous works. Factors such as the contractor's non-compliant rate and the extent of non-compliance (e.g. size of the defective area) should be taken into consideration; and**
- (c) **consider stipulating a time limit for the delivery of bituminous samples for laboratory testing to ensure that there is no undue delay.**

## Response from the Administration

3.28 The **Director of Highways** agrees with the audit recommendations.

## Hidden works

3.29 Hidden works are works the measurement of which cannot be verified after their completion because they would be covered up or put out of view. The three cases of substandard works mentioned in PART 2 (i.e. soil nail works, tunnel maintenance works and road resurfacing works) all involved hidden works. Proper supervision and documentation of hidden works are of paramount importance.

3.30 ***Site supervision requirements.*** According to the HyD Maintenance Administration Handbook, the WSs should check hidden works records prepared by the contractors. The WSs should agree with the contractors on site the recorded measurement before the works are covered up or removed. **The IOWs should check on site at least 25% of the hidden works records checked by the WSs.** To facilitate checking, the WSs pass the signed hidden works records to the IOWs immediately and before the hidden works are put out of view, so that the IOWs can decide whether they would carry out the site check. If the hidden works have to be covered up within a short time after the checking by the WSs, the WSs should either inform the IOWs before going out for the checking, or immediately inform them by phone to seek their agreement before covering up the works. The IOWs have to endorse hidden works records and indicate thereon whether they have personally checked the hidden works.

3.31 ***Deputy Director of Highways' concern.*** In May 2001, after the case of substandard soil nail works (i.e. Case 1 — see paras. 2.4 to 2.6) came to light, the Deputy Director of Highways wrote to the Regional Offices expressing concern about the non-availability of many hidden works records despite that the works had been completed some time ago. He drew their attention to the requirements that the IOWs should have the opportunity to check any hidden works before they were covered up, and that the IOWs should check at least 25% of the hidden works records.

## ***Technical audits on IOWs' extent of checking***

3.32 In 2004, the Contract Advisory Unit carried out technical audits on hidden works records of three term maintenance contracts to ascertain whether the IOWs had checked at least 25% of such records. The technical audit results, as summarised in Table 6, show that there were cases where the IOWs had not complied with the requirement.

Table 6

**HyD technical audits on IOWs' extent of checking  
(based on hidden works records)**

Item No.	Contract	Date of technical audit	Hidden works records audited	Hidden works records found to have been checked by IOWs	Percentage of records checked by IOWs
			(a)	(b)	(b)/(a)×100%
			(No.)	(No.)	(%)
1	Contract H	July 2004	11	0	0%
2	Contract K	March 2004	6	1	17%
3	Contract M	February 2004	24	0	0%
<b>Total</b>			<b>41</b>	<b>1</b>	<b>2%</b>

Source: HyD records

***Audit review of IOWs' extent of checking***

3.33 The sample size of the Contract Advisory Unit technical audits was relatively small (only 41 records — see Table 6). Therefore, Audit carried out a review with a larger sample size (467 records — see Table 7) using the same methodology employed by the Contract Advisory Unit. The review covered hidden works records of four term maintenance contracts for January 2005. The results, as summarised in Table 7, show that in three of the contracts reviewed, the IOWs had not fully carried out the required 25% check on hidden works records.



Table 7

**Audit review of IOWs' extent of checking  
(based on hidden works records)**

Item No.	Contract	Hidden works records reviewed	Hidden works records found to have been checked by IOWs	Percentage of records checked by IOWs
		(a)	(b)	(b)/(a)×100%
		(No.)	(No.)	(%)
1	Contract G	111	18	16.2%
2	Contract H	138	10	7.3%
3	Contract I	109	32	29.4%
4	Contract N	109	0	0%
<b>Total</b>		<b>467</b>	<b>60</b>	<b>12.9%</b>

Source: HyD records

***Computerised records of IOWs' check***

3.34 In 1999, the Corruption Prevention Department of the ICAC reviewed the HyD supervision procedures of term maintenance contracts. The ICAC expressed concern over the lack of mechanism to monitor whether the IOWs had carried out the required 25% check on hidden works records. The ICAC recommended that the checking by IOWs should be recorded in a computer system to facilitate the HyD senior staff's monitoring.

3.35 The HyD has a computerised works order system. Since 2001, the New Territories Regional Office has made use of its works order system to maintain computerised records of the checking on hidden works records by the IOWs. The system can generate statistics on the checking by the IOWs from time to time for management use. However, the Urban Regional Office has not yet maintained similar computerised records of the checking by the IOWs.

***Audit review of computerised records***

3.36 Based on the computerised records of the New Territories Regional Office's works order system for the period from January to March 2005, Audit carried out a review to ascertain whether the IOWs had checked 25% of the hidden works records. The review covered six of the seven term maintenance contracts managed by the New Territories Regional Office (see para. 3.37 for the seventh contract). The results, as summarised in Table 8, show that in four of the six contracts reviewed, the IOWs had not fully carried out the required 25% check on hidden works records.

**Table 8**

**Audit review of IOWs' checking of hidden works  
(based on computerised records)**

<b>Contract</b>	<b>Works orders (with hidden works) reviewed</b>	<b>Hidden works records checked by IOWs</b>	<b>Percentage of records checked by IOWs</b>
	<b>(a)</b>	<b>(b)</b>	<b>(b)/(a)×100%</b>
	<b>(No.)</b>	<b>(No.)</b>	<b>(%)</b>
Contract A	64 (Note 1)	10	15.6%
Contract B	115 (Note 2)	15	13.0%
Contract F	355	24	6.8%
Contract H	407	42	10.3%
Contract J	484	140	28.9%
Contract L	716	240	33.5%

*Source: HyD records*

*Note 1: The number of works orders issued under this contract was small because lump sum payment was used for a substantial part of the works.*

*Note 2: The number of works orders issued for the selected period from January to March 2005 was small because this contract was due to expire in March 2005.*

3.37 According to the HyD Maintenance Administration Handbook, all staff should ensure that the information input into the works order system is accurate and up-to-date. In the Audit review mentioned in paragraph 3.36, Audit had to exclude Contract N because the data input was incomplete regarding the IOWs' check on hidden works records for January 2005. In a review of 109 works orders with hidden works (see item 4 of Table 7 in para. 3.33), Audit found that 95 (87%) did not have data input concerning the IOWs' check. For the 14 works orders with data input, Audit further checked their accuracy. Audit found that the data input for two works orders was not supported by documents.

## **Audit observations**

### ***Inadequate checking of hidden works records by IOWs***

3.38 Both the HyD technical audits and Audit reviews show that, in some cases, the IOWs did not fully carry out the required 25% check on hidden works records (see Tables 6 to 8). The HyD needs to strictly enforce the laid down requirements so as to prevent substandard works and fraudulent claims.

### ***Computerised records of IOWs' check***

3.39 Computerised records of the IOWs' check on hidden works records can facilitate monitoring by the HyD senior management. As mentioned in paragraph 3.35, the Urban Regional Office has yet to maintain such computerised records in its works order system. For the New Territories Regional Office which has such computerised records, the audit findings in paragraph 3.37 show that there is a need to ensure that the input of information into the system is accurate and complete.

## **Audit recommendations**

3.40 **Audit has recommended that the Director of Highways should:**

- (a) **require the IOWs to strictly follow the laid down requirements on supervisory check of hidden works records;**
- (b) **maintain computerised records of the IOWs' check on hidden works records in the works order system of the HyD Urban Regional Office; and**
- (c) **ensure that the information input into the works order system is accurate and complete.**

## Response from the Administration

3.41 The **Director of Highways** agrees with the audit recommendations. He has said that not all the works (such as cleaning of footbridge/subways) contained in hidden works records are put out of view after completion. These works can be checked after completion but the contractors include them in the hidden works records for simplicity and completeness of measurement. While Tables 7 and 8 indicated that, in some cases, the IOWs' check on hidden works records did not fully meet the 25% requirement due to limited staff resources, the risk was not high. This was because the IOWs subsequently carried out spot checks on some of the works during their routine site inspections, although such checks had not been clearly recorded. Having said that, the HyD will remind the contractors to include only the relevant hidden works in the hidden works records. More training will be given to the IOWs to prioritise their workload in order to meet the 25% check requirement.

## Night works

3.42 To minimise disruption to traffic, road maintenance works are often required to be carried out at night. This is especially true for maintenance works in road tunnels and on high speed roads. In view of the case of substandard tunnel maintenance works (i.e. Case 2 — see paras. 2.7 and 2.8), in 2003 the Corruption Prevention Department of the ICAC studied the HyD procedures for the maintenance of road tunnels. The study noted that the WSs either took up shift duties or worked overtime to supervise the tunnel maintenance works. However, the IOWs were not entitled to overtime allowance. The extent of the IOWs' check on tunnel maintenance works varied from team to team. For IOWs who were also responsible for monitoring other maintenance works carried out in the daytime, their monitoring of the tunnel maintenance works at night was limited.

3.43 The ICAC recommended the HyD to use a dedicated IOW team to monitor the tunnel maintenance works outside office hours. However, the HyD informed the ICAC that it had reservations about the recommendation because of staff resources constraint. **In this connection, the HyD informed the ETWB that the levels of supervision were set with regard to the nature of the works. The required levels of supervision were the same irrespective of whether the works were carried out within or outside office hours.** The HyD should have the flexibility to plan its staff deployment so as to achieve the laid down supervision levels.

**Technical audit**

3.44 In July 2004, the Contract Advisory Unit carried out a technical audit on Contract H. Based on the checking of 11 works orders with hidden works, the technical audit found that none of the hidden works was checked by the IOWs. In response, the New Territories Regional Office said that the works orders involved drainage clearance works carried out at night and the IOW concerned had not carried out the required 25% check. The IOW had been reminded to comply with the Maintenance Administration Handbook's requirement of 25% checking.

**Audit review**

3.45 Using the same methodology used by the Contract Advisory Unit, Audit carried out a review on the level of the IOWs' night-time supervision of hidden works. Audit selected the works orders with hidden works for January 2005 from two term maintenance contracts for review. The results are summarised in Table 9.

**Table 9****Audit review of IOWs' night-time supervision of hidden works**

		<b>Contract N</b>	<b>Contract H</b>
<b>(a) Works orders with hidden works</b>	<b>(No.)</b>	109	138
<b>(b) Works orders with hidden works carried out at night</b>	<b>(No.)</b>	37	53
<b>(c) Percentage of night works ((c) = (b)/(a)×100%)</b>	<b>(%)</b>	34%	38%
<b>(d) IOWs' check</b>	<b>(No.)</b>	0	10
<b>(e) IOWs' check carried out at night</b>	<b>(No.)</b>	0	1
<b>(f) Percentage of IOWs' check carried out at night ((f) = (e)/(d)×100%)</b>	<b>(%)</b>	0%	10%
<b>(g) Percentage of IOWs' check on hidden works carried out at night ((g) = (e)/(b)×100%)</b>	<b>(%)</b>	0%	2%

Source: HyD records

3.46 It can be seen that while more than one-third of the hidden works were carried out at night, the IOWs' level of supervision at night was disproportionately low (i.e. from 0% to 10%). The percentage of the IOWs' check on hidden works carried out at night (from 0% to 2%) did not meet the Maintenance Administration Handbook's requirement of 25% checking.

3.47 Apart from hidden works, the Maintenance Administration Handbook requires the IOWs to also check other types of works on site to verify the progress of the contractor's works and to assess the quality of checking by the WSs. The site audits should be carried out at least two times a week. Audit further reviewed the level of the IOWs' night-time site audits. Audit selected the works orders for January 2005 from a maintenance contract for high speed roads (Contract B) for the review. The results are summarised in Table 10.

**Table 10**

**Audit review of IOWs' site audits carried out at night**

		<b>Contract B</b>
<b>(a) Works orders for January 2005</b>	<b>(No.)</b>	134
<b>(b) Works orders with night works</b>	<b>(No.)</b>	101
<b>(c) Percentage of night works ((b)/(a)×100%)</b>	<b>(%)</b>	75%
<b>(d) IOWs' site audits</b>	<b>(No.)</b>	22
<b>(e) IOWs' site audits carried out at night</b>	<b>(No.)</b>	5
<b>(f) Percentage of IOWs' site audits carried out at night ((f)= (e)/(d)×100%)</b>	<b>(%)</b>	23%

*Source: HyD records*

3.48 It can be seen that while some 75% of the works orders in January 2005 involved night works, only 23% of the IOWs' site audits were carried out at night. In September 2005, the HyD informed Audit that many of the 101 works orders involved works that could be subsequently checked in the daytime. However, according to the Maintenance Administration Handbook, the site audits serve to verify both the contractor's works and to assess the quality of the site check by the WSs. There is still a need to carry out sufficient night-time site audits of night works having regard to their nature and importance, particularly for the verification of site checks carried out by the WSs.

### **Audit observations**

3.49 To minimise disruption to traffic, a large proportion of maintenance works in urban roads are carried out at night. However, both the HyD technical audit and Audit reviews show that the IOWs' night-time supervision was not commensurate with the frequency of night works (see paras. 3.44 to 3.48). While Audit appreciates that there is important daytime supervision work for the IOWs to perform, they still need to carry out sufficient night-time supervision having regard to the nature and importance of the night works.

### **Audit recommendations**

3.50 **Audit has *recommended* that the Director of Highways should:**

- (a) **require the IOWs to carry out sufficient night-time supervision of night works having regard to their nature and importance; and**
- (b) **closely monitor the IOWs' level of supervision for night works.**

### **Response from the Administration**

3.51 The **Director of Highways** agrees with the audit recommendations. He has said that:

- (a) as regards the IOWs' night-time checks of hidden works mentioned in Table 9 (see para. 3.45), his comments in paragraph 3.41 are relevant; and

- (b) most of the works of Contract B mentioned in Table 10 (see para. 3.47) had to be performed at night. If the HyD required the IOWs to check all the works at night (Note 4), there would be inadequate IOWs working in the daytime as they would be given time-off after the night works. Whilst the HyD accepts that the IOWs should accord more time to check night works (both for checking hidden works and for verifying the WSS' site supervision quality), the frequency and need of night-time checking must be left to the discretion of the IOWs and their supervising Engineers/Chief Technical Officers. The HyD places emphasis on the checking of night works having regard to their nature and importance and not their frequency.

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**Note 4:** *Audit understands that there might be practical difficulties to check all the works at night due to staff resources constraints. In paragraph 3.50(a), Audit has recommended that the Director of Highways should require the IOWs to carry out sufficient night-time supervision of night works having regard to their nature and importance.*



## PART 4: ADMINISTRATION OF TENDER DOCUMENTS

4.1 This PART examines the HyD administration of tender documents, with particular reference to Contract A where errors were found in the contract rates for some maintenance works.

### Procedures for letting term maintenance contracts

4.2 **Preparation of tender documents.** The HyD groups term maintenance contracts into batches according to their common expiry dates (normally the 31st March, i.e. the end of a financial year). The HyD has a Term Contracts Committee (TCC) to coordinate the tendering programme of each batch of term maintenance contracts. The TCC is chaired by a Chief Highway Engineer (Note 5), with representatives from the Regional Offices, the Research and Development Division, the Contract Advisory Unit and the Maintenance Accounts and Quantity Surveying Unit as members. According to the terms of reference of the TCC, the responsibilities for preparing tender documents are divided as follows:

- (a) the TCC is responsible for the constant review and updating of a set of standard contract documents to suit term contracts for **general** highway maintenance; and
- (b) the relevant Regional Offices and Divisions are responsible for the drafting of **special provisions** to suit individual contracts.

4.3 **Tendering.** Payments for works done under term maintenance contracts are calculated in accordance with a Schedule of Rates which forms an integral part of the contract. A Schedule of Rates typically contains more than 2,000 works items which are grouped into various trade sections. For tendering purpose, the HyD predetermines a standard market rate for each works item in the trade sections. Tenderers have to compete on the basis of percentage adjustments (i.e. increase or decrease) they offer for the trade sections. After receiving tenders from the Central Tender Board, a Chief Highway Engineer of the relevant Regional Office convenes a Tender Assessment Panel (TAP — Note 6) to assess tenders. The TAP prepares the tender report and recommendations for endorsement by the relevant Regional Highway Engineer before submission to the Central Tender Board for approval.

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**Note 5:** *Before April 2005, a Senior Engineer of the Contract Advisory Unit chaired the TCC.*

**Note 6:** *Members of the TAP for Contract A include a Senior Engineer of the Contract Advisory Unit, a Senior Engineer of the New Territories Regional Office and a professional staff from another works department (an engineer of the Drainage Services Department).*

## Tender preparation for Contract A

4.4 In late March 2003, the TCC started the tender preparation exercise for a batch of four term maintenance contracts (including Contract A) which would commence on 1 April 2004. A chronology of key events concerning Contract A is at Appendix D. According to the division of responsibilities mentioned in paragraph 4.2, the TCC focused on changes to the standard documents that were common to the four term maintenance contracts. Contract A is a maintenance contract for high speed roads under the management of the New Territories Regional Office. The responsibilities for drafting special provisions to suit Contract A rested with the project Engineer and Senior Engineer of the New Territories Regional Office.

4.5 ***New contract approach.*** Contract A is the first maintenance contract for high speed roads to try out the new Management-Operation-Maintenance contract approach (Note 7). The new contract approach required a lot of changes to the standard contract format. The project Senior Engineer and the Senior Engineer of the Contract Advisory Unit were mainly responsible for drafting special provisions for implementing this new contract approach. The project Engineer was responsible for drafting other special provisions for Contract A.

4.6 ***New composite rates for lighting, signing and guarding of roadworks.*** In previous contracts, the provision of lighting, signing and guarding equipment (hereinafter referred to as LSG) for roadworks was paid for by reference to the number of individual equipment (i.e. traffic cone, flasher, etc.) actually used and the rates for these items in the Schedule of Rates. (Photograph 4 shows an example of LSG for roadworks.) This payment method was cumbersome and the ICAC had questioned whether the HyD staff concerned had actually counted the items before certifying payment. **To simplify measurement and obviate corruption opportunity, the project Engineer worked out composite rates for the provision of LSG for each 50-metre section of roadworks.** The project Engineer included both the new composite rates and individual rates in the Schedule of Rates for Contract A. The composite rates were intended for roadworks involving the closure of at least one traffic lane whereas the individual rates might be used for works of a more piecemeal nature.

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**Note 7:** *Under this new approach, the contractor was responsible for providing scheduled road maintenance services, including road inspection, design and supervision for the repair of the highway structures. It was believed that the performance based payment method would encourage the contractor to use his innovation to improve efficiency and cost-effectiveness.*

### Photograph 4

#### Lighting, signing and guarding equipment for roadworks



Source: HyD records

### Errors found in the Schedule of Rates

4.7 In April 2004, shortly after the commencement of Contract A, the contractor pointed out to the project Engineer that the composite rates for LSG were very high. The project Engineer then found out that the units of measurement for the following two composite rates had been mis-typed as “m-day” (i.e. metre-day) instead of “no.-day” (i.e. number-day) in the Schedule of Rates:

- (a) **Item no. 97753.** The item description was “Lighting, signing and guarding equipment for 50m closure excluding Approach and End Tapers”; and
- (b) **Item no. 97754.** The item description was “E.O. (extra-over) of rate no. 97753 for every additional 50m”.

For both items, the correct units should be “no.-day” as the HyD’s intention was to have each 50-metre section of roadworks using LSG measured as one single unit (see para. 4.6). **The typing errors would inflate each rate by 50 times because the rate specified for each 50-metre section would be taken as that for each metre of roadworks.**

4.8 Apart from the typing errors in the units of measurement, there was an initial disagreement over the application of item 97754. The HyD intended that, for a certain length of lane closure, the provision of LSG for the first 50 metres should be valued using item 97753, while that for each additional length in units of 50 metres should be valued using item 97754. As regards the item description for 97754 (see para. 4.7(b)), the contractor contended that item 97754 should be applied for each additional 50 metres in addition to item 97753. The HyD disagreed with this interpretation. The contractor subsequently agreed not to pursue his interpretation of item 97754.

4.9 Under Clause 13 of the Preambles of Contract A, there was a contract provision on the application of composite rates, as follows:

*“Unless expressly stated otherwise in the Contract or in the Works Order, composite lump sum items shall be used wherever applicable to pay for any part of the works carried out by the Contractor.”*

The HyD attempted to rely on this clause to avoid the use of the erroneous composite rates by expressly stating in the relevant works orders that all LSG for roadworks should be valued using the individual rates. However, the contractor challenged this approach as this was a departure from the HyD practice to value the instructed works by a composite rate whenever an appropriate composite rate existed.

4.10 After obtaining legal advice, the New Territories Regional Office discussed with the contractor about reducing the LSG rates. After several rounds of discussions, in July 2004, the contractor proposed to reduce the LSG composite rates by 22% for general works and by 80% for repair works after traffic accident. The contractor also withdrew his contention on measurement of the LSG items. The New Territories Regional Office considered that the contractor’s cost reduction proposal was not outside the scope of the contract. In August 2004, the Regional Highway Engineer/New Territories exercised the delegated authority under the Stores and Procurement Regulations (for an officer at the Directorate D2 level or above) to accept the contractor’s cost reduction proposal.

### **Cause of the errors**

4.11 In a review in April 2005, the HyD found that, in drafting the special provisions for Contract A, the project Engineer had used the previous contract documents as a basis. He amended these old documents where necessary by handwriting. A site clerk assisted him in typing up a new set of tender documents for Contract A. He claimed that most probably for items 97753 and 97754 in the Schedule of Rates, “no.-day” was mistyped as “m-day” as the two in handwriting were similar. Due to heavy workload, he could not detect the typing errors at that time. He forgot whether he had drawn the higher levels’ attention to these two new rates. As there were many new items and rates included for Contract A, he did not bring up items 97753 and 97754 for the TCC’s discussion.

## Key findings of the Investigation Panel

4.12 In May 2005, the Director of Highways appointed an internal Investigation Panel (Note 8) to give a fresh look into the whole incident. In late June 2005, the Panel submitted a report on its findings to the Director of Highways. Key findings of the Panel are summarised in paragraphs 4.13 to 4.15.

4.13 ***Preparation of tender documents.*** The Panel considered that the project Engineer might have made the errors in the composite rates due to his workload and time constraint in preparing the tender documents. The Panel recommended that Regional Offices and Divisions of the HyD should duly consider the comparative workload of their staff in assigning officers to prepare tender documents. The Panel also found that the HyD quality management procedures had not spelt out the Senior Engineer's duties of checking tender documents prepared by his staff although in this case the Senior Engineer concerned had reviewed the documents but could not identify the errors. The Panel recommended that the said procedures should be amended accordingly. Moreover, any draft tender documents based on previous contracts should be submitted in correction mode to highlight any amendments.

4.14 ***Financial implications.*** Subsequent to the discovery of the errors in mid-April 2004, the HyD reached an initial agreement with the contractor on reduced rates for LSG. The Panel had attempted to ascertain the extra cost to the Government due to the errors. However, in August 2005, the HyD informed Audit that the financial information in the Panel's report was based on the initial agreement. In the light of further data available, the HyD had commenced a further review of the situation. Discussions with the contractor were ongoing and the finalised financial implications would be made available at a later stage.

4.15 ***Settlement procedures.*** The Panel noted that the Regional Highway Engineer/New Territories had exercised the delegated authority under the Stores and Procurement Regulations to enter into an agreement with the contractor on the cost reduction proposal (see para. 4.10). However, the Panel considered that the agreement with the contractor fell within the meaning of a claim settlement. The Financial Services and the Treasury Bureau's approval to negotiate with the contractor with a view to settling the claim should have been sought. The Panel recommended that the Project Administration Handbook should make it clear that the relevant procedures governing claim settlement and supplementary agreement should apply in situation like that in Contract A.

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**Note 8:** *The Chairman and member of the Panel are the HyD senior officers who had no association with the preparation of tender documents nor the administration of term maintenance contracts.*

## **Audit observations**

4.16 The LSG composite rates in Contract A were new additions to the Schedule of Rates. New additions to contract documents are risky areas and should be double-checked to avoid errors. The fact that the errors in these composite rates were not detected until after the award of contract revealed that there were areas for improvement in the existing administration of tender documents. To facilitate the HyD early action, in early June 2005, Audit forwarded the initial findings (as summarised in paras. 4.17 to 4.21) to the HyD. **The HyD welcomed and agreed to Audit's findings.** Audit's other findings are summarised in paragraphs 4.22 and 4.23.

### ***Control over new/non-standard items during tender preparation stage***

4.17 The Schedule of Rates for a term maintenance contract typically contains more than 2,000 works items. Any new additions/amendments to the Schedule of Rates, if not properly highlighted by the initiating project Engineer, would easily escape the attention of the checkers. This was what happened to the typing errors in the LSG composite rates in Contract A. **To avoid similar errors in future, officers responsible for preparing tender documents of term maintenance contracts should be required to highlight new additions/amendments to the Schedule of Rates for the attention of their supervisors and the TCC.**

### ***Control over the inclusion of extra-over rates***

4.18 The HyD intended to use the composite rate items 97753 and 97754 for valuing LSG for the first 50 metres and each additional 50 metres of roadworks respectively. However, the description for item 97754 was worded as "E.O. (extra-over) of rate no. 97753 for every additional 50m". In the event, there was disagreement over the application of item 97754 (see para. 4.8). While the contractor finally agreed not to pursue his interpretation of item 97754, this incident highlighted a need to tighten control over the proper use of extra-over rates. **Any proposed use of non-standard items (such as extra-over rates which have an additional financial implication to the Government) should be subject to critical vetting and formal approval, with full justification properly documented for accountability purpose.**

### ***Role of the TCC***

4.19 Audit understands from the HyD that, during the tender preparation stage of Contract A, the TCC had not specifically checked the two erroneous composite rates. As mentioned in paragraph 4.11, this was partly because the project Engineer did not bring up these items for the TCC's discussion. A more fundamental reason was that the existing terms of reference of the TCC did not specifically require the TCC to check both the

standard and non-standard items of tender documents before tender invitation. The composite rates used in Contract A were non-standard items. According to its terms of reference, the TCC is responsible for the constant review and updating of a set of standard contract documents to suit term contracts for general highway maintenance. The drafting of special provisions to suit individual contracts remains the responsibility of the relevant Regional Offices and Divisions. **There is a need to amend the TCC's terms of reference to spell out clearly its checking duties, covering both the standard and non-standard items of tender documents.**

### ***Role of the TAP***

4.20 While the TAP examined the tenders before making its tender recommendations, the errors in the composite rates also eluded its attention. This was because for term maintenance contracts, the units and rates of the works items were pre-printed in the Schedule of Rates. In their tender submissions, the tenderers needed only to fill in adjustment percentages against the trade sections (see para. 4.3). For tender analysis purpose, the TAP applied the tendered adjustment percentages to certain predetermined weighting factors of the respective trade sections to arrive at an adjusted tender value for comparison among the competing bids. There was no need for the TAP to make reference to the pre-printed units and rates in the Schedule of Rates. Hence, the TAP could not be expected to detect typing errors in the Schedule of Rates in its tender assessment process. **In the circumstances, Audit considers that there is a need to strengthen the checking of the pre-printed units and rates in the Schedule of Rates before tender invitation by using an independent body to perform this checking duty.**

### ***Need for timely review***

4.21 While the errors in the composite rates were discovered in April 2004, the HyD conducted an overall review of the tender administration procedures for term maintenance contracts in April 2005 (Note 9). During the period April 2004 to April 2005, the HyD awarded another batch of three term maintenance contracts. Together with the other three term maintenance contracts that were awarded in the same batch as Contract A in March 2004, there were six contracts which had been processed by similar tender administration procedures as Contract A. As highlighted in paragraphs 4.17 to 4.20, there is room for improvement in these procedures. **There is a need to critically examine the contract documents of these six term maintenance contracts to see whether there are similar errors, and to take appropriate action to rectify any errors found.**

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**Note 9:** *In January 2005, the HyD drew up proposals to reorganise the TCC. With effect from April 2005, the Chief Highway Engineers of the Regional Offices took turns to chair the TCC for a term of two years.*

4.22 Apart from the review in April 2005, the Investigation Panel appointed in May 2005 also recommended other improvements to the tender administration procedures (see paras. 4.13 and 4.15). As a matter of good management practice, there is a need to promptly review the tender administration procedures whenever major errors are found in contract documents so that any lesson learnt can be taken on board without delay.

### ***Future application of individual rates***

4.23 For Contract A, the HyD included composite rates for valuing roadworks involving the closure of at least one traffic lane and individual rates for valuing works of a more piecemeal nature. However, the contractor had challenged the use of individual rates where a composite rate existed (see para. 4.9). There is a need to seek legal advice on the proper use of individual rates and composite rates in future term maintenance contracts.

### **Audit recommendations**

4.24 **Audit has *recommended* that the Director of Highways should:**

- (a) **issue an instruction requiring officers responsible for preparing tender documents of term maintenance contracts to highlight new/non-standard items in the Schedule of Rates (e.g. new composite items) for the attention of their supervisors and the TCC (see para. 4.17);**
- (b) **tighten the control over the inclusion in the Schedule of Rates any non-standard items (e.g. extra-over items) which have additional financial implications to the Government (see para. 4.18);**
- (c) **amend the TCC's terms of reference to clearly spell out its checking duties, covering both the standard and non-standard items of the tender documents (see para. 4.19);**
- (d) **strengthen the checking of the Schedule of Rates before tender invitation by using an independent body to perform this checking duty (see para. 4.20);**
- (e) **critically examine the contract documents of the other six term maintenance contracts awarded in 2004 and 2005 to see if there are similar errors, and take appropriate action as soon as possible to rectify any errors found (see para. 4.21);**



- (f) **promptly conduct a review of the tender administration procedures if major errors are found in the contract documents so that any lesson learnt can be taken on board without delay (see para. 4.22);**
- (g) **closely monitor the implementation of the recommendations of the Investigation Panel (see para. 4.22); and**
- (h) **seek legal advice on the proper use of individual rates and composite rates in term maintenance contracts in future (see para. 4.23).**

4.25 **The lessons learnt from this incident may also benefit other works departments in their administration of term maintenance contracts. Audit has *recommended* that the Secretary for the Environment, Transport and Works should consider informing all works departments of the audit recommendations.**

### **Response from the Administration**

4.26 The **Director of Highways** welcomes the audit recommendations on the ways to improve the tendering and contract administration procedures. He has said that since this incident, the HyD has reviewed the control and checking procedures in tender preparation and also the management of term maintenance contracts. The HyD is in the process of preparing a new Technical Circular to provide more explicit guidelines on the management procedures including the vetting of all changes during tender preparation. Pending promulgation of the new circular, the HyD has implemented the new checking procedures since April 2005. As regards the six contracts mentioned in paragraph 4.21, the HyD has examined their contract documents and found no errors similar to those of Contract A.

4.27 The **Secretary for the Environment, Transport and Works** has said that:

- (a) as regards the audit recommendation in paragraph 4.25, she will remind all works departments to review their administration of term maintenance contracts to avoid occurrence of similar events; and
- (b) as regards the Investigation Panel's recommendation mentioned in paragraph 4.15, in December 1997, the then Works Bureau issued guidelines on claims management. These guidelines have been posted on the Intranet of the ETWB and works departments for internal reference purpose. The ETWB has no objection to the Panel's recommendation on beefing up the Project Administration Handbook where necessary.

## **PART 5: CONTROLS OVER INTERIM PAYMENTS**

5.1 This PART examines the HyD controls over interim payments for term maintenance works.

### **Payments for works**

5.2 ***Cost estimate for works order.*** The HyD instructs its term contractors to carry out maintenance works by issuing works orders. The Engineer for the Contract and his representatives have the authority to issue works orders subject to the laid down financial limits. Before the issue of a works order, a WS prepares a cost estimate for the works order (based on the Schedule of Rates and the estimated quantities required). The cost estimate is checked by an IOW and endorsed by his supervisor (Engineer/Chief Technical Officer). According to the HyD Maintenance Administration Handbook, the cost estimate should be regularly reviewed during the progress of works and should be revised if any quantities are found to differ substantially from the estimated quantities.

5.3 ***Interim payment.*** During the progress of works, a contractor can apply for interim payments for the completion of part of a works order. The aggregated interim payments for any works order shall not exceed 90% of its cost estimate. The contractor is responsible for submitting all necessary documents to support his application for interim payments.

5.4 ***Submission of dimension book and last interim payment.*** Dimension books are documents used to record the measurements of the actual works carried out by a contractor. Upon the completion of a works order, the contractor should submit the dimension book within 90 days of either the date of completion or the date specified for completion, whichever is the earlier. After the contractor has submitted the dimension book, the HyD may certify the last interim payment to the contractor. The amount of the last interim payment will be equal to 90% of either the cost estimate or the claimed value for the works order, whichever is the smaller, less all previous interim payments made.

5.5        ***Batch payment for completed works orders.*** The large number of works orders renders it not cost-effective to check every works order before final payment. Most works departments, including the HyD, adopt a computerised batch payment system. The works orders are batched and sample checked for accuracy of the measurements in the dimension books submitted by the contractor. After checking, any adjustment found necessary in the claimed values of the sampled works orders is applied to the claimed values of all works orders in the batch to arrive at a tentative offer. If the contractor accepts the tentative offer, the final payment will be made (i.e. the final value of the works orders less any interim payments previously made).

### **Concern over excessive interim payments**

5.6        While the aggregated interim payments for any works order are limited to 90% of its cost estimate, interim payments in excess of the final value of the works order (i.e. overpayment) can occur if the cost estimate has been overstated. In 1996, the HyD management expressed concern about overpayments. This was because if the overpayment occurred in one financial year but the recovery of the same was in a subsequent financial year, the amount recovered would be credited to the general revenue as required under Financial and Accounting Regulations. In other words, the recovered amount would not be available for funding maintenance works. For 1995-96, there were some 200 works orders with overpayments which were recovered in a subsequent financial year. The recovered amount that had to go to the general revenue and hence unavailable for maintenance works was \$550,000. In another review in 2002, the HyD found that the overpayment problem had further grown in 2000-01. There were some 858 works orders with overpayments of \$1.9 million, which were recovered in a subsequent financial year. The HyD had since stepped up efforts to prevent similar overpayments.

### **Audit check**

5.7        Based on the HyD accounting records on recovery of overpayments in previous years, Audit reviewed the position of overpayments on works orders for the years 2001-02 to 2004-05. The results are summarised in Table 11.

Table 11

## Overpayments on works orders

Year	Works orders with overpayment (Note)	Amount of overpayment recovered and credited to the general revenue	Average amount of overpayment per works order
	(a)	(b)	(b)/(a)
	(No.)	(\$)	(\$)
2001-02	736	2,593,021	3,523
2002-03	819	2,618,817	3,198
2003-04	417	1,215,729	2,915
2004-05	280	1,151,575	4,113

Source: HyD records

Note: Only those works orders with overpayment made in previous years and recovered in the year shown in the left hand column were included. The number of works orders with overpayment occurring and recovered within the same year was small, ranging from 50 in 2001-02 to 5 in 2004-05. The total number of works orders issued in a year ranged from 88,000 in 2001-02 to 64,000 in 2004-05.

**Examination of outsized claim report**

5.8 If the claimed value of a works order deviates significantly from the cost estimate, the works order will not be batched by the computer system for payment but will be listed in an outsized claim report for further investigation. The outsized claims may be caused by inaccurate estimates of works orders, changes in scope of the works, or errors in the contractor's claim. The project officers responsible for the works orders have to ascertain the reason of the outsized claims before the system further processes payment.

5.9 Audit examined the outsized claim reports for October and November 2004. Of the 606 works orders included in the reports, 383 (63%) had cost estimates significantly larger than the claimed value. From these works orders with cost estimates significantly larger than claimed values, Audit selected 19 high-value ones for further analysis. The results are summarised in Table 12.

Table 12

**Works orders with cost estimates  
significantly larger than claimed values  
(position as at 30 June 2005)**

Works order	Original estimate	Final estimate	Revision of estimate before interim payment	Amount of overpayment
	(\$)	(\$)	(Yes/No)	(\$)
<b>(A) Finalised works orders:</b>				
1	2,476,800	1,999,938	No	Nil
2	1,970,000	1,575,000	No	30,681
3	332,200	240,000	No	Nil
4	260,800	185,653	No	Nil
5	488,300	326,296	No	69,849
6	625,600	469,515	No	Nil
7	132,000	41,000	No	24,008
8	710,000	514,339	Yes (Note 1)	Nil
9	143,000	87,000	No	Nil
10	630,000	338,100	No	31,475
11	1,380,000	1,107,209	No	11,876
<b>(B) Works orders not yet finalised:</b>				
12	1,100,000	888,033	Yes (Note 2)	(Note 3)
13	4,500,000	3,777,950	No	
14	2,339,400	1,935,000	No	
15	653,000	505,636	No	
16	1,586,000	1,159,195	No	
17	1,581,000	965,490	No	
18	2,320,000	1,941,000	No	
19	410,000	321,000	No	

Source: HyD records

Note 1: The original estimate was revised from \$710,000 to \$520,000.

Note 2: The original estimate was revised from \$1,100,000 to \$768,000.

Note 3: The overpayment position (if any) could not be determined at this stage.

5.10 It can be seen from Table 12 that, of the 19 works orders, the cost estimates of 17 had not been revised to reflect the actual works done before using them as a basis for making interim payments. In the event, of the 11 works orders with final payment processed by 30 June 2005, there were overpayments in 5 works orders (highlighted).

### **Audit observations**

5.11 Excessive interim payments for maintenance works, especially those not recovered in the same year, are not desirable. Table 11 in paragraph 5.7 shows that the HyD had reduced the number of overpaid works orders in recent years. However, there is still scope for reducing the amount of overpayment. Table 12 shows that there is a need to revise the cost estimates of works orders to reflect the actual works done before using them as a basis for making interim payments.

### **Audit recommendations**

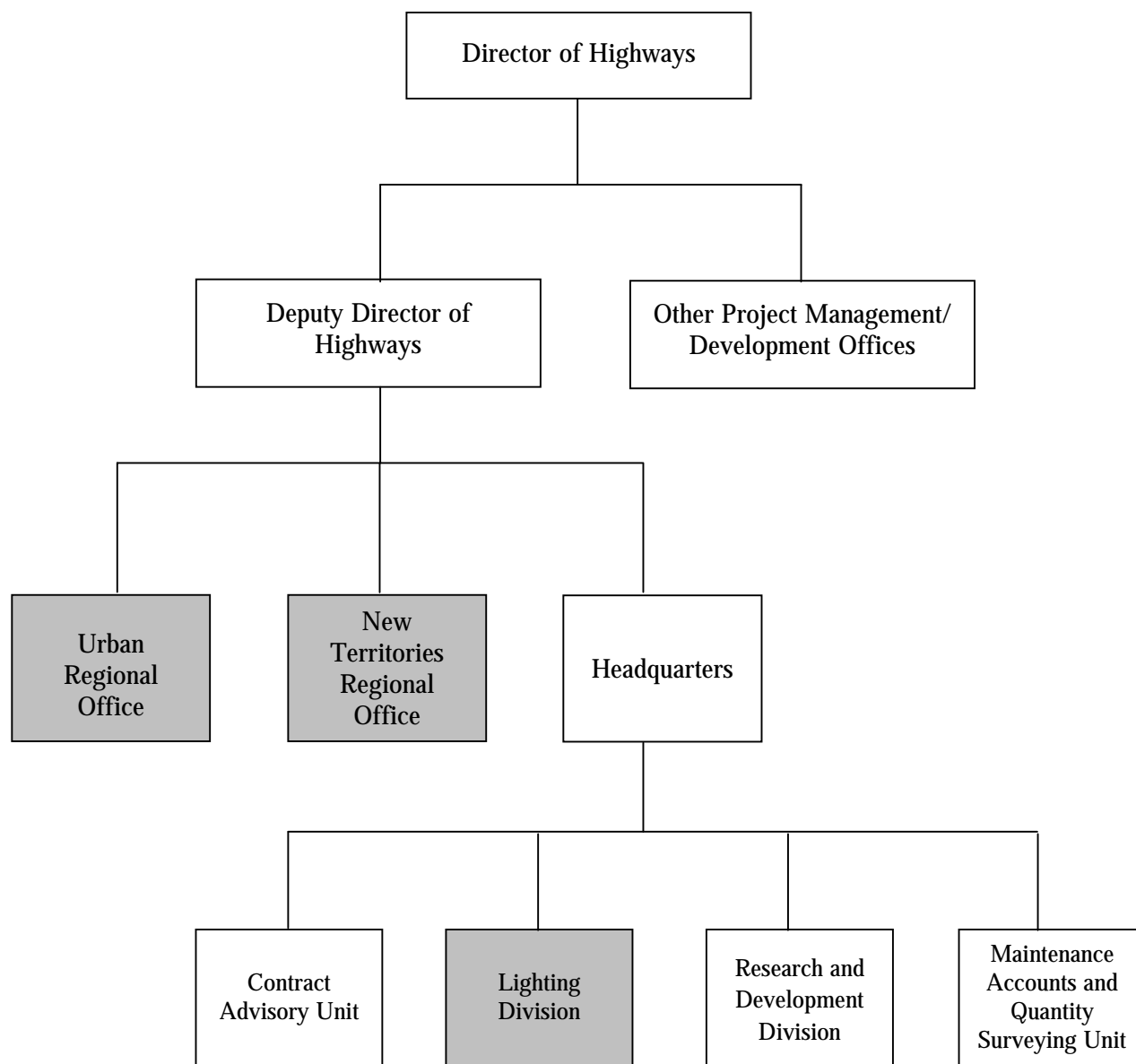
5.12 **Audit has *recommended* that the Director of Highways should:**

- (a) **continue the efforts to prevent excessive interim payments of maintenance works; and**
- (b) **remind his staff to review and update the cost estimates of works orders before using them as a basis for making interim payments.**

### **Response from the Administration**

5.13 The **Director of Highways** agrees with the audit recommendations.

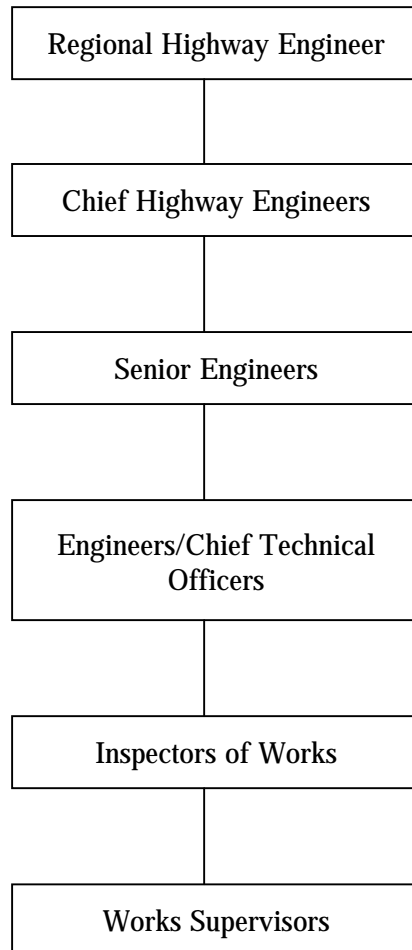
**Simplified organisation chart of the HyD**



Legend:  Regional Offices and Lighting Division responsible for managing term maintenance contracts

Source: HyD records

**Management structure of a Regional Office**



*Source: HyD records*



**Term maintenance contracts examined by Audit**

<b>Term maintenance contract</b>	<b>Contract period</b>
<b><i>For high speed roads (2 contracts):</i></b>	
Contract A	1.4.2004 – 31.3.2008
Contract B	1.4.2002 – 31.3.2005
<b><i>For local roads within districts (11 contracts):</i></b>	
Contract C	1.4.2005 – 31.3.2009
Contract D	1.4.2004 – 31.3.2007
Contract E	1.4.2004 – 31.3.2007
Contract F	1.4.2004 – 31.3.2007
Contract G	1.4.2003 – 31.3.2006
Contract H	1.4.2003 – 31.3.2006
Contract I	1.4.2003 – 31.3.2006
Contract J	1.4.2003 – 31.3.2006
Contract K	1.4.2002 – 31.3.2005
Contract L	1.4.2002 – 31.3.2005
Contract M	1.4.2001 – 31.3.2004
<b><i>For highway structures (1 contract):</i></b>	
Contract N	1.4.2002 – 31.3.2005

*Source: HyD records*

**Chronology of key events for Contract A**

March 2003	The TCC started the tender preparation exercise for a batch of four term maintenance contracts (including Contract A).
August – September 2003	The project Engineer and Senior Engineer of the New Territories Regional Office, and the Senior Engineer of the Contract Advisory Unit drafted the special provisions for Contract A.
November 2003	The HyD invited tenders for Contract A.
January 2004	The tendering exercise was closed.
February 2004	The TAP assessed the tenders.
March 2004	With the approval of the Central Tender Board, the HyD awarded Contract A.
April 2004	Contract A commenced.
Mid-April 2004	The project Engineer found out that the units of measurement for two composite rates (item nos. 97753 and 97754) had been mis-typed as “m-day” instead of “no.-day”.
May – August 2004	After obtaining legal advice, the HyD discussed with the contractor on reducing the rates for LSG.
August 2004	The HyD accepted the contractor’s cost reduction proposal.
January 2005	The HyD drew up proposals to reorganise the TCC.
April 2005	The HyD conducted a review of the control and checking procedures on tender preparation and also the management of term maintenance contracts.
May 2005	The Director of Highways appointed an internal Investigation Panel to give a fresh look into the whole incident.
Late June 2005	The Investigation Panel submitted a report on its findings to the Director of Highways.
August 2005	The HyD discussions with the contractor were ongoing.

### Acronyms and abbreviations

Audit	Audit Commission
ETWB	Environment, Transport and Works Bureau
HyD	Highways Department
ICAC	Independent Commission Against Corruption
IOW	Inspector of Works
LSG	Lighting, signing and guarding equipment
PoSW	Prevention-of-substandard-works
SMP	Subcontractor Management Plan
TAP	Tender Assessment Panel
TCC	Term Contracts Committee
WS	Works Supervisor