

CONSTRUCTION INDUSTRY INSTITUTE, HONG KONG

AND

THE HONG KONG POLYTECHNIC UNIVERSITY

Appendices to the Draft Final Report of the CII-HK

Research Project

Entitled

Construction Safety Involving Working at Height for

Residential Building Repair and Maintenance

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Appendix 1 Search for alternatives questionnaire



Dear colleagues,

We are members of a research team at the Department of Building and Real Estate, The Hong Kong Polytechnic University. We are conducting a research entitled "**Construction Safety Involving Working at Height for Residential Building Repair and Maintenance**", which is jointly funded by Construction Industry Institute – Hong Kong (CII-HK) and the Hong Kong Polytechnic University. The research aims at improving construction safety involving working at height for residential building repair and maintenance.

The current practice for doing external maintenance work in Hong Kong is to erect a temporary platform by way of a truss-out bamboo scaffold supported by metal brackets. However, the practice appears to be highly unreliable and a number of fatal accidents have occurred. We would like to search for overseas practice/system in dealing with this type of work. I would be grateful if you could advise some of your good practices in safeguarding construction safety in particular in handling external repair and maintenance work where working externally at height is involved by completing and returning the following questionnaire.

A Hong Kong Characteristic - Truss-out Scaffold Supported by Steel Brackets

Introduction

In Hong Kong, residential building repair and maintenance works very much rely on the truss-out scaffold supported by steel brackets (see figures below). Due to height and the existing conditions of the high-rise buildings, external wall repair and maintenance works are extremely difficult. For example, it would be impractical to use scaffolding towers or equivalent devices which need to be erected from the ground, to reach a flat say on the 28th floor, for a small job such as changing an air conditioner. As a result truss-out scaffolds supported by steel brackets are convenient, fast and cheap to use.

Current Methods

The current practices use steel brackets to support truss-out scaffolds. Introduction of the steel brackets simplified the procedure. The simplicity meant that young scaffolders with less experience were also able to construct truss-out scaffolds. These young scaffolders often lack safety awareness. Hence for this year alone there have been five fatal accidents already due to the collapse of truss-out scaffolds.

Today, the truss-out scaffold is constructed by a worker which is probably the same person as the worker performing the repair or maintenance work. Firstly, steel brackets are fixed to the external wall and this procedure is done probably by the worker leaning out from a window. The steel brackets are held in place by supposedly three anchor bolts. Then a layer of bamboo will be placed on top of the steel brackets to form a temporary working platform. Surrounding the temporary working platform the workers will also construct a guard rail using again bamboo.

Photograph and Illustration

Half collapsed truss-out scaffold supported by steel brackets (ref.: www.takungpo.com)	Illustration of truss-out scaffold (ref.: www.labour.gov.hk)
	

Solutions Sought

As a result of the consequences, Hong Kong is rapidly searching for alternative methods to the truss-out scaffold supported by steel brackets. As an expert in this field, we would like to seek your views on the following:

1. What might be the potential problems in adopting truss-out scaffold supported by steel brackets?
2. Do you use similar system in your country? If so, do you experience similar problems?
3. If not, what system do you use in your country?
4. What other alternatives are available?

Please return the completed questionnaire to Miss Esther Cheung via email at bs Esther@inet.polyu.edu.hk or by fax at 852 2764 5131. Your contribution to our research study is very much appreciated.

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The Hong Kong Polytechnic University

October 2005

Appendix 2 Architectural Services Department keys notes on enhanced measures for safe use of ladders

Key notes on Enhanced Measures for Safe Use of Ladders

1.0 General

- 1.1 Ladders shall primarily be used to provide access to different elevations. Suitable working platforms should be considered as the first priority for working-at-height activities, especially for those activities of long duration or heavy-duty.
- 1.2 Where the provision of a working platform is not reasonably practicable, the use of ladders should only be restricted to works of short duration (less than half hour) and light-duty in nature only. The height of ladders for such purposes should not exceed 2m.
- 1.3 A risk assessment shall be conducted on the use of ladders before it is accepted for the working-at-height activities. The risk assessment shall specify the ladders suitable for the work in terms of type, material, size, and loading. Tool-box training should be provided for the workers before he/she is allowed to use ladders on the site.
- 1.4 Only ladders in good and sturdy state shall be used. Furthermore, use of ladders should only be allowed on firm and level base.
- 1.5 A pair of rigid support stretchers should be provided on both sides of an A-ladder for firmly locking its legs when in an extended position. The use of string or loose tie wire to hold the legs should be prohibited.
- 1.6 The two-topmost rungs of an A-ladders should not be used for standing or working. Any one using an A-ladder as a walking device should be reprimanded and repeated offender should be dismissed off site.
- 1.7 Metal ladders should not be used for electrical works or carrying out works at the vicinity of live cable(s) unless it is fully insulated at footing of the ladder.
- 1.8 For straight ladders used for access to elevated levels, it should be leaned on a secured structure at an angle of approximately 75° (about 1 out to 4 up) to avoid slipping or tipping backward.
- 1.9 The straight ladder used for access should be long enough to maintain at least 1.05m above the landing level when in the leaning position. There should be no rungs along the ladder above the landing level to facilitate safe access/egress onto the landing. The ladder should be firmly secured at the base, or if possible, at the top also, to ensure its stability. A-ladders should not be used as straight ladders for leaning against a structure for access/egress.
- 1.10 Unless the manufacturer specified, ladders should be used for access by single person only. The ladder user should never attempt to lean over or stretch out of the ladders, and should face the ladder and use his/her at least one hand for holding the ladder to maintain the balance of the body when ascending or descending.
- 1.11 No ladder should be used in a horizontal position as working platform, or be tied to another ladder to achieve a greater length.
- 1.12 Safety officer/supervisors should conduct appropriate safety inspection, supervision and regular review upon working-at-height activities associated with use of ladder on site.

2.0 Inspection, Maintenance and Storage of Ladders

- 2.1 A registration scheme for good and sturdy ladders together with the necessary identification should be established prior to their use on site.
- 2.2 Prior to the commencement of work for a day, the ladders should be visually inspected by an appointed safety representative, foreman or ganger, to ensure that they are safe for use for the intended works. A checklist should be established for the ladder inspection.
- 2.3 Every ladder should be inspected for its integrity by a designated site personnel at least quarterly, and the results should be recorded for readily inspection upon request.
- 2.4 Colour Coding System, similar to the lifting appliances and lifting gear system, should be adopted to identify the good and sturdy ladders. The colours for the corresponding months should be clearly marked at the topmost rung of the ladders after the quarterly inspections as follows: -

i.	Blue colour	Good and sturdy ladder for	January, February and March
ii.	Yellow colour		April, May and June
iii.	Green colour		July, August and September
iv.	Orange colour		October, November and December
v.	Red colour	To be removed from site	
vi.	White colour	Under quarantine	

- 2.5 Ladders should be properly stored at dry areas after use. They should be kept in a manner that will prevent sagging and warping.
- 2.6 Ladders should not be painted as it may conceal the defect on ladders.

Appendix 3 Synergis Holdings Limited working at height guidelines

文件名稱：高空工作安全程序

版本：01

文件編號：SHP-013

2 頁之第1頁

高空工作安全程序

高空作業有從高處跌下或物體下墮的危險，提供適當的工作台是必須的。但在不能使用合適的工作台時，應使用扣緊於穩固點的全身式安全帶，以控制人體下墮的危險。

1. 使用工作台的安全要點

- A.** 工作台的結構須良好及堅穩。
- B.** 工作台不得負荷過重，而物料重量須平均分佈在工作台上。
- C.** 工作台須緊密地鋪上木板、夾板或金屬板，並妥為繫緊以免翻倒。
- D.** 工作台的闊度最少為 400 毫米；如作運輸物料，則其闊度最少為 650 毫米。
- E.** 提供上落工作台的安全通道，如固定的爬梯，不可攀爬棚架上落。
- F.** 工作台每邊均須設有 900 毫米至 1,150 毫米的護欄，而中間的一條護欄，高度不少於 450 毫米，亦不高於 600 毫米及最少有 200 毫米高的踢腳板，以防止物料墮下傷人。
- G.** 工作台須定期由合資格人士檢查及簽發認可表格。

2. 使用流動塔式通架及鋼通架的安全要點

- A.** 提供上落工作台的安全進出路，例如內置的固定爬梯。
- B.** 工作台每邊均須設有 900 毫米至 1,150 毫米的護欄，而中間的一條護欄，高度不少於 450 毫米，亦不高於 600 毫米及最少有 200 毫米高的踢腳板，以防止物料墮下傷人。
- C.** 當有人在工作台時，切勿移動通架。
- D.** 如使用流動式塔式通架，腳部之滑輪必須鎖好以防止該通架使用移動。
- E.** 斜撐必須依照製造商所定之情況下使用，以確保該通架穩固。
- F.** 通架的高度與最短底邊長度的比率應限於 3.5(室內)或 3(室外)。

文件名稱：高空工作安全程序
文件編號：SHP-013

版本：01
2 頁之第2頁

- G. 應由合資格人士負責鋼通架的設計及訂定工作程序。設計時應對鋼通架的負重作出實際評估，並訂明鋼通架的結構，繫穩裝置的類別和搭建方法。
- H. 鋼通架在搭建後，須由合資格人士根據設計圖則，檢查鋼通架及繫穩裝置，證明後才可使用。
- I. 工作台須定期由合資格人士檢查及簽發認可表格。公司本身員工若擔當合資格人士必須曾接受認可相關訓練。

棚架及鋼通架之安全程序

1. 應由合資格人士負責棚架的設計及訂定工作程序。設計時應對棚架的負重作出實際評估，並訂明棚架的結構，繫穩裝置的類別和搭建方法。
2. 棚架必須穩固地搭建在適當的位置。搭建棚架時必須先勘察建築物外牆物料結構，以確保該物料能夠承託棚架設計的負重量。如外牆是由泥磚或沙磚建成，則不適宜選用"拉爆"或"撞爆"式螺絲作為繫穩的用途，須選用其他適當的繫穩錨栓。
3. 結構性繫穩錨栓的長度與安裝程序，須參照錨栓製造商所提供的操作指引。
4. 每個"狗臂架"必須裝上三顆或以上的繫穩錨栓，"狗臂架"的數量須符合棚架設計及負重量的要求。
5. 搭建安全上落設施，以便工人在棚架上的工作平台和樓宇之間進出。
6. 棚架在搭建後，須由合資格人士根據設計圖則，檢查棚架及繫穩裝置，證明後才可使用。
7. 由合資格人士負責經常檢查及維修整個棚架和繫穩裝置，為確保安全，在大風雨後應立即進行檢查及維修。

梯子安全使用程序

1. 爬梯的斜度要恰當，梯子底部與高度，應保持 1 比 4 的比例。
2. 用適當長度的爬梯工作，切勿把兩道短梯綁起來，成為長梯。
3. 如梯子架於通道上或門邊時，要安排一人在梯下看守，以免梯子被意外推翻。
4. 切勿將梯子靠於玻璃，電線喉及其他不穩固的物件上；梯柱亦應平均地靠於牢固物體上。
5. 梯腳要置於平實的基礎上。
6. 當爬梯用作上落時，梯子頂端應高出工作台面最少 1 米，以作扶手之用。
7. 當站在梯上工作時，要面向梯子，並最少以一手緊握梯柱。否則，使用者須配戴安全帶，而安全帶亦應繫於穩固支點上。
8. 切勿持重物上落爬梯，應使用起重繩。
9. 木梯上不應塗上有顏色的漆油，以防覆蓋了梯具之裂痕。
10. 梯子要存放在室內，避免受太陽照射引致爆裂，或受雨水浸濕引致霉損。
11. 在設有架空電纜的地方，不要使用金屬爬梯，應選用絕緣梯子，以減低觸電危險。
12. 金屬梯腳須有絕緣防滑護墊。
13. 使用"摺梯"時應將梯具充分張開。

個人防護器具分配程序

1. 分配個人防護器具時須注意以下事項：

- A. 於露天或可能有物件從高處墮下的地方必須使用安全帽。
- B. 凡高於兩米或以上工作而不可能使用工作台時，必須使用安全帶。
- C. 在高噪音地方(每天個人噪音暴露量達 90 分貝((A))或以上)必須使用護耳罩。
- D. 在眼部有可能受被碎物飛出或液體濺出損害的地方，必須使用護眼罩。
- E. 在有可能吸入塵埃而致損害健康的地方，必須使用口罩。
- F. 在有可能吸入毒氣而致損害健康的地方，必須使用呼吸器。
- G. 防護器具的有效日期。
- H. 防護器具是否明顯損毀。
- I. 使用者有否接受有關器具的使用訓練。
- J. 檢查完畢後，必須記錄於個人工具簽收記錄表內。
- K. 個人防護器具須定期檢查，如有任何損壞應即時更換；應依照供應商之指示期限更換，但無論如何亦應每 2 年更換一次。

Appendix 4 Synergis Holdings Limited inspection report



Synergis Management Services Ltd.
新昌管理服務有限公司
Occupational Safety and Health Inspection Report
職業安全健康巡查報告

Project: 物業名稱:	Date of Inspection: 巡視日期:
Total Pages of this report () including this page 本視察報告合共()頁, 包括此頁	Ref. No. 檔案編號:
Inspected By: 巡查人士:	Target Activity: 巡查活動類別:

Please put "✓" in appropriate box. 於適當之格內填上「✓」

Item	ASPECTS	G	S	P	N/A	Item	ASPECTS	G	S	P	N/A
1. Site Management 工地管理											
1.1	Working Area 工作地方					1.9	Sign Board 安全通告				
1.2	House Keeping 地方整理					1.10	Accident Statistic Board 意外統計數字				
1.3	Access & Egress 通道					1.11	Dust Control 泥塵控制				
1.4	Illuminate 照明					1.12	Noise Control 噪音控制				
1.5	Ventilation 通風					1.13	Material Stacking 物料擺放				
1.6	Toilet Facility 洗手間					1.14	Disposal of Waste Water 積水處理				
1.7	Drinking Facility 飲水設施					1.15	Traffic Control 交通控制				
1.8	Fire Extinguisher 滅火筒					1.16	Others 其他				
2. Office Safety 辦公室安全											
2.1	House Keeping 地方管理					2.6	Fire Equipment 滅火設備				
2.2	Illuminate 照明					2.7	Form 251 Display (FSR) 表格 251 展示				
2.3	Ventilation 通風					2.8	Fire Emergency Access 走火通道				
2.4	Toilet Facility 洗手間					2.9	Escape Route 逃生指示				
2.5	Drinking Facility 飲水設施					2.10	Others 其他				
3. First Aid 急救											
3.1	First Aid Box 急救箱					3.3	Notice (2 employees Name) 2 名負責人員姓名標示				
3.2	First Aid Content 急救用品					3.4	Others 其他				
4. Electricity 電力											
4.1	Switch Box 總掣箱					4.7 b	First Aid Notice (Electrical Shock) 急救告示 (電擊)				
4.2	Short Circuit 短路系統					4.8	Wiring 電線				
4.3	Fixed Installation 固定裝置					4.9	Socket 插座				
4.4	Switches 開關掣					4.10	Plug 插頭				
4.5	Earth 地線					4.11	Welding Machines 焊機				
4.6	Connection 電線接駁					4.12	Portable Tools 手提工具				
4.7 a	Warning Notice (Electrical Hazard) 警告標誌 (電力危險)					4.13	Others 其他				
5. Chemical Safety 化學品											
5.1	Chemical Label 危險標籤					5.5	Ventilation 空氣流通				
5.2	Chemical Storage 化學品存放					5.6	Personal Protective Equipment 個人保護設備				
5.3	Guideline 安全指引					5.7	No Smoking Sign 禁止吸煙告示				
5.4	Container 盛載容器					5.8	Others 其他				

新昌-職業安全巡查報告

10/2003 編製

第 1 頁, 共 4 頁



Synergis Management Services Ltd.
新昌管理服務有限公司
Occupational Safety and Health Inspection Report
職業安全健康巡查報告

Please put "✓" in appropriate box. 於適當之格內填上「✓」

Item	ASPECTS	G	S	P	N/A	Item	ASPECTS	G	S	P	N/A
6.	Working At Height 高空工作										
6.1	Working Platform 工作台					6.9	Guardrail at Roof edge 天台圍欄				
6.2	Supporting 足夠支撐					6.10	Safety hoops at fixed ladders 固定樓梯安全環				
6.3	Ladder (wood) 木梯					6.11	Life Line 救生繩				
6.4	Ladder (Aluminum) 鋁梯					6.12	Use of Safety Harness 安全帶之使用				
6.5	Ladder (Bamboo) 竹梯					6.13	Against Falling Object 防止物件下墮				
6.6	Safe Access 安全通道					6.14	Protection to the Public 保護公眾				
6.7	Guardrail 圍欄					6.15	Form 5 Display (CSSR) 表格五之展示				
6.8	Toe Board 踢腳板					6.16	Others 其他				
7.	Machinery/Plant 機械設備/裝置										
7.1	Circular Saw 風車鋸					7.5	Chain Block 手動吊機				
7.2	Abrasive Wheel 磨輪					7.6	Emergency Stop 緊急停機掣				
7.3	Drilling Machine 鑽床					7.7	Guarding 護罩				
7.4	Air Container 壓力容器					7.8	Others 其他				
8.	Scaffolding 棚架										
8.1	Bamboo Scaffold 竹棚					8.4	Nylon Mesh 尼龍網				
8.2	Metal Scaffold 金屬棚					8.5	Catch Fen 斜棚				
8.3	Form 5 Display (CSSR) 表格五之展示					8.6	Others 其他				
9.	Gondola 吊船										
9.1	Protection 吊船保護					9.4	Certificate Display 檢驗證書展示				
9.2	Loading Capacity 負重數量					9.5	Display of Form 1 表格一				
9.3	Independent Life Line 獨立救生繩					9.6	Others 其他				
10.	Confined Space Work 密閉空間工作										
10.1	Gas Testing Display 氣體測試展示					10.7	Use of PPE 使用防護器具				
10.2	Work Permit Display 工作証展示					10.8	Standby Person 候命人員				
10.3	Risk Assessment Display 危機評估展示					10.9	Breathing Apparatus 呼吸器				
10.4	Rescue Equipment 拯救裝備					10.10	Gas Monitoring 氣體監察				
10.5	Emergency Access 緊急通道					10.11	Certified Worker 核准工人				
10.6	Fencing 圍欄					10.12	Others 其他				
11.	Gas Welding Work 氣體焊接工作										
11.1	Flash Back Arrester 防止回火器					11.6	Fire Extinguisher 滅火器				
11.2	Pressure gauge 壓力儀器					11.7	Trained Person 受訓練工人				
11.3	Pipe 喉管					11.8	Personal Protective Equipment 個人防護裝備				
11.4	Chemical Label 警告標籤					11.9	Protection to the Public 保護公眾				
11.5	Quantity 存放數量					11.10	Others 其他				



Synergis Management Services Ltd.
新昌管理服務有限公司
Occupational Safety and Health Inspection Report
職業安全健康巡查報告

Please put "✓" in appropriate box. 於適當之格內填上「✓」

Item	ASPECTS	G	S	P	N/A	Item	ASPECTS	G	S	P	N
12.	Road Work 道路工作										
12.1	Traffic Signal	交通訊號				12.6	Reflect Jacket	反光衣			
12.2	Flash Lamp	閃燈				12.7	Fencing	圍欄			
12.3	Cone	雪糕筒				12.8	Work permit	工作准許証			
12.4	Road Sign	道路標誌				12.9	Suitable Notice	適當告示			
12.5	Pedestrian Access	行人通道				12.10	Others	其他			
13.	Personal Protective Equipment 個人防護設備										
13.1	Safety Helmet	安全帽				13.9	Apron	圍裙			
13.2	Eye Goggles	護眼罩				13.10	Safety Boot	安全鞋			
13.3	Dust Mask	防塵口罩				13.11	Safety Belt	安全帶			
13.4	Chemical Mask	化學物品口罩				13.12	Independent Life Line	獨立救生繩			
13.5	Gloves	手套				13.13	Fall Arrestor	防墮扣			
13.6	Chemical Gloves	化學物品手套				13.14	Reflective Vest	反光衣			
13.7	Ear Protector	護耳罩				13.15	Use of PPE	使用防護器具			
13.8	Breathing Apparatus	呼吸器具				13.16	Others	其他			
14.	Specific Checking for Cleaning Operation 專題檢查：清潔作業										
14.1	Site Management	工地管理				14.7	Manual Handling	人力搬運			
14.2	Material Stacking	物料擺放				14.8	Safe Use of Machinery	安全使用機械			
14.3	First Aid	急救				14.9	Control of Biological Hazards	控制生物性危害			
14.4	Electrical Safety	用電安全				14.10	Road Work Safety	道路工作安全			
14.5	Chemical Safety	化學品安全				14.11	Personal Protective Equipment	個人防護設備			
14.6	Safe Work At Height	高空工作				14.12	Others	其他			

Legend : G- Good (良好)
S- Satisfactory (滿意)
P- Poor (嚴重違反安全法例，立即進行改善)
N/A Not Applicable (不適用)

REMARK:

備註：

In this inspection, improper and dangerous conditions have been reported in this inspection report (other than working procedures and workplace). We would like to advise you that you should exercise utmost care to ensure that safety precautions are implemented in accordance with the legislation.
於此次巡視期間發現的錯誤或危險已被紀錄在本巡視報告內，但仍未包括所有工序及工作場所，現再提示駐物業的主管人員，無論何時均有責任確保所管理的物業及工作場所保持一個符合法例標準的安全工作環境。

Reported By (報告人)

Verified By (核對人)

Date: _____
日期：_____

Date: _____
日期：_____

[illegible]

Appendix 5 Henderson Land Development Company Limited working at height guidelines

工程主任作業指引

4

高空工作

本部最近接獲查詢有關苑廈技工之高空工作要求、法例要求及苑廈技工使用高空工作台所需條件是否不需要訓練合格證書等，本部翻查有關資料及法例，建議除必須擁有「平安咭」及購買有關高空工作之保險外，亦建議修讀有關高空工作之安全課程，增加對高空工作的知識，使到高空工作的意外得以減少，而該類課程可向職業安全健康局或建造業訓練局查詢，而 2005 年度之高空工作課程可參考附件。

雖然在法例上使用高空工作台者，沒有規定需要備有訓練合格證書，但該工人亦受「工廠及工業經營條例」及「建築地盤(安全)規例」所規管，因此該使用人必須配戴安全帶/安全頭盔及如何處理物料/廢料等工具。

另外，蓋建高空工作台如鐵架或竹棚，則需由「曾受訓練的人」蓋建及由「合資格的人」直接監督，「合資格的人」在棚架在首次使用前的 14 天內或在有機會影響工作台的強度及穩固性的天氣情況之後，作出檢查，否則不能使用，經檢查而發現的瑕疵，應立刻作出改善，並在「表格五」作出報告。

「曾受訓練的人」是指該人所執行的職責是在「合資格的人」直接監督下架設、擴建、更改和拆卸工作台，及該人已完成相等於為「合資格的人」而舉辦的正式鐵架/竹棚工作訓練，並具備最少三年該類工作台工作經驗。

以竹棚為例，「合資格的人」是指該人須受“實質訓練及實際經驗，該人：

- (i) 已完成正式的竹棚工作訓練，例如職業訓練局主辦的三年制棚工學徒計劃（根據第 47 章《學徒制度條例》），或建造訓練局舉辦的一年全日制竹棚架訓練課程/計劃，或已在建造業訓練局舉辦的竹棚工藝技能測試中取得合格的成績；
- (ii) 具備十年或以上的竹棚工作經驗；

- (iii) 能閱及讀理解棚架計劃書、設計圖、規格及棚架施工方法說明書，使其能有足夠能力監督棚架工程及證實棚架的安全性。他亦應能找出現存及可預見的潛在危險或能影響僱員衛生或危害僱員的工作環境。

除了以上外，本部建議各苑廈先檢查及確定所購買之勞工保險及第三者保險有否包括保障高空工作之工人或第三者，才考慮應否由苑廈之維修員進行高空工作。

第一版：二〇〇五年一月

編製人：工程部

AL/JT

二〇〇五年一月二十九日

第 2 頁，共 2 頁

(只供內部參閱)

156 運送危險品安全知識

編號：THC

在一九九七年發生的一宗交通意外，毒性化學品從運送車輪漏出，引起公眾人士及運輸界對運送危險品的關注。消防處檢討危險品法例有關運送危險品的部份後，建議作出修訂，現正諮詢各界意見。更提高運送危險品的安全水平，業內前線及督導層員工責任重大，此課程特別為他們而設，講解運送危險品的基本安全措施，務求他們工作得更安全、健康和有效。

課程內容：

- 簡介有關運送危險品的法例
- 常見運送危險品的意外成因
- 運送危險品的安全裝置及措施
- 危險品標籤
- 包裝及疊放危險品
- 緊急應變措施

講師	： 專業人士或職安局顧問
授課語言	： 粵語輔以中文講義
授課形式	： 部份時間制日間課程
授課期	： 三小時三十分
入學條件	： 須具有閱讀及書寫中文的能力
證書頒發條件	： 出席率達百分之一百及考試合格
學費	： \$140* / \$110** (原價：\$155)

157 工作上的暴力事故

編號：VIO

近年來，很多行業的員工，例如保安人員、社會工作者及一些在前線執行任務的公務員，在工作時，有機會遇到暴力事故，這些情況引起社會人士極大的關注。

本課程主要讓學員認識因工作引起暴力事故的成因，以及如何制定完善的制度去處理該等事故。

課程內容：

- 工作上暴力事故的分析
- 暴力事故發生的原因
- 不同行業工作引起暴力事故的例子
- 發生暴力事故前的徵兆
- 處理暴力事故的策略

講師	： 專業人士或職安局顧問
授課語言	： 粵語輔以中文講義
授課形式	： 部份時間制日間課程
授課期	： 三小時三十分
入學條件	： 須具有閱讀及書寫中文的能力
證書頒發條件	： 出席率達百分之一百及考試合格
學費	： \$140* / \$110** (原價：\$155)

158 醫療廢料安全處理

編號：WAS

醫療廢料不單對醫護人員構成威脅，亦能影響廢物處理工人的安全和健康，如處理不當，更可能對公眾造成不良影響。涉及問題的醫療廢料有針筒及其它物品。本課程對象是接觸醫療廢料的各界人士，目的是提供醫療廢物的分類、包裝、處理、存放及運送等知識以減少意外發生。

課程內容：

- 醫療廢料的種類及危害
- 醫療廢料安全操作
- 安全棄置程序及方法

講師	： 專業人士或職安局顧問
授課語言	： 粵語輔以中文講義
授課形式	： 部份時間制日間課程
授課期	： 三小時三十分
入學條件	： 須具有閱讀及書寫中文的能力
證書頒發條件	： 出席率達百分之一百及考試合格
學費	： \$140* / \$110** (原價：\$155)

159 高空工作安全課程

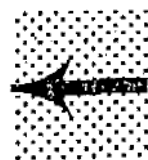
WHT

高空工作在安全的考慮上，是要盡可能去避免，因為當中涉及的危害，可以引至極嚴重的後果，所以如果要進行高空工作，一定要採取足夠的安全措施，減少意外的發生。本課程的主旨，是介紹有關高空工作的法例要求，並解釋如何進行高空工作的風險評估，從而明白到所需的安全措施，使到高空工作的意外得以減低。

課程內容

- 法例對高空工作的要求
- 高空工作的風險評估
- 預防人體下落的措施
- 高空工作的安全管理
- 個案分析
- 高空工作的個人防護設備示範
- 高空工作的個人防護設備實習

講師	： 專業人士或職安局顧問
授課語言	： 粵語輔以中文講義
授課形式	： 全日制課程
授課期	： 六小時
入學條件	： 具有適當的教育水平並具有有關工作經驗
證書頒發條件	： 出席率達百分之一百及考試合格
學費	： \$420* / \$330** (原價：\$470)



Appendix 6 Henderson Land Development Company Limited working at height instructions

OHSAS 18001 WORKING INSTRUCTION

Title: 主題: 高空工作事宜		Doc. No.: 檔案編號: W68-(OHS)-WI-007		
		Revision: 版本: 1		
		Page: 1 of 2		
		頁數: /		
<p>1. 目的</p> <p>建立一般審核工作於二米高度或以上的棚架，高空工作平台及梯子的指引</p> <p>2. 一般事項</p> <p>屋苑主管 (SIC) 或其代表須依從此指令處理審核及管制有關人士使用工作棚架，高空工作平台及梯子。</p> <p>3. 定義</p> <p>「合資格人士」： 就「建築地盤 (安全) 規則」規定須由合資格的人執行的職責而言，“合資格的人”指符合下述情況的人： 由承建商指定執行該職責，而「建築地盤 (安全) 規則」規定該承建商須確保該職責由合資格的人執行；及 因其所受的實則訓練及實際經驗而有足夠能力執行該職責。</p> <p>4. 工作指引</p> <p>4.1 凡工作不能在地面上或從地面處或永久性結構建築物安全地進行時，有關工作人員須提供並確保所有使用工作平台或其他支持用的設施的結構，令工作能安全地進行。</p> <p>4.2 屋苑主管 (SIC) 或其代表確保工作棚架或高空工作平台在符合以下的情況下使用：</p> <p>4.2.1 棚架 / 高空工作平台</p> <p>I. 在首次使用前</p> <p>II. 在經過擴建、部份拆卸或更改後；</p> <p>III. 在經歷天氣影響其強度、穩定性或任何部份經移位後；或 在緊接每次使用的 14 天之內，曾經由合資格人士檢查；及</p>				
Revision 版本	Effective Date 生效日期	Prepared By(Signature) 編寫者(簽署)	Approved By(Signature) 批核者(簽署)	Change History 更改歷程
1	15-Oct-2003	Eddy Ho ()	MR ()	New issue

QS-FORM1(P1).doc (1st March, 2002)

OHSAS 18001 WORKING INSTRUCTION

<p>Title: 主題: 高空工作事宜</p>	<p>Doc. No.: 檔案編號: W68-(OHS)-WI-007 Revision: 版本: 1 Page: 2 of 2 頁數: /</p>
<p>4.2.2 檢查該棚架的人士已按認可格式作出報告 (表格五)，並加以簽署，而該報告述明棚架處於安全使用狀態。</p> <p>4.2.3 時刻將檢查報告或副本備於使用有關棚架或管理處存檔。</p> <p>4.2.4 監管任何人士於該棚架或高空工作平台上工作均須配帶符合規格之安全帶。而須保持將安全帶於工作時一直繫於穩固的繫穩物上。此外，如有關棚架 / 工作平台是可移動的，在移動的過程中；不准有任何人員於該棚架 / 工作平台上，免生危險。</p> <p>4.2.5 不得在工作棚架或高空工作平台上加置台架、木梯或鋁梯。</p> <p>4.2.6 梯子之使用</p> <ul style="list-style-type: none"> i. 選擇合適之梯子。 ii. 梯子使用前須先行檢查妥當，切勿自行加裝延伸部份。 iii. 梯子的頂部最少要高出其擱置點一米以作扶手之用。 iv. 使用梯子時須保持斜度不超過一比四 (底部之距離比垂直高度)，梯底闊度越大會越安全。 v. 須確保梯子固定在平坦及不滑溜之表面上。 vi. 當上落梯子時切勿攜帶重物。 vii. 有需要時，配帶安全帶。 <p>4.2.7 所有工作台使用人士需曾原生產商 (OEM)，供應商或合格導師指導及學習使用工作台。選擇工作台須考慮其載重能力，工作台高度，工作台面積及穩定性。</p> <p>4.2.8 須確保工作台擺放位置平台，如工作台有配置活動車輪，須確保使用時鎖上車輪。須確保除工作台入口外，所有地方圍欄須緊密牢固。</p> <p>4.2.9 須確保工作台在使用時遠離其他物件及高掛電纜。</p> <p>4.2.10 切勿令工作台超重使用，及切勿在有人使用時移動工作台。</p> <p>4.2.11 如棚架搭建工程由業主自僱的承辦商建造，則業主須向承辦商索取有效的表格五並提交管業處，確保該承辦商所搭建的棚架附合法例之要求。</p>	

QS-FORM1(P2).doc (1st March, 2002)

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附件 (三)

OHSAS 18001 WORKING INSTRUCTION

Title: 主題: 高空工作安全指引		Doc. No.: 007 檔案編號: W68-(OHS)-WI-025	
		Revision: 版本: 第 2	
		Page: 1 of 1 頁數: 1	

1 目的
希望屋苑範圍內有關人員通力合作執行高空工作安全措施, 更能有效地促進屋苑環境安全。

2 適用範圍
公司轄下管理屋苑之範圍內所有員工及進入屋苑工作之承辦商。

3 工作指示
屋苑各部門(管業/保安/維修/會所/清潔)工作人員或外判承辦商因應工作需要涉及(離地2 米或以上)高空工作時均有責任執行高空工作安全措施避免發生工傷意外。常用措施如下:

1. 高空工作的安全要點, 例如:
 - 地洞、樓邊、電梯槽口、吊船、梯子、工作台
2. 高空工作安全程序:
 - 儘量安排工程在地面, 不可行時必須使用適當安全設備才進行高空工作
3. 高空工作風險管理:
 - 辨認與高空工作有關的危害、評估危害的嚴重性、制定及執行控制措施
4. 工作台的安全使用:
 - 工作台的安全要點、流動式塔式通架
5. 梯子的安全使用:
 - 使用梯子的安全要點、使用固定直梯的安全要點
6. 防止人體墮下措施:
 - 安全網、安全帶、背套式安全帶及其附件/防墮式緩沖器
7. 高空工作的安全檢查表, 應用範圍包括:
 - 棚架、工作台、樓邊、電梯邊、電梯槽口、梯子、防止人體/物料墮下措施、其他相關措施

上列安全措施取材自職業安全健康局之建造業高空工作安全須知, 各人均可上網瀏覽安全須知詳情, 網址如下:
(<http://www.oshc.org.hk/others/bookshelf/result.c.asp?search=%B0%AA%AA%C5%A4u%A70>)

各組部門主管需經常提示涉及高空工作的員工重視執行高空工作的安全措施。主管或其委派之專責人員也需監管承辦商在屋苑進行高空工作時的安全措施。

駐苑經理於屋苑每月例會與各部門主管檢討高空工作安全情況務求駐苑員工認識工業安全的重要性。

透過一系列指導或指引將職業健康安全訊息傳達各階層員工/進入屋苑工作之外判承辦商認識職業健康安全以達致將危機減至最低。

Revision 版本	Effective Date 生效日期	Prepared By(Signature) 編寫者(簽署)	Approved By(Signature) 批核者(簽署)	Change History 更改歷程
1	15-Apr-2005	Philip Leung()	MR ()	New issue

QS-FORM1(P1).doc (1* March, 2002)

Appendix 7 Well Born Real Estate Management Limited working at height guidelines

**OHSAS 18001
WORKING INSTRUCTION**

Title: 主題: 高空工作事宜	Doc. No.:
	機中編號: WBO (OHS) WH 007
	Revision:
	版本: 1
	Page: 1 of 2
	頁數: 1

1. 目的

建立一般審核工作於二米高度或以上的棚架，高空工作平台及梯子的指引

2. 一般事項

屋苑主管 (SIC) 或其代表須依從此指令處理審核及管制有關人士使用工作棚架，高空工作平台及梯子。

3. 定義

「合資格人士」：

就「建築地盤 (安全) 規則」規定須由合資格的人執行的職責而言，「合資格的人」指符合下述情況的人：

由承建商指定執行該職責，而「建築地盤 (安全) 規則」規定該承建商須確保該職責由合資格的人執行；及

因其所受的實則訓練及實際經驗而有足夠能力執行該職責。

4. 工作指引

4.1 凡工作不能在地面上或從地面處或永久性結構建築物安全地進行時，有關工作人員須提供並確保所有使用工作平台或其他支持用的設施的結構，令工作能安全地進行。

4.2 屋苑主管 (SIC) 或其代表確保工作棚架或高空工作平台在符合以下的情況下使用：

4.2.1 棚架 / 高空工作平台

- I. 在首次使用前
- II. 在經過擴建、部份拆卸或更改後；
- III. 在經歷天氣影響其強度、穩定性或任何部份經移位後：或在緊接每次使用的 14 天之內，曾經由合資格人士檢查；及

Revision 版本	Effective Date 生效日期	Prepared By(Signature) 編寫者(簽署)	Approved By(Signature) 批核者(簽署)	Change History 更改歷程
1	15-Oct-2003	Eddy Ho ()	MR ()	New issue

QS-FORM1(P1).doc (1st March, 2002)

OHSAS 18001

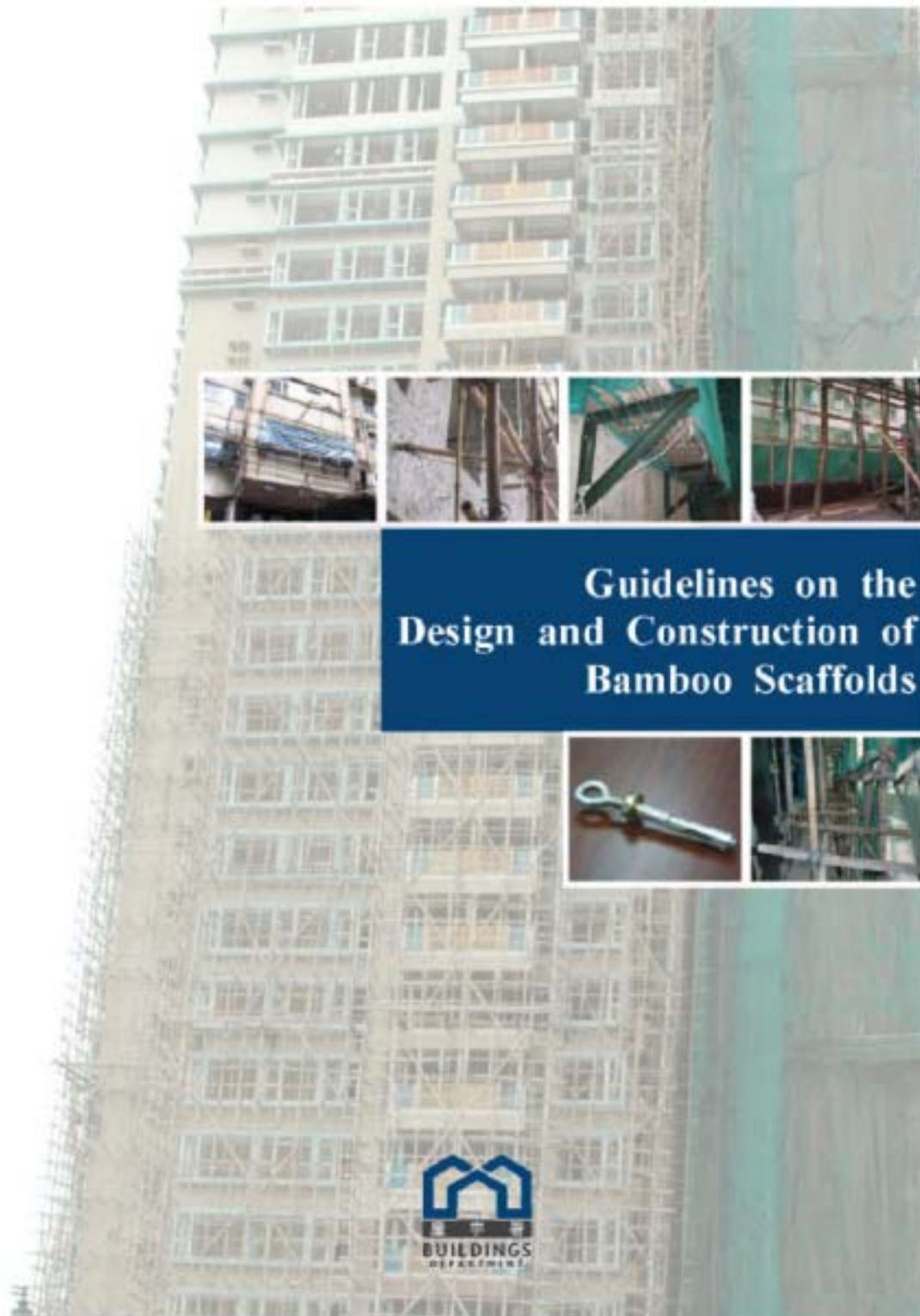
WORKING INSTRUCTION

Title: 主題: 高空工作事宜	Doc. No.:
	檔中編號: WISO-OHS-WI-007
	Revision:
	版本: 1
Page: 2 of 2	
頁數: /	

- 4.2.2 檢查該棚架的人士已按認可格式作出報告 (表格五)，並加以簽署，而該報告述明棚架處於安全使用狀態。
- 4.2.3 時刻將檢查報告或副本備於使用有關棚架或管理處存檔。
- 4.2.4 監管任何人士於該棚架或高空工作平台上工作均須配帶符合規格之安全帶。而須保持將安全帶於工作時一直繫於穩固的繫穩物上。此外，如有關棚架 / 工作平台是可移動的，在移動的過程中；不准有任何人員於該棚架 / 工作平台上，免生危險。
- 4.2.5 不得在工作棚架或高空工作平台上加置台架、木梯或鋁梯。
- 4.2.6 梯子之使用
- i. 選擇合適之梯子。
 - ii. 梯子使用前須先行檢查妥當，切勿自行加裝延伸部份。
 - iii. 梯子的頂部最少要高出其擱置點一米以作扶手之用。
 - iv. 使用梯子時須保持斜度不超過一比四 (底部之距離比垂直高度)，梯底闊度越大會越安全。
 - v. 須確保梯子固定在平坦及不滑溜之表面上。
 - vi. 當上落梯子時切勿攜帶重物。
 - vii. 有需要時，配帶安全帶。
- 4.2.7 所有工作台使用人士需曾原生產商 (OEM)，供應商或合格導師指導及學習使用工作台。選擇工作台須考慮其載重能力，工作台高度，工作台面積及穩定性。
- 4.2.8 須確保工作台擺放位置平台，如工作台有配置活動車輪，須確保使用時鎖上車輪。須確保除工作台入口外，所有地方圍欄須緊密牢固。
- 4.2.9 須確保工作台在使用時遠離其他物件及高掛電纜。
- 4.2.10 切勿令工作台超重使用，及切勿在有人使用時移動工作台。
- 4.2.11 如棚架搭建工程由業主自僱的承辦商建造，則業主須向承辦商索取有效的表格五並提交管業處，確保該承辦商所搭建的棚架附合法例之要求。

QS-FORM1(P2).doc (1st March, 2002)

Appendix 8 Buildings Department Bamboo Scaffold Guidelines



Guidelines on the Design and Construction of Bamboo Scaffolds

A Introduction

1. These guidelines provide good practices for the design and construction of bamboo scaffolds commonly used in Hong Kong. Recommended practices on the design, erection, maintenance and dismantling of bamboo scaffolds are given. Detailed standards of design and construction of some types of simple bamboo scaffold, including double-layered, truss-out and signboard bamboo scaffolds are given in Section 2 of Part B of these guidelines with typical examples for each of these types of bamboo scaffold. When the recommended standards are not followed for the design and construction of these types of simple bamboo scaffold or when other types of bamboo scaffold not covered in Section 2 of Part B of these guidelines are used, the bamboo scaffold should be designed by a design engineer with a performance-based design approach.
2. These guidelines aim to ensure the structural safety and stability of bamboo scaffolds during their lifetime. In this connection, apart from the main frame of the bamboo scaffold, technical requirements for the putlogs, nylon strips, drilled-in anchors and steel brackets are also given. The Buildings Department should be notified whenever bamboo scaffolds are to be erected.
3. For matters relating to labour safety, reference should also be made to the Code of Practice for Bamboo Scaffolding Safety issued by the Labour Department in 2001. The Code of Practice provides practical guidance for the compliance of the requirements under the Factories and Industrial Undertakings Ordinance and Construction Sites (Safety) Regulations regarding structural safety and stability of bamboo scaffolds when workers work in the bamboo scaffolds. If scaffolds in use come under the control of the Construction Sites (Safety) Regulations administered by the Labour Department, requirements as specified in the Code of Practice have to be complied with.
4. Compliance with these guidelines does not confer immunity from relevant legal requirements.

B Design and Construction of Bamboo Scaffolds

1. Material Specification

1.1 Bamboo Members

The commonly used bamboo types are Kao Jue and Mao Jue. They should be 3 to 5 years old and air-dried in vertical positions under indoor condition for at least 3 months before use. The nominal length of both Kao Jue and Mao Jue is 6 m.

All bamboo members should be free from visual defects, and meet the following requirements on the cross-sectional dimensions:

Kao Jue The nominal external diameter should not be less than 40 mm.

Mao Jue The nominal external diameter along the unlapped length should not be less than 75 mm with a nominal minimum thickness of 10 mm.

1.2 Nylon Strips for Knotting

Nylon strips of adequate strength, stiffness and durability should be used for knotting in bamboo scaffolds.

The minimum ultimate strength of the nylon strips should not be less than 50 kgf or 0.5 kN per strip while the nominal width is 5.5 to 6.0 mm with a nominal thickness ranges from 0.85 to 1.0 mm.

All knots should be tightened with at least 5 rounds of nylon strips. The ends of the nylon strips should be crossed and twisted to form a single twisted end which passes through the knot twice to give one round turn for proper anchorage.

1.3 Lateral Restraints

Effective lateral restraints should be provided to the main posts of the outer layer of double-layered bamboo scaffolds.

An effective lateral restraint takes the form of putlog which consists of a metal tie and a bamboo strut. A mild steel bar of at least 6 mm diameter with a yield strength of 250 N/mm² and a minimum elongation of 15% or a bundle of mild steel wires with equivalent tension capacity and mechanical properties should be used. It should be properly anchored to structural elements with the use of an anchor bolt together with a properly installed bamboo strut.

The free-standing portion of bamboo scaffolds at the top should be tied back to the building structure.

1.4 Drill-in Anchor Bolts

High quality drill-in anchor bolts should be used in the installation of steel brackets and putlogs for the construction of bamboo scaffolds. All anchor bolts should be installed onto structural elements. The installation details and procedures of anchor bolts should be in strict accordance with the manufacturer's recommendations.

To ascertain the quality of anchor bolts and their supporting structural elements, representative samples of the installed anchor bolts should be tested. The test load should be 1.5 times the working load and should be maintained for at least 3 minutes. The distance between the reaction legs of the pull-out test equipment and the centre of the bolt should be at least 8 times the bolt diameter to prevent assistance of support reactions against the pull-out test force. No sign of separation or failure in concrete and the bolt should be observed during the test.

Sampling rates for testing anchor bolts are recommended as follows:- (whichever is the greater)

- a. for steel bracket (at each layer): 10% and not less than 5
- b. for putlog: 5% and not less than 5

The anchor bolts should be heavy-duty type with at least 12 mm diameter and a minimum tensile capacity of 7 kN.

1.5 Steel brackets

Steel brackets for bamboo scaffolds in construction sites should be made of 80×80×6 Grade S275 Equal Angle with a minimum unit weight of 7.34 kg/m while those for truss-out bamboo scaffolds should be made of 50×50×5 Grade S275 Equal Angle with a minimum unit weight of 3.79 kg/m or suitable size of steel brackets. The steel angles should be welded with 5 mm fillet welds. The steel brackets are preferably galvanized or painted with 2 layers of red lead primer.

2. General Forms of Bamboo Scaffolds

This section provides detailed standards of design and construction of some typical types of single bamboo scaffold, including double-layered, truss-out and signboard bamboo scaffolds.

When the recommended standards given in this section are not followed or when other types of bamboo scaffold not covered in this section are used, they should be designed by a design engineer. For a bamboo scaffold for demolition works, irrespective of its size, the design engineer should also ensure the bamboo scaffold is capable to withstand the increased wind load acting on the plastic sheeting.

2.1 Double-layered Bamboo Scaffolds

The inner layer, at about 200 – 250 mm from the building face, is known as the finishing scaffold. The outer layer, at about 600 mm from the inner layer, is called the working scaffold. Working platforms are erected between the inner and outer layers.

For the outer layer, Mao Jue or firs are erected as the main vertical posts at a maximum distance of about 1.3 m apart. They are rested on either solid ground or steel brackets. The posts are connected with horizontal ledgers for fixing their position. Kao Jue are erected between two Mao Jue or firs as standards at a distance of about 650 mm. Standards are vertical members overhung by the bottom ledgers which are made of Mao Jue. The vertical distance between two ledgers is about 600 to 750 mm. Two pieces of Kao Jue fixed in an 'X' shape at an angle of 45° to 60° are the bracings for keeping lateral stability. Each bracing must be tied to the posts, standards and ledgers of the scaffold. This forms the basic configuration of a double-layered bamboo scaffold.

For the inner layer, all posts, standards and ledgers are Kao Jue. Bracings should be provided. Transoms are erected to connect the inner and the outer layers. These transoms are also used to support the working platform.

Alternatively, posts may be spaced at a distance of 2.6 m. Such an arrangement should be substantiated by a design engineer. Diagram 1 indicates this alternative arrangement for reference.

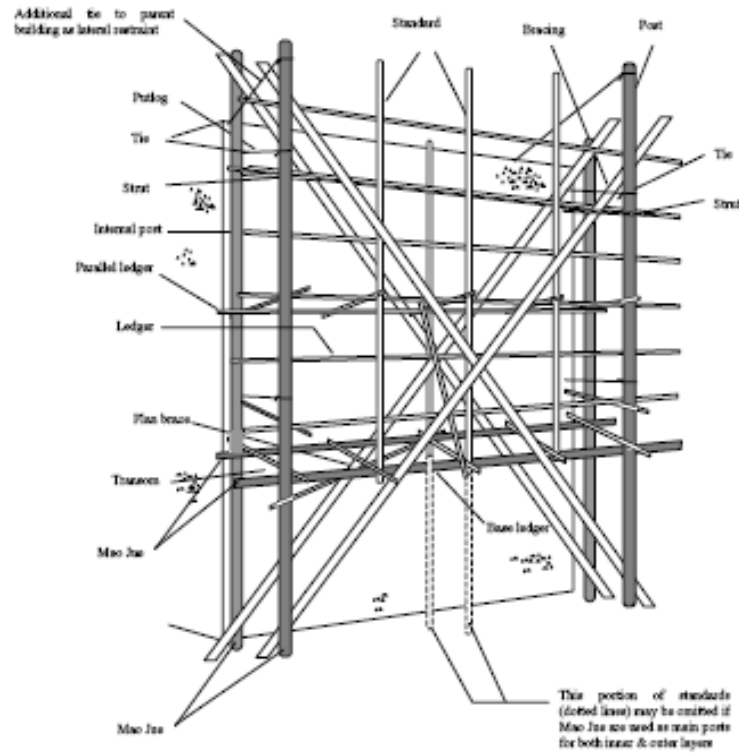


Diagram 1 – Alternative arrangement for double-layered bamboo scaffold

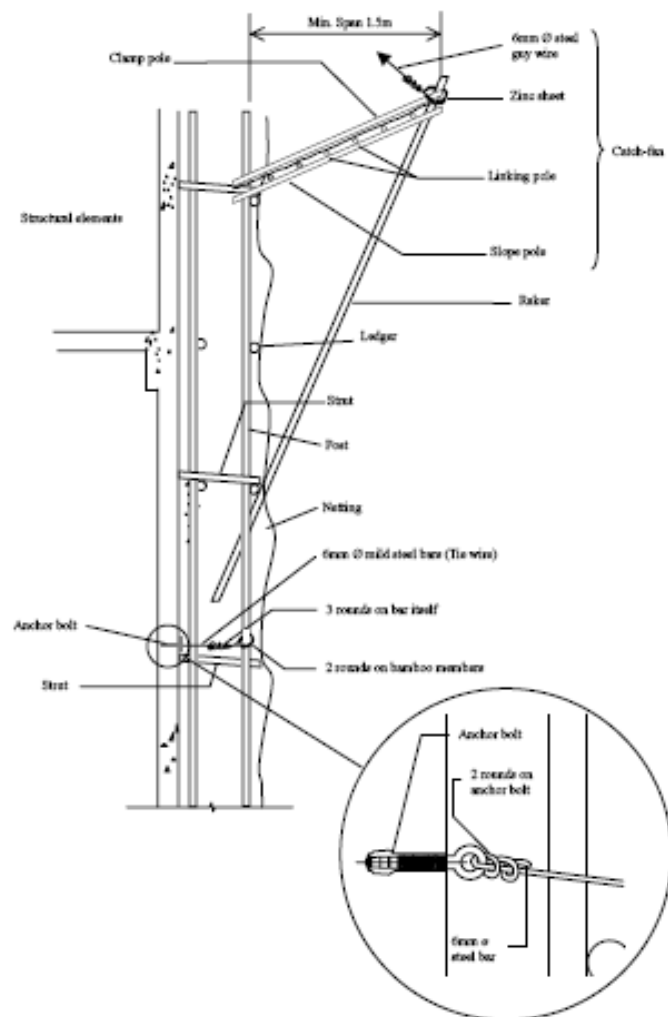
Diagram 2 shows the details of putlog and catch-fan. The putlog should be fixed to the post at the outer layer at one end and to the structural element of a building at another end with the use of a 6 mm diameter mild steel bar pre-fixed to the structural elements with the use of an anchor bolt. Catch-fans should be provided at 15 m vertical intervals and are connected to the working platforms. The span length of the catch-fan should not be less than 1.5 m from the outer layer of the scaffold. The outer edge of the catch-fan should be tied with

a 6 mm diameter steel guy wire at a spacing of not more than 2.6 m. The steel guy wire should be tied securely onto the main posts. The catch-fans must be covered with galvanized zinc sheets for debris collection and removal. For a huge catch-fan, additional ties such as hang pole and raker are required.

To safeguard structural stability of bamboo scaffolds under extreme weather conditions, putlogs should be provided at a horizontal spacing not greater than 3.0 m. At a height less than 100 m above ground, the vertical spacing of putlogs should not be greater than 6.3 m while at a height of 100 m or more, the vertical spacing should not be greater than 4.2 m.

The spacing between the vertical posts may be increased to 3 m in case it is properly designed by a design engineer. Diagram 3 shows for the design engineer's reference the layout of a 15 m high double-layered bamboo scaffold with a post spacing of 3 m.

For a scaffold greater than 15 m in height, it should be designed by a design engineer. Diagram 4 shows for the design engineer's reference the layout of a 19 m high double-layered bamboo scaffold with a post spacing of 3 m.



One loaded platform (See Table 1)
 $L = 3.0 \text{ m}$; $h = 2.1 \text{ m}$
 Height (H) = 14.8 m or $6@2.1 + 2.2$
 Inner layer: KJ + MJ
 Covered area per pullog = $3 \times 2.1 \times 3 = 18.9 \text{ m}^2$
 Transoms not shown for clarity

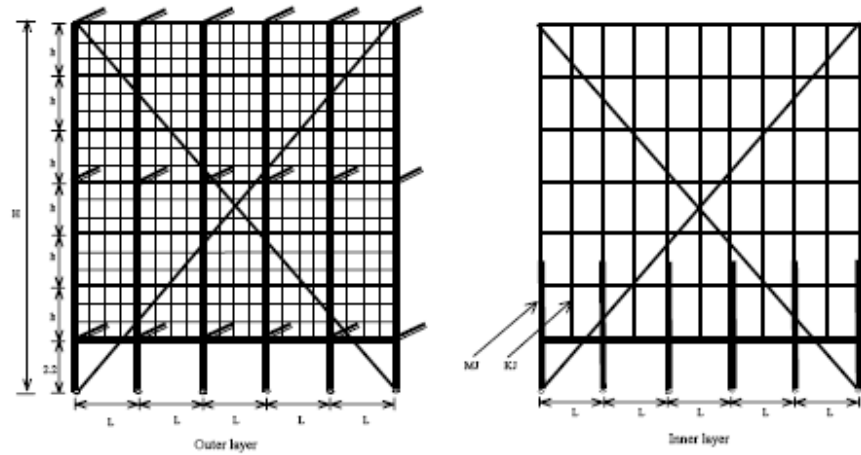


Diagram 3 –Configuration for double-layered bamboo scaffold with a height of 15m (for reference only)

One loaded platform (See Table 1)
 $L = 3\text{m}$; $h = 2.1\text{m}$
 Height (H) = 19.0m or $8 @ 2.1 + 2.2$
 Inner layer: KJ + MJ
 Covered area per pullog = $3 \times 2.1 \times 3 = 18.9\text{ m}^2$
 Transoms not shown for clarity

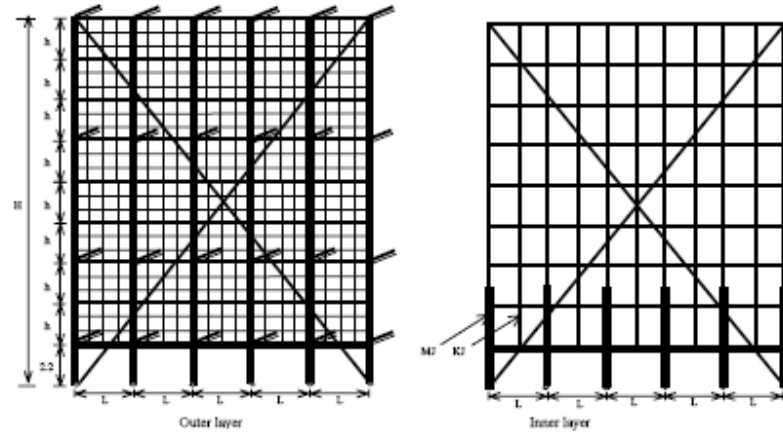


Diagram 4 –Configuration for double-layered bamboo scaffold with a height of 19m (for reference only)

Overall height (m)	≤ 100	≤ 100	100 ~ 500
Basic wind pressure (kPa)	2.86	2.86	3.72
System height, H (m)	15	19	15 and 19
Platform height, h (m)	2.1	2.1	2.1
Post spacing, L (m)	3	3	3
Putlog arrangement	3h	3h	2h
Covered area per putlog (m ²)	18.9	18.9	12.6

Table 1 Layout schedule for double-layered bamboo scaffolds in Diagrams 3 and 4

2.2 Truss-out Bamboo Scaffolds

Diagram 5 shows a typical truss-out bamboo scaffold. It is commonly used for the repair of external drain pipes, spalling concrete, loose external rendering, removing external unauthorized building works, etc. Since it is a light duty scaffold, Kao Jue will generally suffice. The rakers, standards and parallel ledgers must be supported by steel brackets fixed to the structural elements of a building.

The overall height of a truss-out bamboo scaffold should not exceed 6 m.

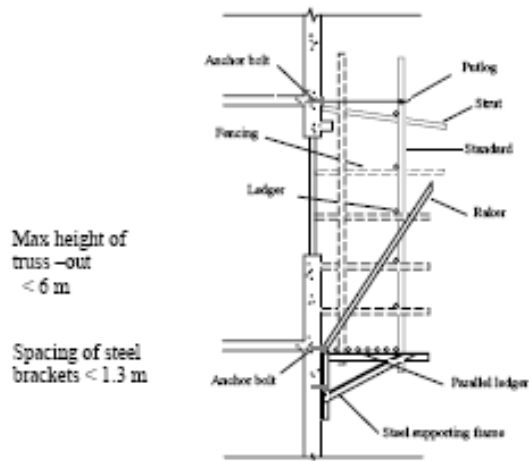


Diagram 5 – Truss-out bamboo scaffold

2.3 Bamboo Scaffolds for Signboards

Diagram 6 shows a typical bamboo scaffold for signboards. It is usually of cantilever construction with a maximum length to height ratio of 4:3. The whole bamboo scaffold is supported by steel wires or hang poles fixed to the structural elements of a building. The scaffold must not obstruct the traffic flow underneath and reference should be made to the “Guide on Erection & Maintenance of Advertising Signs” published by the Buildings Department.

If the bamboo scaffold for signboard projects by more than 5 m, it should be separately designed.

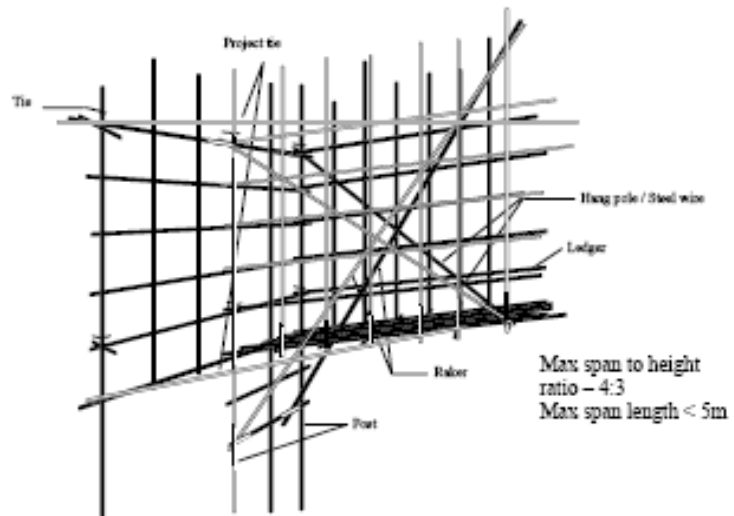


Diagram 6 – Bamboo scaffold for signboard

3. Steel Brackets

Steel brackets are essential to the overall stability of a bamboo scaffold. Diagram 7 shows the details of a steel bracket for the support of posts of a bamboo scaffold for construction site. All steel brackets should be securely mounted onto the structural elements of a building with high quality anchor bolts and comply with the following requirements:

- The horizontal spacing between the steel brackets should not be larger than 1.3 m; and
- The concrete strength of the structural element to which the steel bracket is fixed should be not less than 25 N/mm^2 .

All anchor bolts should be installed strictly in accordance with the manufacturer's recommendations.

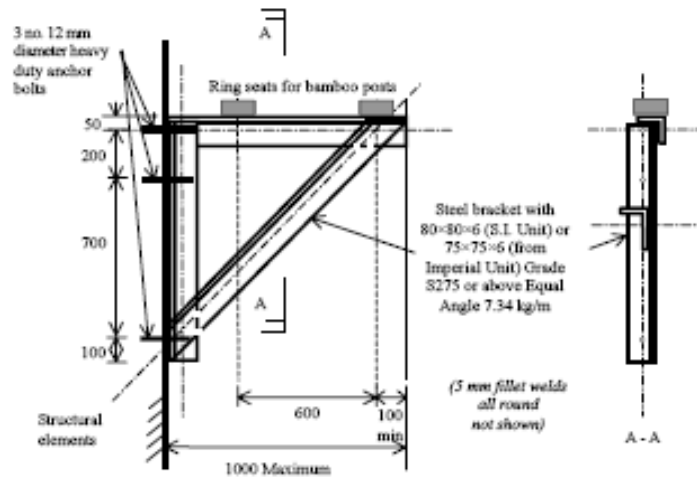


Diagram 7 – Base support for general construction

Diagram 8 shows the details of a steel bracket for the support of standards of a truss-out scaffold.

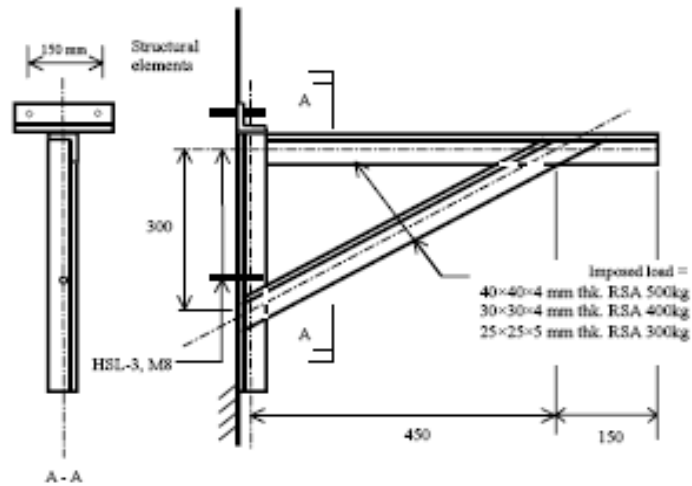


Diagram 8 – Base support for truss-out scaffold

There may be occasions that a post of a bamboo scaffold does not rest on the steel bracket, the design engineer should ensure that the loading from the misaligned post can be effectively transferred to the steel bracket.

4. Erection

- 4.1 Bamboo scaffolds shall be erected by trained workmen under the immediate supervision of a competent person.
- 4.2 Work should be started from the bottom level to the top level and from the interior part to the exterior part. The height of the bamboo scaffolds erected at any side should not be greater than the topmost part of the building or structure by one storey. The cantilever portion at top should be properly tied and secured against wind.
- 4.3 All vertical members of scaffolds should be plumbed.

- 4.4 The scaffolds should be effectively braced and tied back to ensure overall stability. The bracings should extend from the base to the top of the scaffolds.
- 4.5 Where the scaffolds are erected adjacent to a road or pathway, overlay or screen nets must be provided to envelop the scaffolds for the protection of persons or vehicles against falling objects.
- 4.6 The building on which the truss-out scaffolds are to be erected should be examined to ensure that the structural elements can support the loadings of the scaffolds. Strictest control should be exercised on the loads applied to the truss-out scaffolds.
- 4.7 All knottings between bamboo members should be tight and secure. Knottings for posts/standards and ledgers, ledgers and transoms, bracings/rakers, etc. should be tied by nylon strips. For post/standard, ledger and transom to be tied together, any two of them should be tied up first and then the remaining one should be tied up on top of them.
- 4.8 For connection between two bamboo members, the following length of overlap should be followed:
 - a. 1.5 m to 2 m for posts/standards,
 - b. at least 2 m for ledgers and bracings/rakers

Besides, the distance between two knottings on the overlapping portion of the bamboo members should not be greater than 300 mm, and the tail of one bamboo member should be connected to the head of the other. Diagram 9 illustrates the proper connection of bamboo members for bracings/rakers, ledgers, posts/standards used in a bamboo scaffold.

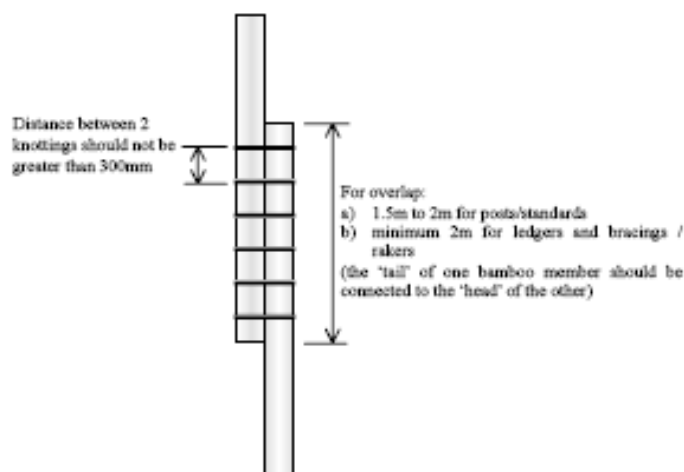


Diagram 9 – Proper connection of bamboo members for bracing / rakers, ledgers, standards / posts

- 4.9 All ledgers, bracings, rakers, ties, struts and transoms should not be used for hanging equipment, tool and materials.
- 4.10 The truss-out bamboo scaffolds should be supported by the structural elements of a building and are prohibited to rest on decorative features nor non-structural elements of the building.

5. Maintenance and Inspection

- 5.1 Bamboo is a natural material and it expands and contracts as the moisture content changes. Proper workmanship, close supervision and frequent inspection are required to ensure the structural integrity of the bamboo scaffolds.
- 5.2 The bamboo scaffolding works should be supervised by a competent person who should inspect the bamboo scaffold as follows:-
 - a. upon completion of the first erection of the bamboo scaffold;

- b. at intervals of not more than 14 days after the first inspection;
 - c. after a tropical cyclone, heavy rain or storm;
 - d. after any substantial addition or alteration of the bamboo scaffold; and
 - e. before commencement of dismantling the bamboo scaffold.
- 5.3 More frequent inspection must be provided when:-
 - a. a tropical cyclone warning signal is announced;
 - b. a strong monsoon signal is announced; or
 - c. there is severe gusts, especially during April and May
- 5.4 Plastic sheeting, especially for bamboo scaffolds for demolition works, must be removed when a tropical cyclone warning signal or a strong monsoon signal is announced.
- 5.5 The competent person should check the strength and stability of the scaffold and ascertain there are no defects and deterioration. Defects found during the inspection should be rectified immediately.
- 5.6 The competent person should record his inspection and findings in the inspection record form.
- 5.7 The competent person should possess the following qualification, experience and competence:
 - a. has satisfactorily completed a formal training in bamboo scaffolding works such as the 3-year Bamboo Scaffolder Apprenticeship Scheme operated by the Vocational Training Council or the 1-year full-time training course in Bamboo Scaffolding of the Construction Industry Training Authority (CITA), or has satisfactorily passed the Trade Test on Bamboo Scaffolding of the CITA; and
 - b. possesses an experience of 10 years or more in bamboo scaffolding works (inclusive of experience under the formal period); and

- c. should be able to read and understand the scaffolding plan, design drawings, specifications and method statement of the scaffolding works, and be capable of identifying existing and potential hazards in the works area and the surrounding.
- 5.8 The bamboo scaffold should be erected, altered and dismantled by trained workmen under the supervision of a competent person. The construction and workmanship of the bamboo scaffold should be in accordance with these guidelines.
- 5.9 The trained workmen should have satisfactorily completed a formal training in bamboo scaffolding works equivalent to any of those required for a competent person and possess at least 3 years experience in bamboo scaffolding works (inclusive of experience under the formal training period).
- 5.10 For bamboo scaffolds in construction site where a site supervision plan is required to be lodged, the Technically Competent Person (TCP) T1 in the Registered Contractor's Stream is required to inspect the integrity of the bamboo scaffolds regularly. The other TCPs in the various streams should also make inspections to the bamboo scaffold as appropriate. The TCPs should ensure no man-made damage of the bamboo scaffolds by other trades of works.

6. Dismantling

- 6.1 Bamboo scaffolds must be immediately removed once the construction/repair works are completed.
- 6.2 Dismantling work must be carried out by trained workmen under the immediate supervision of a competent person.
- 6.3 The strength and stability must be ensured prior to dismantling works.
- 6.4 No components endangering the stability of the bamboo scaffolds should be removed. Unless necessary precautions have been taken, all the ties and bracings should be securely held in position.

- 6.5 Before dismantling the critical members, such as ledgers, ties, struts, rakers, transoms or bracings, the stability of the bamboo scaffolds must be assured by fixing a similar piece of bamboo member at a lower level before removing that critical member.
- 6.6 No materials or debris shall be stacked on the scaffold.
- 6.7 Scaffolds should not be dismantled in vertical section from one end towards the other.
- 6.8 The affected area must be fenced off at the ground level and a warning sign should be displayed in a conspicuous place.
- 6.9 Removed bamboo members must not be thrown, tipped or shot down from a height.
- 6.10 Dismantling should start from upper level to lower level, from exterior to interior and from non load-bearing parts to load-bearing parts.
- 6.11 Scaffolders should note the Factories and Industrial Undertakings Ordinance, Chapter 59 for labour safety.

7. Administrative Arrangement

Before erection of a bamboo scaffold, the building owners, property management companies, Incorporated Owners or the bamboo scaffolding contractor should inform the Buildings Department using the notification form at Appendix A. The name of the bamboo scaffolding contractor, the name of the competent person, the address of the site, the type of building works involved, the BD's file reference number (if available), the name of the authorized person (if available) and the date of commencement and completion of the scaffolding works should be provided.

C Brief Design Guidelines for Bamboo Scaffolds

1. Performance-based Design Approach

Where the recommendations for typical scaffolding systems in these guidelines are not followed, the bamboo scaffolds should be justified by full scale tests or designed by a performance-based design approach. A performance-based design approach can be based on a second-order stability analysis. The load factor used should be 1.5 for dead and live loads and 1.4 for wind load. The wind load can be deduced from a wind speed of a 2-years return period or the design life of the bamboo scaffolds whichever is the greater with appropriate use of wind coefficients for shape and location from the Code of Practice on Wind Effects in Hong Kong 2004.

2. Design Engineer

For performance-based design approach, a design engineer should be appointed to design the bamboo scaffolds. He should be a corporate member of the Hong Kong Institution of Engineers in the civil or structural discipline.

3. Drawings and Specifications

The scope should at least cover the main frame of the bamboo scaffolds, the base support and the putlog.

4. Engineering Justifications

The framing of structural members and details of construction of the bamboo scaffold should be justified in accordance with recognised engineering principles to meet the loads to which the bamboo scaffold may be subjected. The loads should include dead load, imposed load, wind load and operating load. Other practical considerations such as sway of the bamboo scaffold and initial geometrical imperfection and dynamic effects should be properly accounted for.

Appendix A

Original – Buildings Department
Duplicate – Owners/IO/Property management company/AP
Triplicate – Scaffolding contractor

Building Department
BAMBOO SCAFFOLDS
Notification Form

To : Site Monitoring Section
Buildings Department
Room 2901, 29/F
113 Argyle Street
Mongkok
Kowloon

(Fax No.: 3162 0993)

Name of scaffolding contractor	
Address:	
Telephone number:	
Address of site:	
Purpose:	Demolition/Construction site/Repair/Drainage/Removal of UBW*
Commencement date of scaffolding works:	
Completion date:	
Name of competent person:	
Mobile phone number:	
BD file reference no. (if applicable):	
Name of Authorized Person/Registered Structural Engineer/Registered Geotechnical Engineer (if applicable)	

*Name of Owners/Incorporated Owners(IO)/
Property management company/
Authorized Person(AP)/ Scaffolding contractor :

*Post held in Firm : _____

Telephone number : _____

Date : _____ Signature : _____

*Delete whichever is inapplicable

Appendix 9 Sung Hung Kai Properties report - Measure to prevent accidents with truss-out scaffolds

Measures to prevent Accidents with Truss-Out Scaffolds

1. Introduction

Recent fatal accident involving workers falling from truss-out bamboo scaffold for small maintenance works have attracted many seminars, discussions & symposium within the industry, all aiming at finding ways to avoid these accidents.

In SHKP, safety officers, engineers, contract managers, maintenance managers and scaffolding contractors have been teamed up to tackled the problem. The task force have tried to sort out the causes of the accidents and have proposed some immediate measures to minimize the risk of the truss-out scaffolds. Studies are still on the way to produce some long term and more effective ways to prevent accidents. A scaffolding contractor has together with some academics, produced a discussion paper on the issue. The paper is attached as Appendix I for reference.

2. Causes of the Accidents

- 2.1 The accidents will not be fatal if the workers had properly use the personal protective equipment. Lives will be saved if the workers had worn the body harness and had fixed the harness to an independent life-line properly.
- 2.2 4 of the recent 9 victims were below 30 while 4 were over 42 (The age of 1 victim is not identified). The younger ones may not have enough experience while the elder ones may be too experienced to neglect the fundamental details.
- 2.3 The difficulty in fixing the anchorage bolts of the supporting steel brackets have tempted workers not to fix all the three required bolts and this will jeopardize the stability of the truss-out scaffolds.
- 2.4 In many cases, the holes for the anchor bolts are drilled by worker bending over window openings. This may enlarge the diameter of the drilled holes and render the anchor bolts non-effective.
- 2.5 Fixing or dismantling the third bolt without appropriate tools may itself be a cause of the accident.

- 2.6 Other causes of the accidents may include breakage of bamboo, improper fixing of anchorage bolts, and tight working programme

3. Immediate actions within SHKP to minimise the risk

3.1 Administrative measures

- 3.1.1 To pay for safety, the cost-effective way of making the maintenance subcontractors to erect the truss-out scaffold will be abandoned. Truss-out scaffold will be erected by specialist scaffold subcontractor while the maintenance subcontractor will concentrate on their maintenance work.
- 3.1.2 All workers working with truss-out scaffolds have to attend the training courses on “Safety at work on truss-out scaffold and the certificate of competence in use of transportable temporary devices” offered by the Occupational Safety and Health Council before they can, be registered on our list of approved workers.
- 3.1.3 All workers, after attending the above training courses, have to attend a briefing session offered by our safety section (outline of the session is attached as appendix II) before they can work on the scaffold.
- 3.1.4 Subcontractors have to demonstrate that they have competent personals within their organizations who possess the ability and experience to supervise works with truss-out scaffold before they are eligible to become an on-list subcontractor.
- 3.1.5 The scaffold subcontractor should inspect the truss-out scaffold and attached the “Form 5” to the scaffold as requested by the ordinance.
- 3.1.6 The Estate Management and the Main Contractor will ensure that all subcontractors and workers are pre-qualified before allowing them to work with the truss-out scaffold. The Estate Management should also inform the Labour Department when works shall commence on truss-out scaffold.

3.2 Technical measures

3.2.1 Indoor Fixing of Life Harness

Life harness could save lives if being fixed to an independent life-line properly. Normally, life-line are fixed to anchors on the roof and the external wall but in some cases these external anchor points may not be available. There are now transportable temporary anchor devices for anchoring the harness:

- a) The proprietary “Transportable Temporary Anchor Devices” made to BS EN 795 :1977 class B, promoted by the Labour Department is one of the most effective ways to fix the independent life-line (Fig 3),
- b) In cases when the horizontal Anchor Devices mentioned above is not practical, vertical aluminium props of adjustable lengths fixed in between two indoor concrete surfaces can be considered (e.g. vertically, horizontally or diagonally across the bay window, Fig. 1 & 2). The CITA has these vertical props (galvanised iron pipe) tested to a static load of 500kg with good results. To avoid dent, scratches or marking left on the indoor surfaces, the contact area should be covered with non-marking gaskets,
- c) By attaching the life-line to a water-filled road barrier (with a full load of 300kg when filled with water, Fig. 4).

3.2.2 Temporary Access ladder for Drilling of Anchor Bolt holes

The tradesman needs a lightweight and reliable temporary access ladder to be hanged outdoors for his access during the installation of anchor bolts on the outside wall. Once he finished with the anchor bolts, this access ladder will be retrieved. Attached (Fig. 5) is one example of such a design, which clamps on the concrete surfaces of the bay window. The design weight is about 20kg if made of aluminium alloys. Another simpler design (Fig. 6) has also been proven to be practical. They have to be tested on site for reliability and safety.

3.2.3 Drilling fixtures

Some scaffolding failed due to the fact that the anchor bolt used does not match with the size of the hole. Holes with proper size and depth are definitely needed. The tradesman working indoors cannot make holes properly on the outside wall. A fixture or drill stand is needed for him to make holes with precise size and depth. Fig. 7 shows the sequence of drilling when using this drill fixture. The tradesman still need to drill a hole (no need to be of high quality) on the outside wall and use this hole to fix the drill stand to drill a better quality hole and so on. In this way the tradesman can easily make up three good quality holes for his anchor bolts.

The Estate Management will keep a few sets of the above equipment and provide them to the maintenance subcontractors and workers when appropriate.

4. Thoughts for improvement in long term

4.1 Technical Measure

Small-scale truss-out bamboo scaffoldings possess potential hazard in terms of the method of erection, the mean of anchorage and the choice of material. In the long run there is a need to develop a lightweight, reliable and robust working platform which could be easily assembled from the indoor. Prototypes of this kind of platform have been developed but further testing and enhancement are required.

4.2 Administrative Measure

- 4.2.1 In order to prevent subcontractors from employing incompetent workers to work with truss-out scaffold, a registration system should be introduced to ensure that all subcontractors and workers are pre-qualified. Government should allow a grace period for this registration system, so that the industry can train up adequate workers who would be eligible to be registered.
- 4.2.2 Once the registration system is in place, large scale propaganda should be launched to educate the owner-occupiers of the properties, the contractors and the workers of their legal liabilities.
- 4.2.3 After the grace period, the registration system should be policed stringently to ensure that all truss-out scaffold or suspended working platform are done by capable workers and supervised by competent contractors.
- 4.2.4 Besides the registration system, the Government can also consider to legislate on the design of the truss-out scaffold, provision of anchoring points in new building for fixing life-line in future maintenance and the mandatory provision of BMU (Gondola) for buildings with odd maintenance spots.

5. Conclusion

Lives have been racked because of the unsafe nature of the truss-out scaffold. Ordinances and codes of practices have not been strictly complied by contractors and workers and the Labour Department is now reminding them by promotion and prosecution. The industry should be more self-disciplinary and echo the action of the Labour Department to ensure that truss-out scaffold are erected and dismantled by trained workers equipped with suitable tools and supervised by competent persons. In the long run, besides the development of more stable work platforms, the legislation on the provisions for future maintenance in new buildings should also be considered.

Prepared by H.Y. Chan / Dennis Lau

Figures

Figure 1 --- Props for the fixing of safety life harness

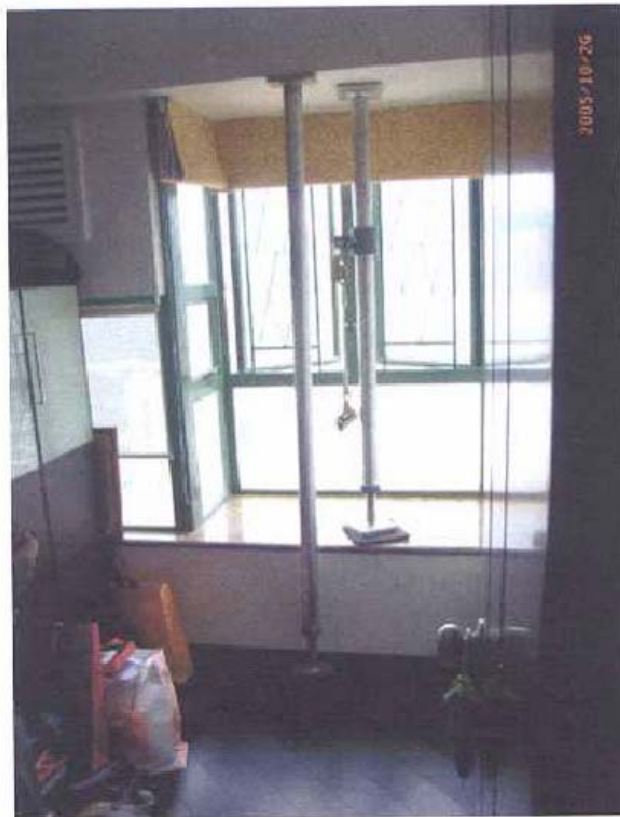


Figure 2 --- Propping positions

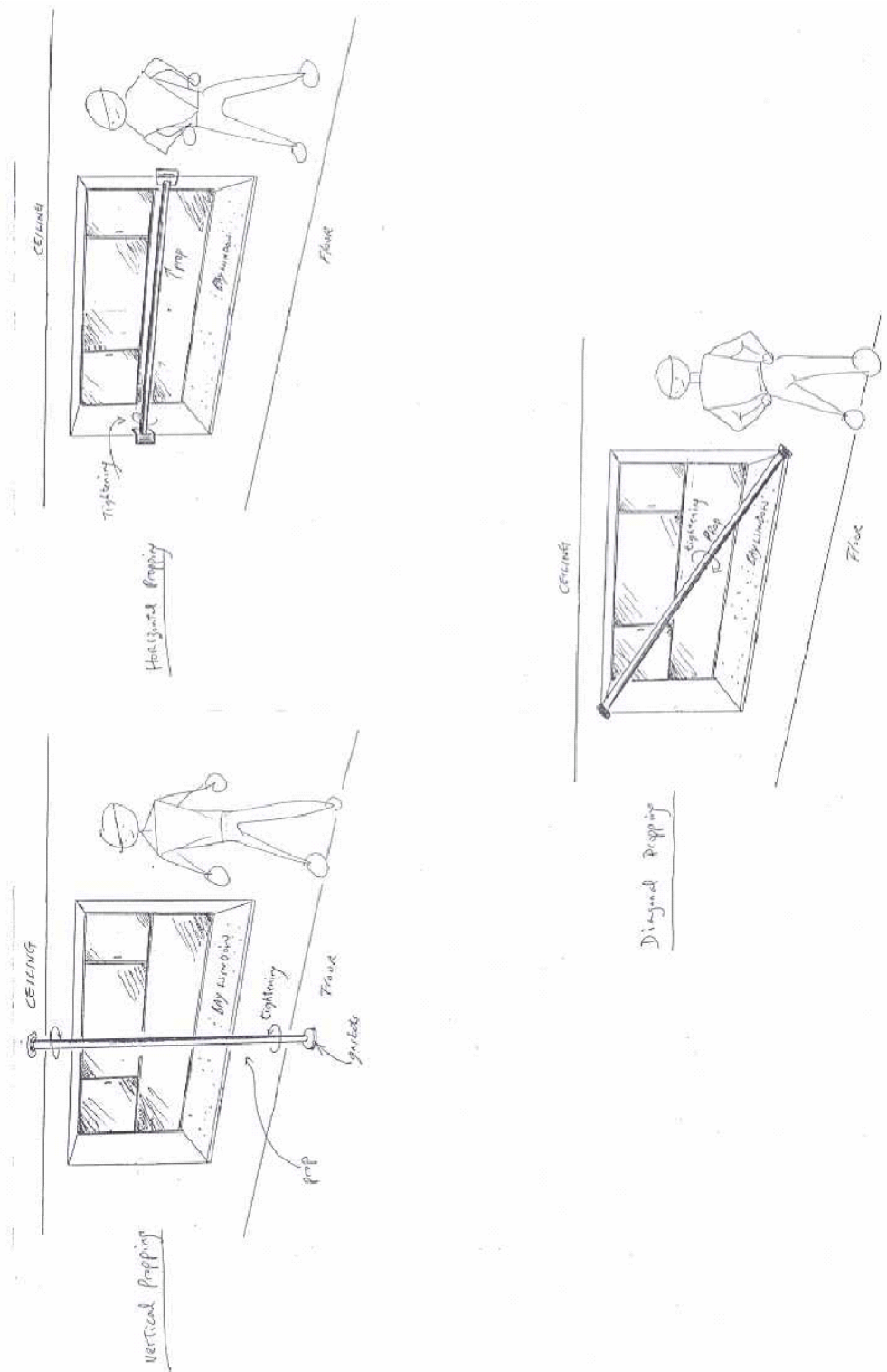


Figure 3 --- Fixing of safety life harness by means of door frames



Figure 4 --- A typical water-filled road barrier

The Lightweight RHINO Barrier

Red and white in colour, the Lightweight Barrier is alternative to the Standard Barrier where lighter traffic is required. Specifications are as the Standard Rhino Barrier except weight:

Weight empty: 45kg
Weight filled: 300kg

The BBS Separator

An easily assembled water-fill barrier. Manufactured from UV stabilised polythene. Interlinking 1 metre units which enable straight or curved configurations.

Offering clear visibility and stability for solid line delineation and pedestrian safety.

1.0m length x 0.60m height x 0.50m width.



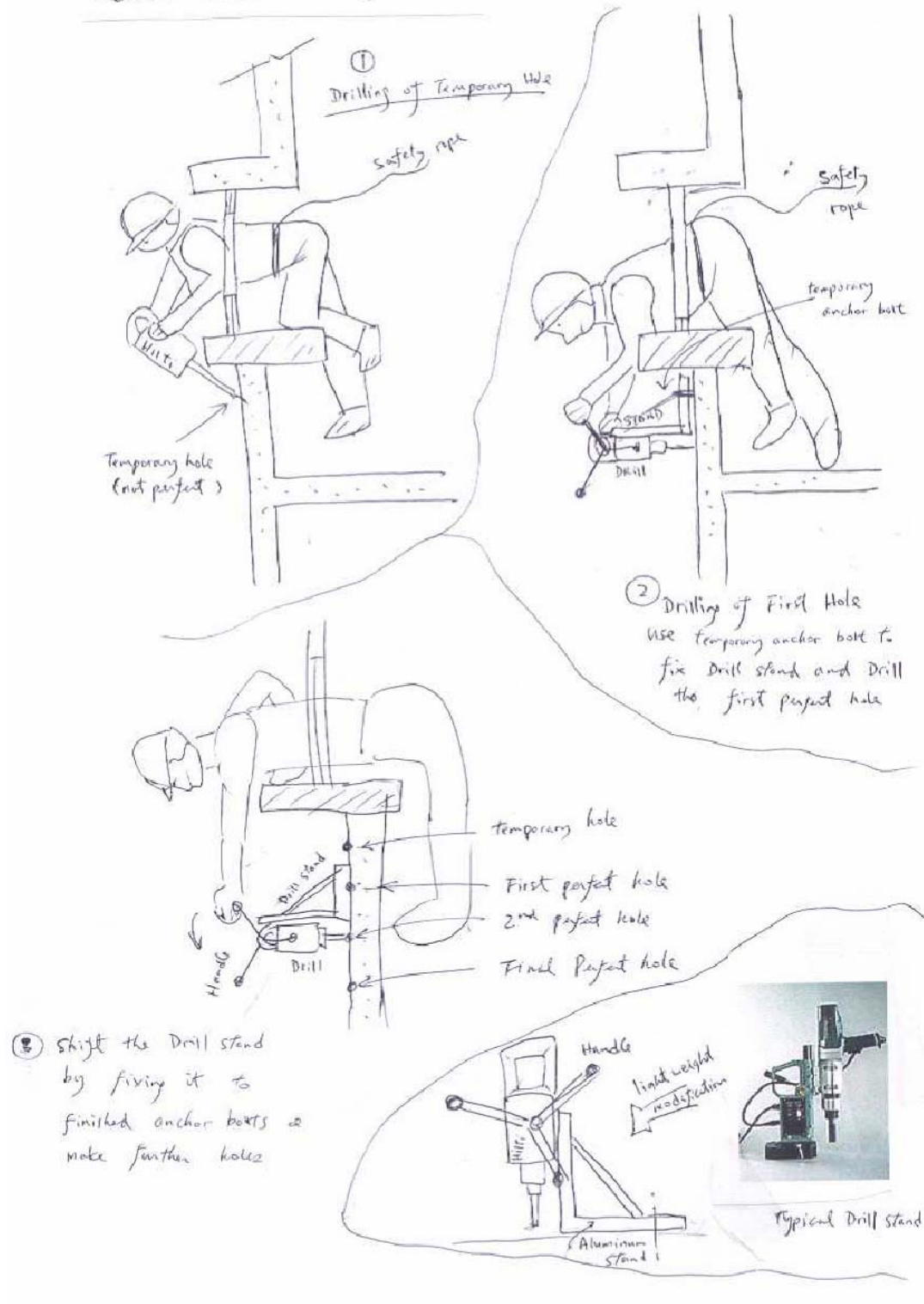
Figure 5 --- Temporary access ladder (Clamp Type)



Figure 6 --- Temporary access ladder (simpler version)



Figure 7 --- Proposed Drilling fixture



Appendix I

**A
Discussion Paper
on
Preventive Measures
To Fatal Accidents for
Construction workers of minor works
and
external works whilst working at height**

By

Francis Y.S. So

Dr. Richard Yuen

Dr. S.M. Lo

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- ii. the introduction of a modula suspended scaffolding system**
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v. the feasibility study of new building design to see if no scaffolding is required for external maintenance and repair

Chapter 7. Conclusion

Reference

Summary

For the past few months, a number of fatal accidents took place for bamboo scaffolders whilst working at height. It attracts the public attention and expects the Government to do something to prevent the accident or improve the situation. This paper tries to analyse the causes of accidents, to propose preventive measures against these fatal accidents and finally making recommendations on how to control and monitor the safety issues for workers working at height. The writer is of the opinion that the major cause of the accident is the human factor, the primary and secondary. The only way to stop the occurrence of fatal accident of persons falling from height is to amend the law in such a way that every party involve has to bear the legal responsibility, both criminal and civil if negligence is found in his part. The legal deterrent is the only way to save life.

For short-term measures, the owner or the main contractor has to report the repair work to the authority (both the Labour Department and the Building Department). The report includes the work details, working procedures and safety assessment. It has to be endorsed by the authorized persons like professional Engineers, Architect and Safety Officers.

For Intermediate measures, the main contractors are those who have been registered in the Building Department and qualified to undergo renovation work. Specialized, sub-contractors and workers for working at height have to be registered.

The Construction Industry Training Authority (CITA) has to set up specialized training courses with an objective to train specialize trade like hanging scaffold, plastering work at height, window installer, drainage workers at height and Electrical and Mechanical workers at height. No worker is allowed to work at height without training or tested by CITA.

In the long run, the Authority may consider to impose that all future building has to include anchorage port/system both at external wall and internal part in their building plans. It will prevent the wrong installation of anchor and cause fatal accident.

Literature Review

Basically there are very few papers, journals or literature being written on the fatal accident of bamboo scaffolding failure cases. For the causes of fatal accidents in Bamboo Scaffold, reference is made to 'Falls of Persons' by Mr. Lee Hung-Kwong, Chapter 8 of Construction Safety in Hong Kong 1996 and (安全管理 – 香港的經驗) by Mr H.K. Lee, 1991. Other reference are drawn from the Labour Department's Occupational Safety and Health Statistical report, press cutting and some from the direct participation of symbolism, Seminar of Construction Industry Safety.

References are also made to the Structural Analysis done by Prof. S.L. Chan in his study of characteristic of bamboo members and the slender structure by second-order analysis using the NIP-NIDA programme.

In his paper on illustrating the strength of bamboo member, if installed properly, the bamboo scaffold has the safety factor of 1.65 to 2 depending on the design of the scaffold. Bamboo Scaffold or Matrix (Metal-Bamboo) Scaffold in Hong Kong are reliable Scaffolding System. Prof. S.L. Chan and Dr. K.F. Chung are the major scholars studying the mechanical property of bamboo member and safety use of bamboo scaffold.

In all, the mechanical properties of bamboo member of the scaffold have been ascertained and verified by Prof. S.L. Chan, Dr. K F Cheung and the research teams in various book published in the recent years. Safety aspects of the bamboo scaffold have been studied by Mr. H.K. Lee in his books. Other data concerning the accidents involving bamboo scaffold are collected through the statistical released by the Labour Department in its Departmental annual reports.

Chapter 1 Introduction

- 1.1 In 2003, there were 4,347 occupational injuries in construction industry (information comes from Labour Department Statistics). It was a drop in the figures when comparing with the figures for the previous years. However, the figures in fatal causes remain the same.
- 1.2 In 2004, the accident rate for the construction industry was 60.3 for every 1000 persons. The fatal accident rate is 0.268 for every 1000 persons. (information comes from the 5th edition, occupational safety and Health Statistical report, July 2005)
- 1.3 For the past three months, there was a dramatic change in the fatal accidents in construction industry. There were 3 cases (photos 1, 2, 3 are attached below) related to scaffolding accidents causing 4 scaffolders dead what are the factors that caused the sudden increase in the fatality of scaffolders in the industry became the case of study amongst the trade associations of construction industry, the mass-media and lastly the related departments in the Hong Kong S.A.R. Government. A lot of ad hoc seminars, symposium and group discussions are held or being held by the interest group with a view to find out a solution to improve the situation. There is very few literature or academic study on the causes of failure of bamboo scaffolding previously nor professional point of view taking an objective position to comment the subject.

Photo (1) – Case 6 Oct 05

樂於助人的一名搭棚判頭，昨晨於灣仔李節街一幢大廈外牆搭建工作台時，疑因自製的繩梯不勝負荷折斷，他自己身上的安全帶亦扣於繩梯上，結果人和繩梯由十一

樓飛墮落四樓平台慘死，遺下孤寡三人，境況堪憐。今次是不足三個月內第三宗同類意外。(10月7日, 東方日報)

Yesterday morning, an obliging scaffolding sub-contractor fell down from height while erecting a suspending bamboo scaffold outside a residential building in Wanchai. It is suspected that the rope ladder, which was made by himself, was broken due to overloading and the safety belt, which he was using at that moment, was connected to the rope ladder also. As a result, he died after fell from 11/F to 4/F podium level. He left behind his family of 3 in deplorable situation. This is the third accident related to suspending scaffold in less than 3 months . (7 Oct, Oriental Daily)

Photo (1)



Photo (2) - Case 28 Sep 05

跑馬地昨午發生奪命工業意外，一名有佩戴安全帶、但未有扣在固定位置的裝修工人，昨午於大廈 16 樓拆去支撐棚架工作台的三角入牆支架（俗稱狗臂架）時，工作台突然不勝負荷，竹枝折斷倒塌，工人連同狗臂架飛墮地面，當場身亡。勞工處正調查意外起因。(九月二十九日, 明報)

Case 28 Sep 05

A fatal industrial accident was happened in Happy Valley. A worker fell from sixteen floor when he dismantled the steel supporting bracket. Although he was wearing the safety harness, the harness was not attached to a fixed anchorage. Therefore the worker and the scaffold was failure and falling from height, the worker was dead instantly. Labour Department was now investigating the reason of the collapsed.(29 Sep, Ming Pao)

Photo (2)



Photo (3) Case 13 Jul 05

新蒲崗昨晨發生奪命工業意外，2 名疑未有佩戴安全帶工人在大廈外牆棚架上更換通風槽時，棚架突然鬆脫塌下，工人雙雙連人帶竹棚從 5 樓飛墮而下，重傷昏迷地上，送院搶救失效死亡。出事棚架部分竹枝及三角鐵架（俗稱狗臂架）四散地上，屋宇署工程師昨晚到現場檢視墜下的狗臂架，發現本應鑲嵌 3 粒螺絲的鐵架，僅有一粒螺絲，相信是意外主因。勞工處正調查意外原因，以及是否有人偷工減料或貪快導致「狗臂架」不勝負荷塌下。（七月十四日，明報）

Case 13 Jul 05

Yesterday morning, an industrial accident was happened in San Po Kong. Two workers were suspected of not wearing the safety harness when they were doing the maintenance work at height. They were falling from fifth floor when the scaffold suddenly collapsed. The workers were in coma and sent to the hospital to make emergency rescue, but died finally. Engineers from Building Department went to inspect the falling bracket. They discovered there was only one anchor bolt was installed, however it is supposed to be three in order to support the bracket, the engineers believed that it was the leading cause of accident. Labour Department was now investigating the reason of the failure of scaffold. (14 Jul, Ming Pao)

Photo (3)



- 1.4 This paper aims at the study of the causes of accidents from the stand-point of a semi-academic and semi-professional as an insider. There is no intention to jeopardize any parties, trade associations or any person in the incidents. Any example quoted represents only the isolated case as illustration. The writer is of the opinion that besides the direct cause of accident-failing to use the personal protection equipment (P.P.E), there are other indirect causes of the accident. It is easy to impose a stricter control over the use of P.P.E. by holding the owner of the renovated flat, the Authorized person responsible for the job and the contractor liable for the enforcement of using P.P.E. It is a very difficult task to change the behavior and mentality of the people that are involved in the game. It requires the strongest determination, commitment and sincere drive of the elite groups, namely, the authority, the owner of the renovated flat, the main-contractors and the specialist trade contractors without which the success in saving life in this respect is too far away from reaching.

Chapter 2 The Accidents

- 2.1 From the accident records (data provided by press-cutting and data provided by Labour Department) for the period of 2003 to Oct 2005, there are altogether 9 fatal accident cases, out of which, 8 cases involved truss-out scaffolds. 7 deaths were scaffolders. The study of all these 9 scaffolding failure cases were summarized in the table 1 as attached (Annex A)

To summarize, there are a number of features found in the cases:-

- i.. No body Harness or P.P.E were attached. In all cases, proper fall arresting systems i.e. safety harness anchoring to suitable anchorage such as independent line were either not provided or if provided, not used.

- ii. 7 out of 9 scaffolding fatal accident cases took place in the course of erection. Again 4 cases out of 9 were correlated with the installation and dismantling of steel brackets.
- iii. 5 out of 9 deceased were below the age of 30.
- iv. 5 out of 9 cases were either lack of supervision or wrong working procedures and improper installation of anchoring point.
- v. Except 2, all cases were doubtful on whether they had received proper training on these kinds of high risk operations, ie. erection and dismantling of truss-out scaffold. It may reveal that the training courses conducted by CITA does not cover truss-out scaffold adequately.

Chapter 3 Causes of the Fatal Accidents

3. Besides the quantitative analysis of the accident itself, the causes of the fatal accidents on scaffolding in the construction industry can be perceived in different points of view vis: the human factor, the environmental factor and the social factor. Again, the role of the parties like the employer of the deceased, the main contractors, the worker and the environment or working condition of each factor may attribute to the occurrence of the fatal accidents. All these causes are discussed as below:-

A The Human Factor

(1) the Employer

- 3.1.i. In some of the seminars and floor discussion, a lot of speakers expressed that the employers had fulfilled their objective in providing the necessary personal protective equipment to the work force who carried out the work. They believed that by doing that, they had done their parts in the safety enhancement duty.
- 3.1.ii Some employers further added that they had asked their employees to sign the receipt of these P.P.E.. They alleged that all their workers had already obtained the “Green Card”. Thus, they should know the importance of wearing the P.P.E. and good enough to protect themselves.
- 3.1.iii Some direct employers had raised an important message that the main contractor had imposed an unreasonable time schedule for them to complete the job. Some of them had worked over-time and very long working hours such that nearly all the labour force are highly exhausted or fatigue causing the accident.

- 3.1iv Quite a number of employer said that the new contractor had laid an unreasonable terms of contract to them. A lump sum contract term to include the safety issue is imposed. Normally, the contract would be awarded to the lowest price such that in order to obtain the contract, they had to cut the expenditure on safety issues with a longer working hour in order to maintain their survival.
- 3.1v. To sum up, under the law, the contractor has the duty to provide instruction, supervision and training to his workers in addition to the provision of safety equipment. However, concurrently the employer role is not clear in controlling, monitoring the use of P.P.E. Either it is shifted to the workers or the main contractor. Some of the grievance may be correct but some are not. The employer of the scaffolder may be the sub-sub contractor of scaffolding works. Some may be the contractor of other trades like aluminum window installer, plastering contractor or painter. That is the reason why very often whenever there is scaffold collapse accident; it is very difficult to identify the employer. Secondly most of the employers are not familiar with the work place environment whether the building in concern had a long history or in a very bad condition was not under consideration. Is the structure strong enough to support the additional force remain unknown to them or beyond their knowledge? Hence, without the background knowledge, the professional expertise and supervision, this kind of arrangement tend to be hazardous to the work force.

(2) the Main Contractor

- 3.2.i By definition, main contractor in construction industry refers to the sole contractor that acts as the principal contractor in control and supervise the job – the repair and maintenance work. Some of the so called ‘main-contractors’ are small running concern. Recently, a lot of repair and maintenance work come up. It is estimated to be 20,000 units for the year 2005 and an additional of 60,000 units are awaiting on the list (a statistical figure released by the Building Authority recently). Furthermore, the change in the Summary Offence Ordinance holding the property owner liable for any falling objects makes the small apartment owners to repair their units. This sudden change has created a lot of business opportunities for both the main contractors, the sub-contractors and the work force. That is the reason why the workers complaint that they have a very tight schedule giving no rest time in their employment.
- 3.2.ii. Time frame - because of the tight working schedule, a lot of the management staff of the main contractor would neglect the safety issue in

order to achieve their objective The project manager, in order to achieve their target of maximizing the profit margin would even reduce the installation of steel brackets in a construction site in order to cut the cost. Some even damage the bamboo scaffold for convenience sake in order to pick up with their construction progress at the expense of the sub-contractor. Photograph 4 & 5 (see below) of a construction site can demonstrate that the bamboo scaffold is damaged by other trade workers or upon the instruction of main contractor for convenience. It also shows that the mid-level management may misinterpret the intention of the main contractor or developer in exercising his personal interest, desire in execution of contract.

Photo (4)



Photo (5)



3.2.iii Main-contractor – Selection of Sub-contractor.

“The best offer”, “Lum-sum contract” with all safety issue included is the common practice in awarding a contract to a sub-contractor in Hong Kong. Whether the sub-contractor has the ability to carry at the job is not their concern. Some even have the idea of awarding the contract to the lowest price first leaving the surplus to compensate the project or runner up contractors if anything goes wrong. Some of the successful tenderers are 20-30% lower than the real market price. If the main contractor hold his kind of mentality, how can the successful tender has spare resources to handle the safety matters. Very often, fatal accidents are caused by the wrong selection of sub-contractor for the work. One example was the sub-contractor for the renovation work of a hotel in Tsimshatsui, after the collapse of bamboo scaffold, the contractor for the work was found absconded. The contract sum offered was at least 15%-20% lower than the 2nd tenderer. Secondly, the sub-contract was not properly organized. There was no structural engineer to endorse the design and calculation of the scaffold. Both the main contractor and the sub-contractor had no communication in the overall management of the project causing the failure of scaffolding and consequently leading one dead and 16 injured

3. the Workers

3.3.i The worker – the heroic mental state of mind.

Regarding the cause of the fatal accidents of scaffolding failure, the psychological heroic state of mind is the major factor. Normally all professional scaffolders carrying high risk duty like truss-out scaffold must have received training and apprenticeship either in the Construction Industry Training Authority (CITA) or his scaffolding company. Even for the casual workers holding a green card must have received some sort of safety training before they can enter into a construction site. Whenever and wherever the working place is above 2 meters, the employer has to provide a proper working platform or the worker has to put on the P.P.E. Nevertheless, nearly all victims are found prima facie that they did not affix their P.P.E. properly onto the independent life line causing the fatality. They had over-looked the hazardous condition of their work place. Furthermore, they had a kind of heroic behaviors that they could manage and control the situation whenever it went wrong. Despite of the P.P.E given, advice repeatedly reminded by the authority, the trade associations and the worker’s union, still a lot of the workers working at height are neglectful in this area. This reflects that the training course on truss-out scaffold is not adequate enough. The use of P.P.E. by the truss-out scaffold workers is not totally accepted in the trade. To the employer and main contractor, it is very difficult to prove that sufficient measures have been taken/given to the worker to prevent the fatality. A stricter control imposed by the employer is in-evitable.

3.3.ii. The worker – lack of knowledge and experience

In reality, a lot of trainee from CITA after graduation had jumped from job to job in order to receive a higher pay. Some smaller employers like to recruit apprentice from well-organized sub-contractor by offering them with a higher pay of 30% -40%. These young apprentices have received proper training from CITA but they are lack of experience. One will find that out of the 9 victims from the table at Chapter 2, 50% of them are young man below 30 years of age. They do not have the experience in identifying the hazardous area in the work place causing the fatality. Once the smaller concern proprietor does not have proper control and management over the young workers, it causes the fatality. The law requires that erection and dismantling of scaffold should be under the supervision of a competent person who should have at least ten years experience. Hence, it is suggested that the authority in concern should exercise a tighter random check on these offenders.

3ciii The worker – rush for quick money

In reality, one can find a small van carrying bamboo piece, erecting bamboo scaffold in urban area. These workers are still rushing for their job schedules. The more job they can complete within a day, the more income they will have. On the other hand, as a professional, one will also find that the present ‘truss-out scaffold’ are quite different from what have been taught in CITA or from the traditional practice. All truss-out scaffolds are rested on the steel brackets only. Once if there is anything wrong with the steel brackets, it will cause disaster the whole scaffolding team. Photographs 6 and 7 (see below) show that there is no independent bamboo support in the scaffold besides the steel brackets. In the past, the professionals would install or set up their

steel brackets. The installation of steel brackets are used only in the recent 20 years. In the past, there were very fatal cases that involved the bamboo scaffolders especially in “suspended scaffold”. But now, it has 3 cases within 3 months with 4 dead. This kind of change, from self set up support to steel bracket, lack of supervision and control and lack of knowledge and experience would inevitably increase the mortality. That is why some have sound out that the CITA training on truss-out scaffold is inadequate.

Photo (6)



Photo (7)



B The Environmental Factor

- 3.i. The external factor that causes the fatality of scaffolding accident is usually the site condition. One should bear in mind that whenever a bamboo scaffold is employed, that means the building has some external work to be done. The condition may be good or bad. In order to familiarize the site

situation, professionals like Structural Engineer should be involved in the planning and execution of job with the specialized sub-contractor more communication is required.

- 3.ii In reality, the cement screed or badding for the external wall varies in thickness from building to building. Because of improper workmanship of the wooden formwork worker in the past, the external wall may have a very thick cement badding. This kind of plastering is totally unreliable. It cannot take the self load of the bamboo scaffold, steel brackets and etc and the life-load of the scaffolder. That is the reason why in photo 1,2 & 3 (photography and press cutting of the accidents), one can find the deceased was found together with the steel bracket. The scaffolding team should not rely on the installation of steel bracket for their safety. The only way to safe guard the life is the installation and use of P.P.E.
- 3.iii Some of the building that required renovation has an old age. Some may even over 40 years and undergo the renovation upon Building Authority's order. The pipe-line anchorage, the external wall and the wind frame are all in bad condition. Without using the P.P.E. together with the independent life-line; scaffolders are risking their lives in erecting truss-out scaffold.

C) The social Factor

i). the public – this is not a direct cause or indirect cause of the accident. But it is a kind of social phenomenon. Whenever in a community, there is a homicide case or accident; the public would air their opinion in improving the public security or demand a better control by the police over the traffic accident. But for the construction industry, it seems that besides the sympathy on the dependants, there is no over-reaction nor demand for better control over the safety issue in construction sites. It seems to take it for granted that fatal accidents in construction industry is inevitable. Of course, works bureau, Labour Department, Building Department and related professional bodies or institute may launch a lot of promotional exercise in publicizing safety in construction site. It seems that there is no fruitful results in raising the general public's occupational safety awareness. It is undeniable that the statistics of accidents and enquires in construction industries has much been improved because of the effort done previously. The result would much be better if the public can pay more attention on the safety issue in renovation work especially when their home is undergoing repair work. At least the fatality rate will not be so high as now.

ii) the tradesmen's association, the workers' union and professional bodies – it seems that all these interest parties have an emotional response upon the increase of fatal accidents in Construction Industry. Like the public, they have the sympathy for the short while but not much can be

done. The loose attitude of these professional bodies or interest groups can not generate any constructive ideas to the government on how to rectify the situation. If they are the interest group and holding the passive attitude, how can one expect the public on the Government to like an active role on improving the situation.

of the
It will be better if these professional bodies can publish the name
main-contractor or sub-contractor in their journal or monthly publication such that it become a kind of psychological pressure to the sub-contractor to improve their quality of work.

(iii) The Government

The Government has a lot of matters with higher priority to solve than the construction safety issue. One cannot blame the Government for these kind of response because of a number of reasons:

- (a) For the H.K.S.A.R. Government, economical issues are their major issues. A tight budget control has already reduced a lot of manpower in upholding safety standard in construction industry. Hence a lot of inspection and ad hoc check are acting upon complaint. The passive approach indirectly leads to the loosening of safety standard in Construction Industry.

Reversely, if more publicity can be done on the proper using of P.P.E., the family pressure onto the workers on truss-out scaffold may help to reduce the accident rate of the truss-out scaffold.

- (b) Politically, the demand of a general public poll in 2007-2008 for the legislature and the Chief Executive Officer by the political parties and pressure-group has already exhausted their attention. It is understandable that the subject in discussion is not their priority. Demand for safety is not the subject of discussion even in the construction trade workers' union, Democratic party and etc.

Chapter 4 The preventive measures to minimize the fatal accidents of persons falling from height: –

4.i Increase the publicity

As it has been mentioned in Chapter 3 above, the public interest and attention on safety issue in construction industry is not enough / insufficient. In order to arouse the public attention and improve the situation, more publicity has to be done either through the newspaper or

mass media. With the group pressure or public pressure, it is quite certain that the self-awareness on safety issue in construction site is much better.

4.ii. Training – Special courses for advanced truss-out scaffolding workers at height.

The courses conducted by CITA and authorized bodies cover a lot on safety issues viz, green card, training course for different trades which include safety measures. There does not seem to be specific training for the erection and dismantling of truss-out scaffold. It is suggested that special courses or refreshed course shall be conducted by experienced instructors from CITA with a view to alert the safety awareness and conscience of the special truss-out scaffold workers. All professional scaffolders who want to do job like these have to undergo the training course again in order to prevent the accidents.

4iii Registration of specialized contractors and workers for works at height.

It has been discussed that previous effort on safety issues in construction has been unsuccessful. To further enhance our construction safety, scaffolders having the required training, set up, resources and control has to be registered in a special register specially for truss-out scaffold. The purpose of this special registration is to conduct a better control over the performance of contractors engaging in the business and practices. Failure in providing P.P.E., monitoring and supervising the job may lead to the delisting of registration. Subsequently both the contractor and worker may be out of job if their compliance record is poor. It may provide a background for the Government to execute a tighter control over the non-compliance performance.

. 4.iv. Publicity on the Use P.P.E.

- (a) The incident of the failure of a Building Maintenance Unit in Shun Tak Centre, Sheng Wan on 7.10.05 indicated that the application of P.P.E. save lives. This is the only way that prevent a person from falling from height. Two workers working on the B.M.U. with their P.P.E. installed and affixed to the B.M.U. found themselves suspended in the certified BMU. They had to be rescued by the fire service on 7.10.05. Every fatal accidents in bamboo scaffolding failure case had P.P.E. put on. But they are not used. If all possible means like training, publicity and enforcement has been exhausted, there is no other alternative but impose a stricter control over the use of P.P.E. It is suggested that the Government should exercise a much harder and stickier control over the workers in use of P.P.E. Any person concerned, including main contractor supervisor, safe officer,

the sub-contractor or its agent, the workers would be criminally liable for prosecution if they are found guilty of non-compliance. The Government should make more publicity on the use of P.P.E. for saving life. It may also show the consequences of the non-compliance. It may have a lot of financial burden to the family, the medical department, the social welfare and the issuance if they are not working properly.

- (b) The union leader of the scaffolding worker's union welcome the suggestion of punishing the workers for not using P.P.E. It may have more influence if they can encourage the workers in using P.P.E. direct in every union activities.

Chapter 5 Conceptual Revolutionary changes on the safety issue by all related parties

5.1 In the past, the safety issues in construction industry are tackled by the individual party in concern. "Efforts by individual party might, however be very limited", it is suggested that safety issue is a common issue in construction industry & should be handle collectively, namely, the authority the owner, the main contractor, sub-contractor and the workers. The professional bodies and interest group can play a secondary & supportive role. It is a team work rather than the responsibility of the employer or sub-contractor.

Hence it is suggested that the Authority should take lead to call for the influential developers, Construction Association, the workers' Union to form into a working party to see if anything can be done in preventing fatal accident of truss-out scaffold.

5.2 For the short term measures, it is suggested that all Housing Estates, both public and private estates, should equip and provide P.P.E. to workers installing the truss-out scaffold. Again, the Estate Management staff can ensure that the working team have put on their P.P.E. and use the P.P.E. without supervision and control by the authorized person, ie. The trained supervisor or the safety officer, the Estate Management staff can stop the work.

5.3 The Estate Management staff can check the possession, validity of the trained team in work permit, green card, trade test, and etc. Only those registered contractors can work in their estate. Indirectly, it helps to control the quality of contractors and workers in the safety standard required by the safety committee.

5.4. The Construction Industry Training Authority should take part in the safety enhancement work by running new or refresher courses in truss-out scaffold. Right from detail analysis on the renovated building to the installation of truss-out scaffold, the course should also cover area that involve the installation of pipe lines, Electrical

and Mechanical parts and window frame structures and etc. The course is an integrated course rather a single-scaffolding training course as the trainee can acquire an apprehensive understanding of the trades that will affect their life and death.

- 5.5 Any new inventory, safe working procedures and method will be taught in this specialized and advance course.
- 5.6. Research and Development of system for truss-out scaffold should be conducted as the mid-term measures. The Government should encourage the public in generating new idea in this aspect and support it by grants and loans.
- 5.7. As an immediate and important measure, the authority should consider the implementation of registration of qualified contractors for truss-out scaffold. In order to prevent the inexperienced workers or sub-contractors to carry out truss-out scaffold, registration of this categories of workers is necessary. It helps to save life.
- 5.8. Besides the registration of the specialized contractors and workers, the authority should consider the implementation of notification system of any renovation work especially working at height. With at least 48 hours of advance notification, the authority has enough time to plan ahead of random check on safety enhancement. All notification of work should be submitted either by the Estate Management office, the owner of the flat or the contractor. Only those with the permit to work can commence with the work. The one that holds the permit should take up the responsibility and liability to ensure safety.
- 5.9 In the long run, renovation work and maintenance work involving work at height is inevitable. In order to provide a safe working condition for the working team, anchorage point or strong support from the building is essential. It is advisable if future building can incorporate this kind of features in their building plan. The Government may encourage and support this concept by giving tolerance or additional floor areas if building can include this kind of features into their plan.

Chapter 6 The introduction of propriety products to enhance the safety of workers working at height

- 6.1 It is arguable that suspended system scaffold is dispersible temporary gondola can be deployed instead.
- 6.2 It is also suggested that lifting appliances like power driven lifting-chair can be engaged in the installation of steel bracket when erecting bamboo scaffold.

6.3 It is a more advanced thinking by introducing a propriety modular system to replace the suspended scaffold, namely a portable modular system that can be installed from inside the building. As it is a propriety product, the details will be announced later.

6.4 Some may complaint that the site situation cannot warrant the use of P.P.E. Again, it is suggested that a propriety installation method and anchorage system to be introduced for the P.P.E that can be installed either from roof above or from apartment inside. Details to be released later.

6.5 Future Studies

6.5.1 So much has been mentioned about the improvement of P.P.E. and safety enhancement method. It is also an academe issue for architects and designers to consider if future building can take into consideration of the safety issue of maintenances workers or house hold from inside the building. Either they may be in the form of a covered anchoring point or exposed features for affecting the safety devices.

6.5.2 It is also a challenging job for architects to consider if they can design the building that include maintenance unit or scaffold around the building.

6.5.3 The above suggestion is open for discussion. Because of the limitation in discussion, it will be dealt with by scholar who has the interest in the subject.

Chapter 7 Conclusion

7.1 Fatal accident in suspended scaffold has a tendency of increasing in number & in frequency. The urgency for repair & renovation causes a lot of pressure to owners, main contractors and the workforce. It is the phenomenon of shortage of experience work force engaging in truss-out scaffold. Hence something must be done to prevent the increase of collapse of scaffold causing fatal accidents in truss-out scaffold and accidents to other trade worker & the public in the scene.

7.2 There seems to be no other choice but impose a tighter control over the quality of work. Unprofessional practice and unqualified sub-contractor & workers should be reframed from engaging in this kind of high risk work. Various approaches have been discussed above. Finally it is of the opinion that with the support from the Government in this direction, the main contractor, reputable developers & the interest parties as a team, the objective of preventing fatal accident in this respect can be achieved.

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簡介：當到達一個新工作環境時，無論是新公司、新地盤、新廠房、新工作地點，為自己安全著想，必須先了解其工作環境，以避免不必要之意外發生。

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 - ※ 簡介新輝維修組對吊棚工作的要求。
 - ※ 詳細介紹僱員安全守則。
 - ※ 僱員之一般性責任及罰則。
 - ※ 個人防護裝備之安全帽和帽帶使用方法。
 - ※ 個人防護裝備之全身式安全帶使用方法(全程連續性使用-扣好才出，入來才解)。
 - ※ 個人防護裝備之防墮扣使用方法。
 - ※ 獨立救生繩扣繫點和綁繫要求(方法)。
 - ※ 獨立救生繩用前檢查和排放位置。
 - ※ 防止高空墮物。
 - ※ 防止棚架超負荷。
 - ※ 棚架上輕放物料，不可在棚上蹦跳，以免棚架突增負荷。
 - ※ 嚴禁破壞。
 - ※ 法定表格五
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 - ※ 颱風措施程序。
 - ※ 嚴禁吸煙。
 - ※ 獲取安全訊息渠道。

編制： 李君權 (安全主任) 制訂日期: 27/10/2005

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職業安全訓練單元

之

吊棚搭拆工作安全

簡介：當到達一個新工作環境、新工作地點時，為自己安全著想，必須先了解其工作環境，以避免不必要之意外發生，**提供一個穩固的棚架，甚為重要。**

『吊棚工作』 主要介紹本集團之屋苑維修的吊棚安全**搭拆**程序，法規等。

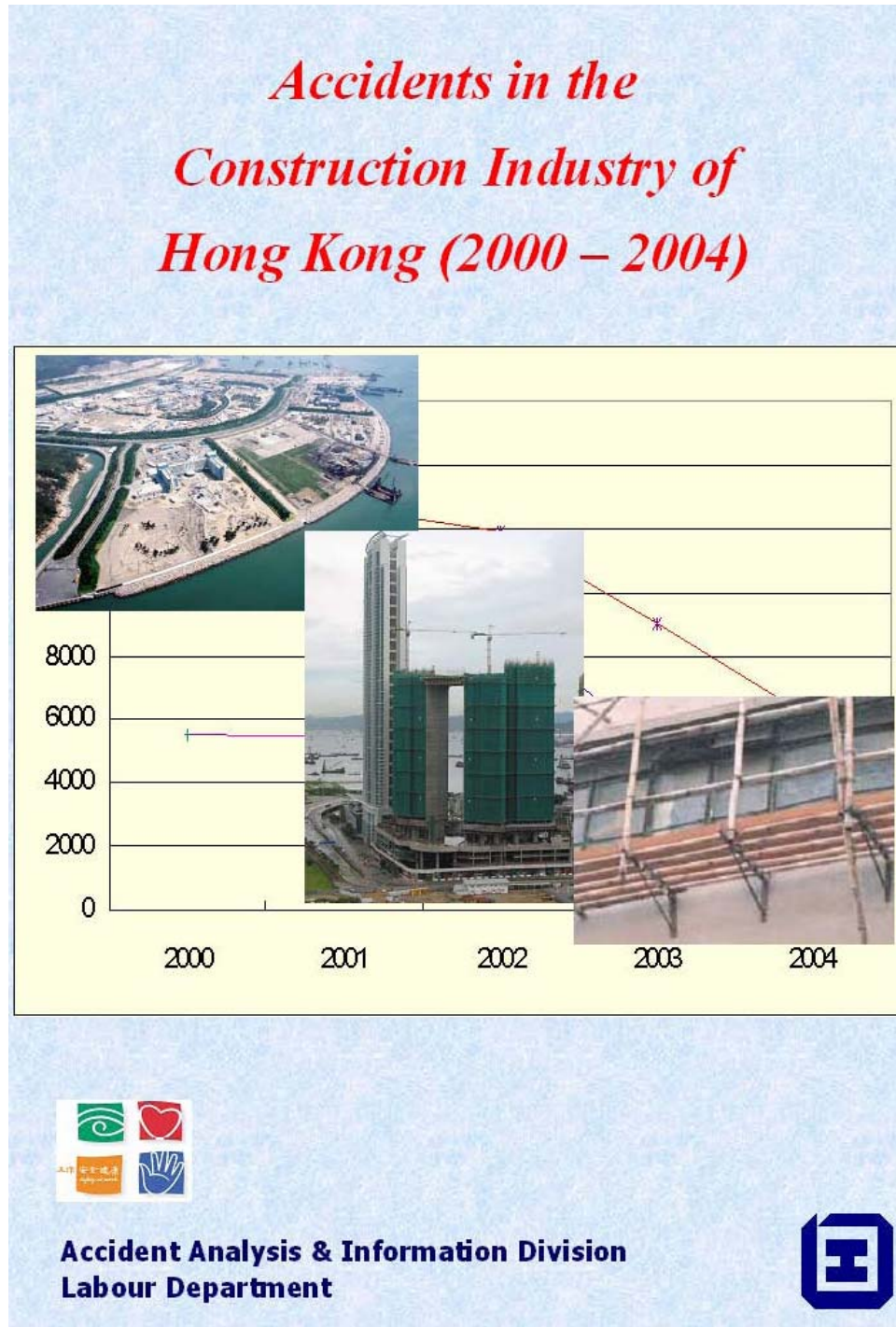
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 - ※ 簡介新輝維修組對吊棚工作和**穩固性的要求。**
 - ※ 詳細介紹僱員安全守則。
 - ※ 僱員之一般性責任及罰則。
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 - ※ 個人防護裝備之防墮扣使用方法。
 - ※ 獨立救生繩綁繫點。
 - ※ 獨立救生繩用前檢查和排放位置。
 - ※ 防止高空墮物。
 - ※ **鑽吼方法，深度合乎標準。**
 - ※ **使用指定(合約列明、工程師指定、)爆頭螺絲。**
 - ※ **用足 3 粒螺絲，嚴禁 1 粒或 2 粒。**
 - ※ **安裝狗臂架數量，C/C 距離(max.1200mm)。**
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 - ※ 颱風措施程序。
 - ※ 嚴禁吸煙。
 - ※ 獲取安全訊息渠道。

編制： 李君權 (安全主任) 制訂日期: 27/10/2005

Appendix 10 Labour Department report - Accidents in the construction industry of Hong Kong 2000-2004



Accidents in the Construction Industry of Hong Kong (2000 – 2004)

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Accidents in the Construction Industry of Hong Kong (2000 – 2004)

**Accidents in the Construction Industry of Hong Kong
(2000 – 2004)**

Overview

The safety performance of the high-risk construction industry in Hong Kong has continued to improve. However, it still has the highest number of fatalities and accident rate. The number of industrial accidents in the construction industry decreased from 4 367 in 2003 to 3 833 in 2004, down by 12.2%. The accident rate per 1 000 workers fell from 68.1 in 2003 to 60.3 in 2004, down by 11.4%. Compared with 2000, the number of accidents showed a hefty drop of 67.9% whilst the accident rate went down by 59.7%. The figures on fatal and non-fatal accidents and accident rates in the construction industry have been decreasing rapidly since 2000. The accident figures and the accident rate in 2004 was the lowest ever recorded over the past years (Table 1). Detailed breakdown by “Type of Accident” is at Appendix 1a.

(Table 1) Industrial Accidents in the Construction Industry

	2000	2001	2002	2003	2004 (compared with 2003)	2004 (compared with 2000)
Fatal	29	28	24	25	17 (-32.0%)	17 (-41.4%)
Non-fatal	11 896	9 178	6 215	4 342	3 816 (-12.1%)	3 816 (-67.9%)
Total	11 925	9 206	6 239	4 367	3 833 (-12.2%)	3 833 (-67.9%)
Accident Rate/1 000 workers	149.8	114.6	85.2	68.1	60.3 (-11.4%)	60.3 (-59.7%)

2. On the causes of fatal cases, fall of person from height has consistently been the number one killer in the construction industry of Hong Kong for many years. Chart 1 shows the distribution of fatal accidents of fall-from-height between 2000 – 2004 and Chart 2 analyses the locations where these fatal accidents occurred. It can be shown that fatal accidents arising from bamboo scaffold, working platform/falseworks and unfenced dangerous places have accounted for nearly half of the total number of fall-from-height fatal accidents in the period.

Accidents in the Construction Industry of Hong Kong (2000 – 2004)

Chart 1: Fatal Industrial Accidents resulted from “Fall of Person from Height” in Construction Industry (2000 - 2004)

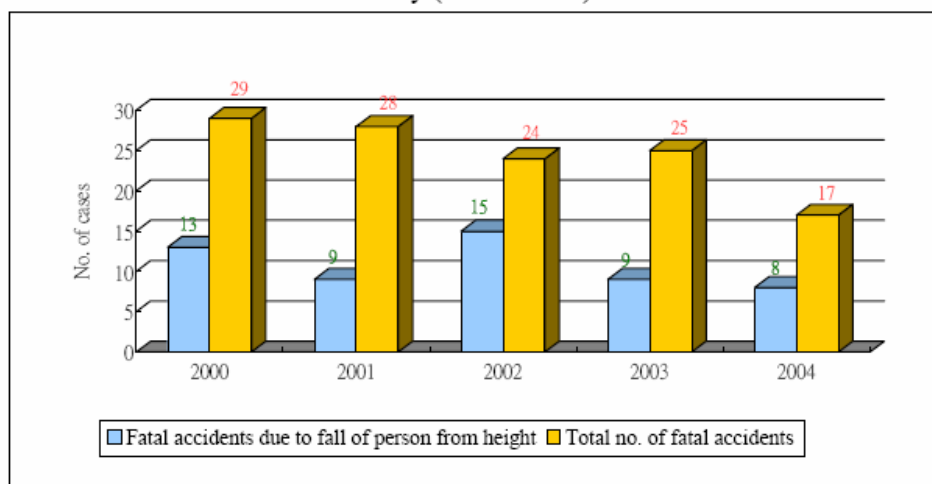
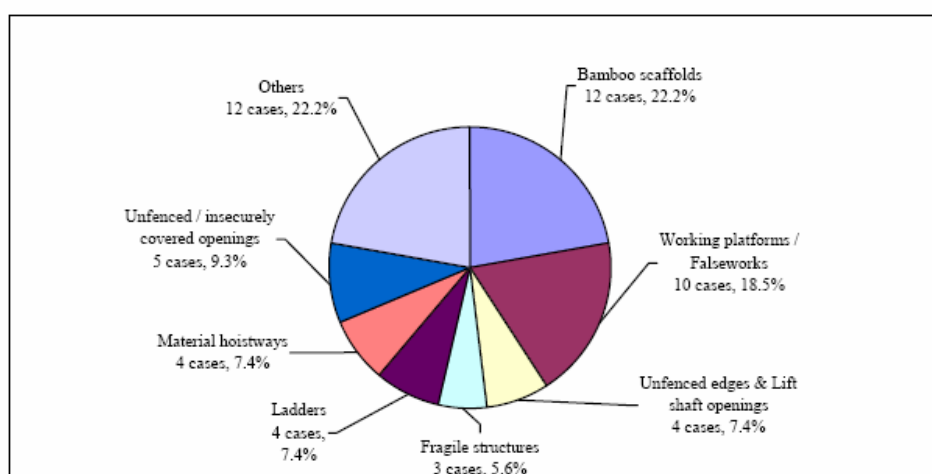


Chart 2: Breakdown of Fatal Industrial Accidents resulted from “Fall of Person from Height” by “Place of Fall” in Construction Industry (2000 - 2004)



Note:

Fatal industrial accident refers to death arising from industrial activity in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.

Accidents in RMAA Works

3. In recent years, there has been a growing concern for the increased spate of accidents in the repair, maintenance, minor alteration and addition works (RMAA), i.e. construction projects for village-type houses in the New Territories, minor alterations, repairs, maintenance and interior decoration of existing buildings. Statistics shows that the number of industrial accidents arising from RMAA works contributed over 30% of the accident toll in the construction industry recently. (Table 2)

(Table 2) Industrial Accidents of RMAA Works

	2000	2001	2002	2003	2004
(a) All reported construction accidents ^{1 & 2}	11 925 (29)	9 206 (28)	6 239 (24)	4 367 (25)	3 833 (17)
(b) Accident rate per 1 000 workers ³	149.8	114.6	85.2	68.1	60.3
(c) All reported accidents in RMAA Works ^{2 & 4}	3 402 (12)	2 582 (4)	1 925 (10)	1 485 (8)	1 454 (6)
(i) No. of reported accidents in RMAA Works in public sector sites ^{2 & 5}	475 (1)	331 (2)	250 (2)	158 (2)	104 (0)
(ii) No. of reported accidents in RMAA Works in private sector sites ²	2 927 (11)	2 251 (2)	1 675 (8)	1 327 (6)	1 350 (6)
Percentage of RMAA accidents to all reported construction accidents [(c)/(a)]	28.5%	28.0%	30.9%	34.0%	37.9%

Note:

1. The figures cover accidents occurred to workers (employees) whose accidents are reported by their employers under the Employees' Compensation Ordinance (ECO).
2. Figures in the brackets denote the number of fatalities.
3. The employment figures for computing the accident rate per 1 000 workers are based on the number of manual site workers published by the Census & Statistics Department.
4. According to the Census and Statistics Department, the employment figure for RMAA works is not available and hence, it is not possible to compute the accident rate for such sector.
5. Public sector sites include projects commissioned by the Government of the Hong Kong Special Administrative Region, Mass Transit Railway Corporation, Kowloon-Canton Railway Corporation and Airport Authority.

4. Under the Construction Sites (Safety) Regulations, notification of commencement of small-scale works, i.e. employing not more than 10 workmen or the duration of the work less than 6 weeks, to the Commissioner for Labour is **not** required. As such, most of the RMAA works would not come to the notice of the Labour Department because of their small scale and short duration.

Fatal Industrial Accidents in RMAA Works

5. Fatal industrial accidents of RMAA works also contributed a significant percentage of the fatal industrial accident toll in the construction industry. (Table 3)

(Table 3) Fatal Industrial Accidents in RMAA Works

		2000	2001	2002	2003	2004
(a) All reported fatal construction accidents	<i>New Works</i> ¹	17	24	14	17	11
	<i>RMAA Works</i> ²	12	4	10	8	6
	Total	29	28	24	25	17
(b) No. of fatal accidents occurred to employers, self-employed persons or illegal workers ³	<i>New Works</i> ¹	1	2	0	1	0
	<i>RMAA Works</i> ²	3	1	5	3	4
	Total	4	3	5	4	4
All fatal construction accidents [(a) + (b)]		33	31	29	29	21
The percentage of reported RMAA works fatal industrial accidents in the construction industry		41.4%	14.3%	41.7%	32.0%	35.3%

Note:

1. *New Works* refer to those construction sites where new development or re-development works are being carried out and of which the employment figures on the number of manual site workers are captured and published by the Census and Statistics Department. This included, without limited to, building, piling demolition, site formation and civil engineering works.
2. *RMAA* means repair, maintenance, alteration and addition and refers to those minor works such as construction projects for village-type houses in the New Territories, minor alterations, repairs, maintenance and interior decoration of existing buildings.
3. This type of fatal accident is not reported to the Labour Department under the ECO. Nonetheless, there have been established channels for fatal and serious accidents to be notified to the Labour Department by Police and Fire Services Department. All these accidents were thoroughly investigated with appropriate action taken afterwards.

Accidents in RMAA Works - analysed by “Type of Accident”

6. The analysis by “Type of Accident” is at Appendix 1b. Two types of accident, namely, “*fall of person from height*” and “*contact with electricity or electric discharge*” are the top two killers in RMAA works. Fall of person, improper manual handling and poor housekeeping have accounted for a significant percentage of industrial accidents in RMAA works. (Table 4)

(Table 4) Industrial Accidents in RMAA - analysed by “Type of Accident” (2000 to 2004)

Fatal Industrial Accidents Top-5 type of accident			Non-fatal Industrial Accidents Top-5 type of accident		
	No. of Cases	%		No. of Cases	%
Fall of person from height	22	55.0%	Striking against or struck by moving object	2 402	22.2%
Contact with electricity or electric discharge	10	25.0%	Striking against fixed or stationary object	1 624	15.0%
Contact with moving machinery or object being machined	2	5.0%	Injured whilst lifting or carrying	1 458	13.5%
Trapped by collapsing or overturning object	2	5.0%	Slip, trip or fall on same level	1 370	12.7%
---	---	---	Fall of person from height	1 361	12.6%

Accidents in the Construction Industry of Hong Kong (2000 – 2004)

Analysis of Fatal Industrial Accidents
by “Fall of Person from Height” in the Construction Industry

7. “Fall of person from height” is the top killer in the construction industry. It contributes from 32% to 63% of the fatal accident toll between 2000 and 2004. The statistics also shows that the deceased persons fell from bamboo scaffolds, working platforms/ falseworks or unfenced dangerous places in nearly half of the fatal cases. (Table 5)

(Table 5) Fatal Industrial Accidents in the Construction Industry (2000 – 2004)

	2000	2001	2002	2003	2004	Total	
Fatal accidents in the construction industry	29	28	24	25	17	123	
“Fall of person from height” fatal accidents in the construction industry	13	9	15	9	8	54	
Percentage of “Fall of person from height” to total (%)	44.8	32.1	62.5	36.0	47.1	43.9	
“Fall of person from height” accidents breakdown by “place of fall”	2000	2001	2002	2003	2004	Total	(%)
Bamboo scaffolds	2	2	5	3	0	12	22.2
Working platforms / Falseworks	3	0	4	0	3	10	18.5
Unfenced edges & Lift shaft openings	1	1	0	1	1	4	7.4
Fragile structures	1	0	0	1	1	3	5.6
Ladders	2	0	1	0	1	4	7.4
Material hoistways	2	2	0	0	0	4	7.4
Unfenced / insecurely covered openings	0	3	1	0	1	5	9.3
Others	2	1	4	4	1	12	22.2

Accidents in the Construction Industry of Hong Kong (2000 – 2004)

**Analysis of Fatal Industrial Accidents by
“Fall of Person from Height” in RMAA Works**

8. “Fall of person from height” is also the top killer in the RMAA works. It contributes from 25% to 75% of the fatal accident toll of the sector between 2000 and 2004. The statistics also shows that 45% (10 cases) deceased persons fell to death from bamboo scaffolds and unfenced edges. (Table 6)

(Table 6) “Fall of Person from Height” Fatal Industrial Accidents in RMAA Works (2000 – 2004) – analysed by “Place of Fall”

Place of fall	2000	2001	2002	2003	2004	Total
Bamboo scaffolds	0	0	3	3	0	6
Working platforms / Falseworks	1	0	0	0	1	2
Unfenced edges & Lift shaft openings	1	1	0	1	1	4
Fragile structures	0	0	0	1	1	2
Ladders	1	0	1	0	1	3
Material hoists	0	0	0	0	0	0
Unfenced / insecurely covered openings	0	0	1	0	0	1
Others	1	0	2	1	0	4
Total	4	1	7	6	4	22
Fatal industrial accidents in RMAA works	12	4	10	8	6	40
Percentage of “fall of person” to total	33.3%	25.0%	70.0%	75.0%	66.7%	55.0%

Accidents in the Construction Industry of Hong Kong (2000 – 2004)

Further Analysis of Industrial Accidents in RMAA (2000 – 2004)

9. According to statistics at Appendix 2a & 2b, July and August are comparatively the more accident-prone months (Table 7).

(Table 7) Top-5 RMAA Accident-Prone Months (2000 – 2004)

Fatal Industrial Accidents			Non-fatal Industrial Accidents		
Top-5 Months			Top-5 Months		
	No. of Cases	%		No. of Cases	%
August	8	20.0%	August	1 157	10.7%
July	5	12.5%	July	1 067	9.9%
June	5	12.5%	May	1 033	9.6%
February	5	12.5%	June	977	9.0%
October	5	12.5%	March	943	8.7%

10. Other statistics on industrial accidents of construction industry and RMAA works are appended in Appendix 3a & 3b, 4 a & 4b, 5 a & 5b, 6 a & 6b and 7 a & 7b. Table 8 shows the summary of various Top-2 analyses

(Table 8) Table of Summary for various Top-2 RMAA Accident Analyses (2000 – 2004)

RMAA Accidents analysed by	Appendices	Top-2	
		Fatal Accidents	Non-fatal Accidents
Type of work being performed	3b	1. "Demolition work" 2. "Electrical wiring"	1. "Material handling" 2. "Manual work"
Body part injured	4b	1. "Multiple locations" 2. "Skull/scalp"	1. "Finger" 2. "Hand/palm"
Injury nature	5b	1. "Multiple injuries" 2. "Contusion & bruise"	1. "Contusion & bruise" 2. "Fracture"
Age group	6b	1. "30-34" 2. "25-29" & "45-49"	1. "40-44" 2. "45-49"
Sex	7b	1. "Male"	1. "Male" 2. "Female"

Accident Analysis and Information Division
Labour Department
November 2005

Industrial Accidents in Construction Industry (2000 - 2004)

- analysed by Type of Accident -

Type of accident	2000	2001	2002	2003	2004	Total	% of Total
Trapped in or between objects	188 (1)	175	160 (2)	148 (1)	136 (1)	807 (5)	2.3% (4.1%)
Injured whilst lifting or carrying	1 956	1 350	918	712	615	5 551	15.6%
Slip, trip or fall on same level	2 203	1 741	1 203	833 (1)	662	6 642 (1)	18.7% (0.8%)
Fall of person from height	1 021 (13)	771 (9)	652 (15)	503 (9)	447 (8)	3 394 (54)	9.5% (43.9%)
Striking against fixed or stationary object	1 465	1 140	790	510	458	4 363	12.3%
Striking against or struck by moving object	2 817	2 162 (2)	1 292 (1)	747 (1)	757 (3)	7 775 (7)	21.9% (5.7%)
Stepping on object	202	123	77	35	33	470	1.3%
Exposure to or contact with harmful substance	80 (2)	77	42	27	16	242 (2)	0.7% (1.6%)
Contact with electricity or electric discharge	24 (5)	29 (4)	18	24 (3)	16 (1)	111 (13)	0.3% (10.6%)
Trapped by collapsing or overturning object	48 (2)	36 (9)	18 (2)	20 (2)	11 (1)	133 (16)	0.4% (13.0%)
Struck by falling object	400 (2)	346 (3)	242 (3)	237 (3)	139 (3)	1 364 (14)	3.8% (11.4%)
Struck by moving vehicle	43	46 (1)	24	27	32	172 (1)	0.5% (0.8%)
Contact with moving machinery or object being machined	683 (2)	621	372	267 (1)	270	2 213 (3)	6.2% (2.4%)
Drowning	0	1	1 (1)	2 (2)	0	4 (3)	0.0% (2.4%)
Exposure to fire	25	24	17	12 (1)	10	88 (1)	0.2% (0.8%)
Exposure to explosion	6	6	9	4	8	33	0.1%
Injured by hand tool	609	420	315	219	171	1 734	4.9%
Injured by fall of ground	4 (1)	5	3	6 (1)	0	18 (2)	0.1% (1.6%)
Asphyxiation	0	0	0	0	0	0	
Contact with hot surface or substance	98	94	65	19	29	305	0.9%
Injured by animal	0	0	0	0	0	0	
Injured in workplace violence	0	0	0	0	0	0	
Others	53 (1)	39	21	15	23	151 (1)	0.4% (0.8%)
Total	11 925 (29)	9 206 (28)	6 239 (24)	4 367 (25)	3 833 (17)	35 570 (123)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (RMAA) (2000 - 2004)

- analysed by Type of Accident -

Type of accident	2000	2001	2002	2003	2004	Total	% of Total
Trapped in or between objects	27	19	21	30	29 (1)	126 (1)	1.2% (2.5%)
Injured whilst lifting or carrying	472	327	241	208	210	1 458	13.4%
Slip, trip or fall on same level	438	335	215	208 (1)	175	1 371 (1)	12.6% (2.5%)
Fall of person from height	396 (4)	261 (1)	282 (7)	211 (6)	233 (4)	1 383 (22)	12.7% (55.0%)
Striking against fixed or stationary object	496	412	317	214	185	1 624	15.0%
Striking against or struck by moving object	828	596	395 (1)	270	314	2 403 (1)	22.2% (2.5%)
Stepping on object	38	35	18	9	7	107	1.0%
Exposure to or contact with harmful substance	35	30	20	5	7	97	0.9%
Contact with electricity or electric discharge	16 (5)	17 (3)	9	7 (1)	10 (1)	59 (10)	0.5% (25.0%)
Trapped by collapsing or overturning object	14 (1)	7	6 (1)	4	3	34 (2)	0.3% (5.0%)
Struck by falling object	96	88	66 (1)	71	28	349 (1)	3.2% (2.5%)
Struck by moving vehicle	8	6	2	11	9	36	0.3%
Contact with moving machinery or object being machined	223 (2)	213	150	112	127	825 (2)	7.6% (5.0%)
Drowning							
Exposure to fire	11	7	7	7	5	37	0.3%
Exposure to explosion	4		5	3	3	15	0.1%
Injured by hand tool	259	198	144	104	92	797	7.3%
Injured by fall of ground							
Asphyxiation							
Contact with hot surface or substance	32	26	21	5	9	93	0.9%
Injured by animal							
Injured in workplace violence							
Others	9	5	6	6	8	34	0.3%
Total	3 402 (12)	2 582 (4)	1 925 (10)	1 485 (8)	1 454 (6)	10 848 (40)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. RMAA means repair, maintenance, alteration and addition and refers to those minor works such as construction projects for village-type houses in the New Territories, minor alterations, repairs, maintenance and interior decoration of existing buildings.
3. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (2000 - 2004)

- analysed by Month -

	2000	2001	2002	2003	2004	Total	% of Total
Jan	928 (1)	580 (1)	656	360 (2)	190 (1)	2 714 (5)	7.6% (4.1%)
Feb	579 (2)	758	354 (1)	262 (2)	284 (3)	2 237 (8)	6.3% (6.5%)
Mar	1 010	934	539 (4)	425 (2)	328 (3)	3 236 (9)	9.1% (7.3%)
Apr	935 (3)	704 (1)	581 (2)	358	324	2 902 (6)	8.2% (4.9%)
May	1 133 (4)	941 (2)	564 (2)	420	330	3 388 (8)	9.5% (6.5%)
Jun	1 123 (1)	794 (4)	584 (2)	352 (7)	365	3 218 (14)	9.0% (11.4%)
Jul	1 183 (6)	800 (2)	592 (5)	425 (3)	368 (2)	3 368 (18)	9.5% (14.6%)
Aug	1 235 (5)	937 (4)	551 (2)	406 (4)	390 (3)	3 519 (18)	9.9% (14.6%)
Sep	1 036 (2)	831 (1)	496 (2)	362 (1)	342 (3)	3 067 (9)	8.6% (7.3%)
Oct	973 (2)	747 (7)	465 (2)	361 (2)	311 (1)	2 857 (14)	8.0% (11.4%)
Nov	968 (1)	613 (3)	446	341	310 (1)	2 678 (5)	7.5% (4.1%)
Dec	822 (2)	567 (3)	411 (2)	295 (2)	291	2 386 (9)	6.7% (7.3%)
Total	11 925 (29)	9 206 (28)	6 239 (24)	4 367 (25)	3 833 (17)	35 570 (123)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (2000 - 2004)

- analysed by Type of Work being Performed-

Type of work	2000	2001	2002	2003	2004	Total	% of Total
Material handling	2 383 (2)	2 026 (2)	1 259 (2)	953 (4)	829 (3)	7 450 (13)	20.9% (10.6%)
Manual work	965	581	491 (4)	439 (2)	939 (5)	3 415 (11)	9.6% (8.9%)
Electrical wiring	700 (4)	518	419 (2)	258	233	2 128 (6)	6.0% (4.9%)
Water pipe fitting	581 (4)	410	280	213	141	1 625 (4)	4.6% (3.3%)
Formwork erection	637 (2)	448	236	169 (1)	119 (1)	1 609 (4)	4.5% (3.3%)
Woodworking	461	361	278	113	137	1 350	3.8%
Plastering	422 (1)	293	163 (1)	137	123	1 138 (2)	3.2% (1.6%)
Lift/escalator installation	292 (2)	268	196 (1)	162 (1)	144 (2)	1 062 (6)	3.0% (4.9%)
Reinforcement bar bending	357	263 (2)	165 (1)	94	69 (1)	948 (4)	2.7% (3.3%)
Air-conditioner installation	235 (1)	252	158	86	85	816 (1)	2.3% (0.8%)
Painting	309	222	107 (1)	83	67	788 (1)	2.2% (0.8%)
Concreting	270 (1)	180 (3)	125	88	61	724 (4)	2.0% (3.3%)
Arc/gas welding	212 (1)	177	117 (1)	65	67	638 (2)	1.8% (1.6%)
Trench work	205 (1)	163	103 (1)	104 (2)	62	637 (4)	1.8% (3.3%)
Glazier work	191	148 (1)	118	85 (1)	64	606 (2)	1.7% (1.6%)
Brick laying	240 (1)	137	106	62	42	587 (1)	1.7% (0.8%)
Bamboo scaffolding	189 (2)	130	90 (3)	75 (1)	65	549 (6)	1.5% (4.9%)
Lifting operation	143 (1)	154 (2)	111	53 (1)	27 (1)	488 (5)	1.4% (4.1%)
Demolition work	108 (2)	126 (6)	77 (2)	84 (3)	74 (1)	469 (14)	1.3% (11.4%)
Plant operation	91	50	76 (1)	30 (4)	19	266 (5)	0.7% (4.1%)
Tubular scaffolding	63	87	64	33	18	265	0.7%
Fire services installation	93 (1)	55 (1)	43	37	21	249 (2)	0.7% (1.6%)
Piling work	63	64	50	18 (1)	18	213 (1)	0.6% (0.8%)
Slope work	58	72 (1)	39	42 (1)	19	230 (2)	0.6% (1.6%)
Surface treatment	55	31	52	13 (2)	2	153 (2)	0.4% (1.6%)
Road works	54	28	33	16	7	138	0.4%
Gas pipe fitting	29	33	21	28	19	130	0.4%
Structural erection	26	18	23	22	22	111	0.3%
Site preparation	38	21	9	11	10	89	0.3%
Tunnelling operation	18	3	1	0	2 (1)	24 (1)	0.1% (0.8%)
Caisson work	4	0	1	1	0	6	0.0%
Diving operation	2	0	1	0	0	3	0.0%
Others	2 431 (3)	1 887 (10)	1 227 (4)	793 (1)	328 (2)	6 666 (20)	18.7% (16.3%)
Total	11 925 (29)	9 206 (28)	6 239 (24)	4 367 (25)	3 833 (17)	35 570 (123)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (RMAA) (2000 - 2004)

- analysed by Type of Work being Performed -

Type of work	2000	2001	2002	2003	2004	Total	% of Total
Material handling	454	381	273 (1)	237 (1)	243	1 588 (2)	14.6% (5.0%)
Manual work	334	210	181	168 (1)	364 (3)	1 257 (4)	11.6% (10.0%)
Electrical wiring	389 (3)	231	199 (2)	134	134	1 087 (5)	10.0% (12.5%)
Water pipe fitting	201 (2)	184	127	115	80	707 (2)	6.5% (5.0%)
Lift/escalator installation	152 (2)	150	129	107	97 (1)	635 (3)	5.9% (7.5%)
Woodworking	216	163	141	49	63	632	5.8%
Air-conditioner installation	184 (1)	158	111	63	70	586 (1)	5.4% (2.5%)
Painting	169	115	82 (1)	57	43	466 (1)	4.3% (2.5%)
Plastering	108 (1)	78	35 (1)	54	47	322 (2)	3.0% (5.0%)
Glazier work	86	64	42	38	39	269	2.5%
Demolition work	42 (1)	62	46 (2)	56 (2)	55 (1)	261 (6)	2.4% (15.0%)
Bamboo scaffolding	68 (1)	46	44 (2)	42 (1)	35	235 (4)	2.2% (10.0%)
Brick laying	60	53	48	25	10	196	1.8%
Fire services installation	50	33 (1)	24	15	11	133 (1)	1.2% (2.5%)
Arc/gas welding	44	20	33	13	14	124	1.1%
Structural erection	7	19	8	3	10	47	0.4%
Surface treatment	9	10	19	8 (2)	1	47 (2)	0.4% (5.0%)
Plant operation	27	3	3		10	43	0.4%
Concreting	10	7	10	3	12	42	0.4%
Formwork erection	16	6		5	3 (1)	30 (1)	0.3% (2.5%)
Gas pipe fitting	6	3	5	10	6	30	0.3%
Lifting operation	9	7	4	3	2	25	0.2%
Tubular scaffolding	8	4	6	4	3	25	0.2%
Trench work	5	6	4	2	6	23	0.2%
Slope work	5	3	1	2	1	12	0.1%
Reinforcement bar bending	3	1		2	4	10	0.1%
Road works	2	1	3			6	0.1%
Site preparation	2	1	1	1		5	0.0%
Piling work			1	1		2	0.0%
Tunnelling operation	1					1	0.0%
Others	735 (1)	563 (3)	345 (1)	268 (1)	91	2 002 (6)	18.5% (15.0%)
Total	3 402 (12)	2 582 (4)	1 925 (10)	1 485 (8)	1 454 (6)	10 848 (40)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. RMAA means repair, maintenance, alteration and addition and refers to those minor works such as construction projects for village-type houses in the New Territories, minor alterations, repairs, maintenance and interior decoration of existing buildings.
3. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (2000 - 2004)

- analysed by Body Part Injured -

Body part	2000	2001	2002	2003	2004	Total	% of Total
Finger	2 645	2 071	1 426	1 002	925	8 069	22.7%
Hand/palm	1 016	860	594	425	384	3 279	9.2%
Foot	1 222	816	493	372	281	3 184	9.0%
Back	1 098	823	527	380	313 (1)	3 141 (1)	8.8% (0.8%)
Eye	959	676	404	258	215	2 512	7.1%
Multiple Locations	713 (16)	652 (27)	429 (16)	352 (18)	353 (8)	2 499 (85)	7.0% (69.1%)
Ankle	642	530	394	269	195	2 030	5.7%
Forearm	417	340	227	157	168	1 309	3.7%
Skull/scalp	437 (8)	347 (1)	230 (5)	150 (4)	117 (6)	1 281 (24)	3.6% (19.5%)
Knee	413	280	232	127	118	1 170	3.3%
Chest	401 (2)	283	184	126 (1)	115	1 109 (3)	3.1% (2.4%)
Leg	325	277	214 (1)	147	96	1 059 (1)	3.0% (0.8%)
Trunk	357	245	163 (1)	121	128	1 014 (1)	2.9% (0.8%)
Shoulder	259	201	119	97	75	751	2.1%
Elbow	200	163	129	75	91	658	1.8%
Thigh	175	154	127	68	56	580	1.6%
Face	168	119	94	56	43	480	1.3%
Upper arm	90	76	52	39	28	285	0.8%
Pelvis/groin	89	66	40	28	33	256	0.7%
Neck	83	56	54	24	25	242	0.7%
Hip	50	46	27	24	19	166	0.5%
Mouth/tooth	51	39	31	15	16	152	0.4%
Abdomen	38	27	21	20	15	121	0.3%
Nose	45	38	14	16	4	117	0.3%
Ear	19	13	8	5	5	50	0.1%
Others	13 (3)	8	6 (1)	14 (2)	15 (2)	56 (8)	0.2% (6.5%)
Total	11 925 (29)	9 206 (28)	6 239 (24)	4 367 (25)	3 833 (17)	35 570 (123)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (RMAA) (2000 - 2004)

- analysed by Body Part Injured -

Body part	2000	2001	2002	2003	2004	Total	% of Total
Abdomen	7	7	3	4	3	24	0.2%
Ankle	173	149	114	81	63	580	5.3%
Back	210	154	95	93	79 (1)	631 (1)	5.8% (2.5%)
Chest	69 (1)	42	34	22	29	196 (1)	1.8% (2.5%)
Ear	5	4	3	2	2	16	0.1%
Elbow	65	50	58	24	42	239	2.2%
Eye	390	264	164	144	112	1 074	9.9%
Face	54	27	41	24	17	163	1.5%
Finger	775	617	491	333	331	2 547	23.5%
Foot	315	206	130	112	86	849	7.8%
Forearm	151	119	88	57	82	497	4.6%
Hand/palm	377	316	221	171	166	1 251	11.5%
Hip	6	6	6	4	8	30	0.3%
Knee	111	63	48	36	37	295	2.7%
Leg	66	55	50 (1)	43	28	242 (1)	2.2% (2.5%)
Mouth/tooth	11	10	4	2	5	32	0.3%
Multiple locations	200 (7)	167 (4)	129 (5)	123 (7)	163 (2)	782 (25)	7.2% (62.5%)
Neck	16	15	11	9	8	59	0.5%
Nose	8	10	5	6	2	31	0.3%
Others		3	1	3	7 (1)	14 (1)	0.1% (2.5%)
Pelvis/groin	29	22	13	14	12	90	0.8%
Shoulder	44	31	18	23	19	135	1.2%
Skull/scalp	155 (4)	115	87 (3)	68 (1)	51 (2)	476 (10)	4.4% (25.0%)
Thigh	38	34	38	23	28	161	1.5%
Trunk	104	71	54 (1)	48	63	340 (1)	3.1% (2.5%)
Upper arm	23	25	19	16	11	94	0.9%
Total	3 402 (12)	2 582 (4)	1 925 (10)	1 485 (8)	1 454 (6)	10 848 (40)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. RMAA means repair, maintenance, alteration and addition and refers to those minor works such as construction projects for village-type houses in the New Territories, minor alterations, repairs, maintenance and interior decoration of existing buildings.
3. Figures in brackets denote the number of fatalities.

Industrial Accidents (Fall of Person from Height) in Construction Industry (2000 - 2004)

- analysed by Injury Nature -

Nature of injury	2000	2001	2002	2003	2004	Total	% of Total
Contusion & bruise	398 (3)	292	234 (5)	173 (1)	135 (2)	1 232 (11)	36.3% (20.4%)
Fracture	262	196	199	169	129	955	28.1%
Sprain & strain	161	112	84	62	56	475	14.0%
Multiple injuries	94 (9)	114 (9)	71 (10)	54 (7)	80 (6)	413 (41)	12.2% (75.9%)
Laceration and cut	36	23	16	18	15	108	3.2%
Abrasion	32	17	16	11	13	89	2.6%
Dislocation	20	9	16	9	9	63	1.9%
Crushing	11	4	10	4	5	34	1.0%
Puncture wound	3	3	5	2 (1)	0	13 (1)	0.4% (1.9%)
Concussion	3 (1)	1	1	1	0	6 (1)	0.2% (1.9%)
Amputation	1	0	0	0	2	3	0.1%
Others	0	0	0	0	3	3	0.1%
Total	1 021 (13)	771 (9)	652 (15)	503 (9)	447 (8)	3 394 (54)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. Figures in brackets denote the number of fatalities.

Industrial Accidents (Fall of Person from Height) in Construction Industry (RMAA) (2000 - 2004)

- analysed by Injury Nature -

Nature of injury	2000	2001	2002	2003	2004	Total	% of Total
Contusion & bruise	141 (1)	89	93 (3)	70	69 (1)	462 (5)	33.4% (22.7%)
Fracture	116	72	97	72	65	422	30.5%
Sprain & strain	65	46	40	24	24	199	14.4%
Multiple injuries	36 (2)	38 (1)	25 (4)	28 (6)	50 (3)	177 (16)	12.8% (72.7%)
Laceration and cut	15	8	6	8	6	43	3.1%
Abrasion	12	5	5	3	8	33	2.4%
Dislocation	3	2	7	4	5	21	1.5%
Crushing	6	1	8	1	4	20	1.4%
Concussion	1 (1)		1	1		3 (1)	0.2% (4.5%)
Amputation	1				1	2	0.1%
Others					1	1	0.1%
Total	396 (4)	261 (1)	282 (7)	211 (6)	233 (4)	1 383 (22)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. RMAA means repair, maintenance, alteration and addition and refers to those minor works such as construction projects for village-type houses in the New Territories, minor alterations, repairs, maintenance and interior decoration of existing buildings.
3. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (2000 - 2004)
- analysed by Age Group -

Age	2000	2001	2002	2003	2004	Total	% of Total	
15-17	72	25	15	6	12	130	0.4%	
18-19	300	187	113 (1)	61	52	713 (1)	2.0%	(0.8%)
20-24	1 210 (4)	882 (1)	603 (3)	384 (2)	327 (1)	3 406 (11)	9.6%	(8.9%)
25-29	1 107 (4)	947 (2)	679 (4)	505 (1)	419 (1)	3 657 (12)	10.3%	(9.8%)
30-34	1 176 (4)	928 (3)	690 (5)	479 (2)	455 (1)	3 728 (15)	10.5%	(12.2%)
35-39	1 683 (2)	1 180 (4)	697 (1)	494 (1)	422 (1)	4 476 (9)	12.6%	(7.3%)
40-44	2 485 (4)	1 859 (7)	1 207 (3)	784 (6)	637 (4)	6 972 (24)	19.6%	(19.5%)
45-49	1 803 (2)	1 520 (5)	1 096 (3)	810 (6)	709 (4)	5 938 (20)	16.7%	(16.3%)
50-54	1 136 (6)	946 (2)	634 (2)	481 (4)	467 (1)	3 664 (15)	10.3%	(12.2%)
55-59	612 (2)	489 (3)	347 (2)	256 (1)	243 (2)	1 947 (10)	5.5%	(8.1%)
60-64	258 (1)	192 (1)	125	85 (1)	76 (2)	736 (5)	2.1%	(4.1%)
>64	82	51	33	22 (1)	14	202 (1)	0.6%	(0.8%)
Unknown	1	0	0	0	0	1	0.0%	
Total	11 925 (29)	9 206 (28)	6 239 (24)	4 367 (25)	3 833 (17)	35 570 (123)	100.0%	(100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (RMAA) (2000 - 2004)
- analysed by Age Group -

Age	2000	2001	2002	2003	2004	Total	% of Total
15-17	38	13	10	1	8	70	0.6%
18-19	137	90	58 (1)	27	22	334 (1)	3.1% (2.5%)
20-24	466 (2)	315	230	182 (1)	170 (1)	1 363 (4)	12.6% (10.0%)
25-29	384 (2)	319 (1)	247 (3)	213 (1)	190	1 353 (7)	12.5% (17.5%)
30-34	380 (4)	286 (1)	235 (3)	175	176 (1)	1 252 (9)	11.5% (22.5%)
35-39	515 (1)	391 (1)	212	172	171	1 461 (2)	13.5% (5.0%)
40-44	659	469 (1)	374 (1)	238 (1)	236 (1)	1 976 (4)	18.2% (10.0%)
45-49	398 (2)	346	295 (1)	248 (4)	225	1 512 (7)	13.9% (17.5%)
50-54	232	201	147 (1)	122	154 (1)	856 (2)	7.9% (5.0%)
55-59	113 (1)	98	80	76	76 (2)	443 (3)	4.1% (7.5%)
60-64	57	35	31	20	22	165	1.5%
>64	23	19	6	11 (1)	4	63 (1)	0.6% (2.5%)
Total	3 402 (12)	2 582 (4)	1 925 (10)	1 485 (8)	1 454 (6)	10 848 (40)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. RMAA means repair, maintenance, alteration and addition and refers to those minor works such as construction projects for village-type houses in the New Territories, minor alterations, repairs, maintenance and interior decoration of existing buildings.
3. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (2000 to 2004)

- analysed by Sex -

	2000	2001	2002	2003	2004	Total	% of Total
Female	430 (1)	353 (1)	210	180 (1)	181	1 354 (3)	3.8% (2.4%)
Male	11 495 (28)	8 853 (27)	6 029 (24)	4 187 (24)	3 652 (17)	34 216 (120)	96.2% (97.6%)
Total	11 925 (29)	9 206 (28)	6 239 (24)	4 367 (25)	3 833 (17)	35 570 (123)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. Figures in brackets denote the number of fatalities.

Industrial Accidents in Construction Industry (RMAA) (2000 to 2004)

- analysed by Sex -

	2000	2001	2002	2003	2004	Total	% of Total
Female	43	36	42	33	34	188	1.7%
Male	3 359 (12)	2 546 (4)	1 883 (10)	1 452 (8)	1 420 (6)	10 660 (40)	98.3% (100.0%)
Total	3 402 (12)	2 582 (4)	1 925 (10)	1 485 (8)	1 454 (6)	10 848 (40)	100.0% (100.0%)

Notes:

1. Industrial accidents refer to injuries and deaths arising from industrial activities in an industrial undertaking as defined under the Factories and Industrial Undertakings Ordinance.
2. RMAA means repair, maintenance, alteration and addition and refers to those minor works such as construction projects for village-type houses in the New Territories, minor alterations, repairs, maintenance and interior decoration of existing buildings.
3. Figures in brackets denote the number of fatalities.

Appendix 11 Wui Loong Scaffolding Works Company Limited – climbing scaffold



滙隆棚業有限公司

Wui Loong Scaffolding Works Company Limited

香港總公司: 香港香港仔黃竹坑業興街 11 號南匯廣場 6 樓 601-606 室

Hong Kong Head Office: Room 601-606, Southmark, 11 Yip Hing Street, Wong Chuk Hang, Aberdeen, Hong Kong

Tel: (852) 28655622 Fax: (852) 28660818 Email: hkoffice@wls.com.hk

澳門分公司: 澳門新口岸北京街 244-246 號澳門金融中心 10 樓 K

Macau Branch Office: Rua de Pequim, Macau Finance Centre 10/K, Macau

Tel: (853) 707223 Fax: (853) 705022 Email: macauoffice@wls.com.hk

電腦控制爬升棚架

Computerized Climbing Scaffold



Website: <http://www.wls.com.hk>

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爬升棚架系統簡介

滙隆棚業有限公司一直致力提供安全暨高質之棚架系統。此外，滙隆亦致力尋找全球性合作伙伴，設計及製造新產品以滿足顧客之需要。

本公司吸取國內外爬升棚架的技術及經驗，供應電腦控制爬升棚架，適用於高層建築，作為一種建築主體施工及外牆裝修的操作平臺和安全維護設備。棚架可隨著建築主體樓層爬升或下降，兼能自動或手動調整各個機位的升降高度和提升速度，確保棚架整體之穩定性。

爬棚部分主要由主框架、防傾防墜導座、上吊掛座、水平桁架、安全網、腳手板、翻板、提升系統、防墜系統、控制系統等構成。

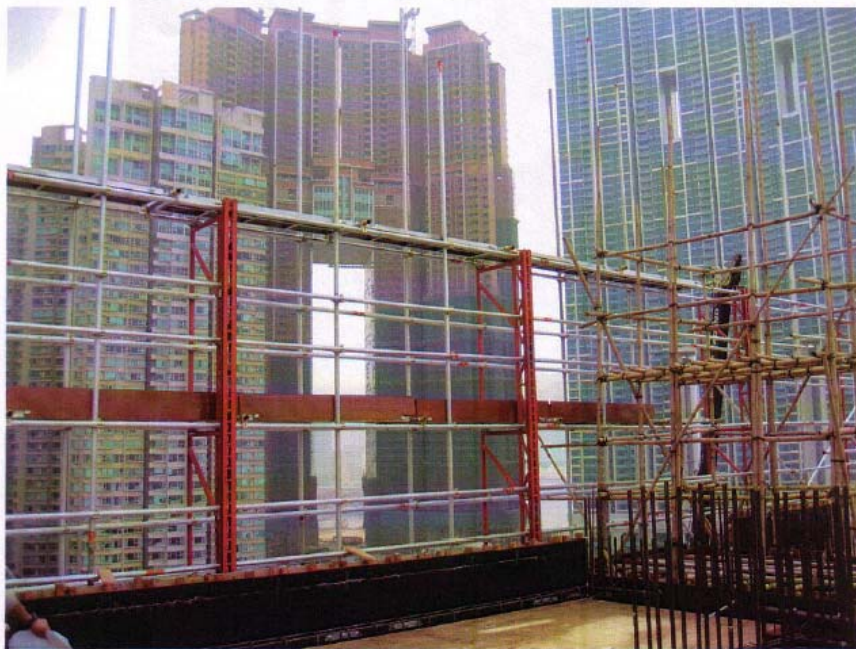
金屬棚架部分由雙棚結構組成。內外棚採用鋼通組成棚架之骨幹，以發揮最高的荷載能力；〈倡〉則採用鋼通以四十五度至六十度角連接。金屬棚架大部分組件與本公司其他棚架互通，大大增加組件互通性及兼容性，達致減輕成本之效。爬升動力系統特別選用高荷載電動馬達，以發揮最大功效，並能於二小時內完成一層一組爬升棚架之上升 / 下降動作。控制系統採用全智能化管理，配合機械性防墮防傾系統，確保棚架之安全性。



組件介紹



棚架內觀



組件介紹

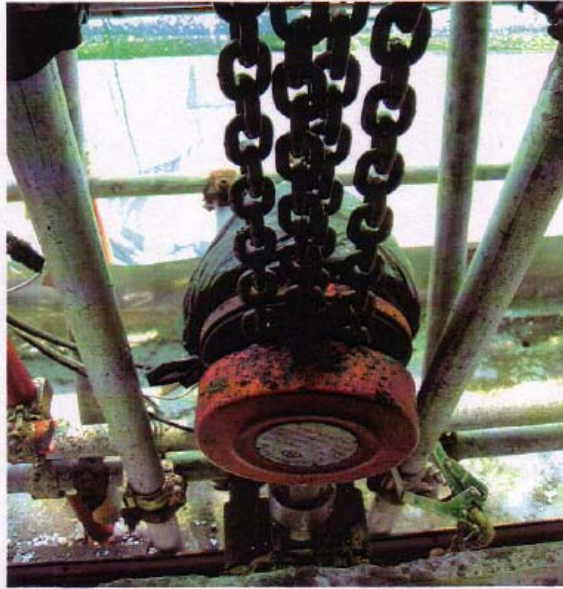


主框架：與金屬棚架相連，穩固棚架



工作台及踢腳板：提供穩固工作平台

組件介紹



電動馬達及導鏈：提供動力供棚架主體上落。



電動馬達底部裝置有重力探測器，提供數據參考及分析，以評估棚架爬升/下降表現。

組件介紹



純機械自動防墜裝置：

以棘輪及擺桿原理自動操作，防止棚架下墮，堅固可靠。



機械防墜裝置：

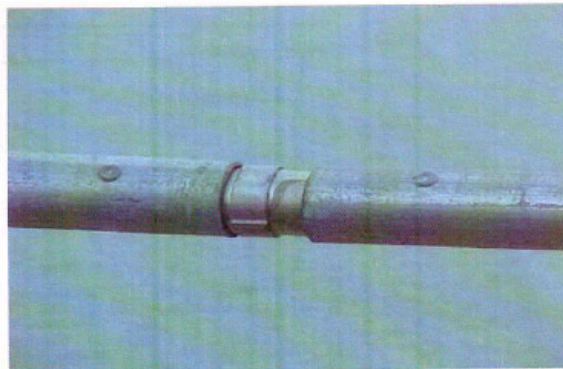
當棚架停止移動，即以掛鈎

鎖上，作為第二重保障。

組件介紹



活動翻板： 外牆與棚架主體之間裝置有活動翻板，防止物件從狹縫中墮下。

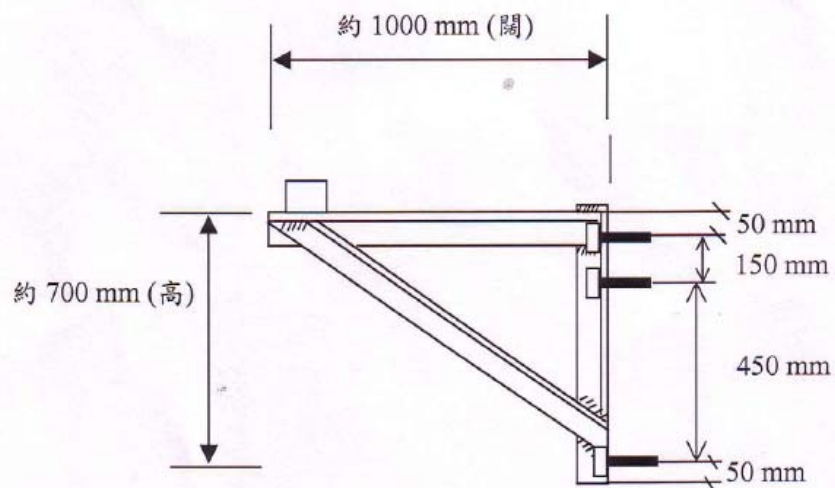


駁芯： 可應用於鋼通之垂直及橫向接駁，內置反鎖系統，能有效避免拆棚時駁芯從高空墜下之意外。

狗脾架設計圖則

角鐵： 75 x 75 x 6mm 黑角鐵

螺絲： 三粒預留 M16 螺絲



Appendix 12 Interview dialogue with Gammon Construction Company Limited

Investigation into Mr. David Suff's Presentation on Replacing A-frame Ladders by Podium Access Systems

Mr. Suff directed us to Mr. Dean Cowley (Tel: 2639 3348, 9098 1295, dcowley@bbljv.com.hk) via his secretary Miss Leung (Tel: 2516 8529). Mr. Cowley provided the following information:

- Gammon has only purchased one podium access system for the purpose of the presentation.
- The product was purchased from a company called Lofts and Ladders (www.loftsandladders.co.uk) in U.K. at the price of GBP386 and HK\$10,000 for the freight.
- The product was imported instead of purchased locally as Mr. Cowley was given a short time frame to search for the product and he had contacts in U.K.
- The product size is 500mmx500mm, the working platform can reach 1500mm high, it is designed for one worker and the product is foldable.
- Gammon intends to purchase 50-100 podium access systems to replace the A-frame ladders for all Gammon construction sites.
- The people assigned for this task are Jessie Hau and Eric Wong.
- The idea originated from their realization that most accidents occur below 2m height.
- The price of replacement would be cheaper than compensating for accidents.
- Mr. Cowley will provide further information relating to their purchased product and Mr. Suff's presentation.

Appendix 13 Letter to the Labour Department requesting for accident statistics



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

Permanent Secretary for Economic Development and Labour (Labour) & Commissioner for Labour
13/F, Harbour Building
38 Pier Road
Central
Hong Kong

(Attn: Mr. CHEUNG Kwok Chee)

14 June 2005

建築及房地產學系
香港 九龍 紅磡
Department of Building and Real Estate
Hung Hom Kowloon
Tel (852) 2766 5814 Fax (852) 2764 5131
bsachan@polyu.edu.hk
Homepage
<http://home.bre.polyu.edu.hk/~bsachan>

教授
陳炳泉 博士

Professor Albert PC Chan

*MSc, PhD, FCIQB, FAIB, FHKIB, MHKIE,
MAIPM, RPE(Bldg)*

Dear Sir,

Request for Accident Data on Construction Work

We are members of a research team at the Department of Building and Real Estate, The Hong Kong Polytechnic University. We are conducting a research entitled "**Construction Safety Involving Working at Height for Residential Building Repair and Maintenance**", which is funded by Construction Industry Institute – Hong Kong (CII-HK). The research aims at improving construction safety involving working at height for residential building repair and maintenance.

We are currently collecting data for the research project. Further to the meeting with Mr. K.L. Pang and Mr. P.W. Chung dated 4 April 2005, we would be grateful if you can provide us with the accident data on construction work from your department. Please rest assured that the data so collected will be treated in strict confidentiality and will be used purely for the above study.

We believe that this research can benefit the construction industry as a whole and can explore valuable findings about construction safety involving working at height for residential building repair and maintenance.

We thank you in anticipation. Should you have any enquiries, please feel free to contact Mr. Max Chan at 2766-4307 or e-mail to bsckchan@polyu.edu.hk. Your prompt reply is highly appreciated.

Yours truly,

Professor Albert P. C. Chan
Principal Investigator
Department of Building and Real Estate
The Hong Kong Polytechnic University

Appendix 14 Interview questions

Construction Safety Involving Working at Height for Residential Building Repair and Maintenance

Question list for interview

Interviewee:

Date:

Company:

Time:

Position/Job title:

Interviewers:

Job nature:

Safety practices and management

1. Please introduce your organization's safety practice/management system.
2. Are there any guidelines on preventing fall of person related construction accidents at your company?
3. Does your company adopt any advanced technology to improve safety for working at height?
4. Are there any difficulties in implementing safety measures and procedures for working at height?

Causes of fall related accidents at workplace

5. What are the situations where working at height is necessary in residential building repair and maintenance works?
6. What do you think are the root causes of accidents in residential building repair and maintenance works?
7. Can you suggest some measures to reduce fall related construction accidents for repair and maintenance works?

Practical solutions to construction safety for working at height

8. How can you increase the awareness of construction workers towards safety for working at height in maintenance works?
9. What do you think are the cost-effective and user-friendly technological solutions?
10. Do you find legal controls effective in maintaining a safe workplace? Why/Why not?

Roles of concerned parties in construction safety

11. What roles should the following parties play in safeguarding working at height for repair and maintenance works?
 - a. Client
 - b. User
 - c. Government
 - d. Contractor
 - e. The general public

Appendix 15 Minutes of interview dialogue with the Housing Society

Construction Safety involving Working at Height for Residential Building Repair and Maintenance

Notes of the Housing Society visit on 20th July 2005 (Wednesday)

Present: PolyU- Daniel CHAN
Albert KWOK
Edmond LAM
Esther CHEUNG
Max CHAN
HS- Augustine CHOW

Venue: Meeting Room, Hong Kong Housing Society,
World Trade Centre, 280 Gloucester Road, Causeway Bay

Time: 2:40 – 4:20 p.m.

Mr. Chow provided 51 pages of hard copy information to support the questions asked in this interview.

The following was discussed in the meeting:

Safety practices and management

1. Please introduce your organization's safety practice/management system.

Chow: The Housing Society set up a safety and health management system in June 2004. The system referenced existing practices and the guidelines provided by the Labour Department. Although the system exists, investigation is still being carried out to ensure its practicability. Problems arise especially due to the contracting system used, where there may also be a number of subsequent sub-contractors. The hierarchy level adopted

means that funding is limited at the bottom end, and as a result safety issues are often neglected to maintain profits. The safety policy was designed to reduce accidents and factors which would affect health. Considerations include building design, methodology adopted and machinery used. All levels of staff are repeatedly reminded of legal requirements and the safety system adopted. Main objective of the system is to eliminate accidents or to lower accident rates. Each year the target is to have fewer accidents than the previous year. The 5 'S' system is also implemented by HKHS for better housekeeping.

Daniel: Do you perform OHSAS 18000?

Chow: Not at the moment, but we have previously employed consultants as well as have some of our own staff who are specialists in this field to provide the necessary information. In addition we have a PMD (property management division) with approximately 800 employees out of the total 900 employees in the organisation.

2. Are there any guidelines on preventing fall of person related construction accidents at your company?

Chow: We follow the Labour Department's guidance on Construction Sites (Safety) Regulations, Prevention of Falls - Cap. 38I, F&IU Ordinance - Cap. 59I. Basically it means that the contractor must take full responsibility over site safety. And if working above 2m high a suitable working platform is required. The Labour Department's guidelines are more than enough, but often it is the ignorance of workers, for example the recent accident of an industrial building in San Po Kong where one screw was used instead of three for the working scaffolding platform. For our own employees we will issue Labour Department's guidelines and run training courses. Recently we have had the recognition from the Occupational Safety and Health Council to issue 'green' cards. We also have internal guidelines in pictorial form for workers to interpret the safety practices involving working at height more easily.

3. Does your company adopt any advanced technology to improve safety for working at height?

Chow: Universities such as PolyU and CityU have looked into this. Also heard of previous trials involving the use of robots, but understand that this technology has still not been totally feasible yet. Our own internal staff has also tried certain technologies such as, when cleaning the top of a footbridge it is dangerous for the staff even if they use scaffolding towers so a paper roll with cleansing towel controlled by pulling the strings was adopted in replacement. These innovations are even better as they are simple, straight forward and require no high technology. The main aim is that it can perform its intended use. New innovations are encouraged in-house to prevent daily problems. High technologies have not yet been implemented. The use of scaffolding towers for redecorations and cleaning are also widely adopted.

4. Are there any difficulties in implementing safety measures and procedures for working at height?

Chow: Firstly, however regulations are refined there will always be loopholes and also it depends on how the user interprets. Secondly, some employers are rather short-sighted. Only looking at the present and not the future, this is a common problem in Hong Kong. After 1997 there has been an improvement as businesses are more permanent, whereas before a lot left Hong Kong after enough money was made, hence no investment was put in safety. Another major problem which we often approach is that safety equipment is provided but not used by the workers or used incorrectly, for example a worker using his safety helmet on top of his cap. The attitude of frontline workers may not be serious, safety equipment often only used when there are inspections or visitors. Often workers find the safety equipment a nuisance, they are also over confident, thinking they have experience, stubborn, impatient and find safety protection time consuming. Although engineers, surveyors and architects are not required to possess a 'green' card it is also advantageous to be aware of the type of training provided to workers and also to be a role model to them. Safety is better in larger organizations such as NGOs, housing authority because 'green' card as well as competent proofs are checked on construction sites, hence

accidents are reduced slightly. But for private organizations the owner may not even know the workers, often the owner employs a contractor who will bring along the workers, hence if accidents do occur the owner may have to take full legal responsibility without knowing why.

Daniel: This was also an issue raised in our previous PolyU research team internal meeting. Discussing which party should be taking what responsibility.

Chow: For example a ‘fall from height’ accident which occurred in Sun Hing Building.

Albert: For Housing Society’s repair and maintenance projects do you often use your own employees or outsource?

Chow: Both, but some jobs still need to be outsourced, for example we have no in-house trained scaffolders. Before contractors start work they are required to sign certain documents to ensure that they are aware of what they are doing. Housing Society staff will perform periodically audits to monitor the workers, it is hoped that this will in turn uplift their risk awareness. The workers are employed by the contractor themselves.

Daniel: If external walls need redecorating or if there is a water leakage, do these jobs also need to be outsourced?

Chow: Yes. If the job is complicated a consultant team (including architect and surveyor) will also need to be employed. Even for smaller jobs, if it appears externally, scaffolding is required which means that the job needs to be outsourced. Often there is a term contract of service between Housing Society and contractors.

Albert: Any particular outsource for jobs that require ‘working at height’?

Chow: Impossible. Instead jobs are outsourced by trade. If jobs require ‘working at height’ sufficient knowledge concerning the legal requirements and safety issues will be provided.

Albert: Any type of checking?

Chow: Competent persons with the necessary professional certificates are required to carry out the job. There are occasional checks. But it is impossible to have the same number of people monitoring the number of people working.

Daniel: Does the flat owners find a company to do the works or do you recommend them someone?

Chow: Flat owners have their own choice whom they wish to employ for their repair works. If they employ someone from outside they must report it to the estate management company in order for them to instruct them relating to safety issues. Estate management staff will stop the works if they notice any unsafe actions.

Albert: Do you provide them with safety gear?

Chow: No. That would be impossible. We would supply safety gear to our own employees as we have the responsibility as an employer.

Daniel: Does the Housing Society have an in-house approved contractor's list?

Chow: Yes. Often the larger contractors used have RGBC recognition, ISO 14000 and ISO 9000, which indicates that they have reached a recognized standard of certification.

Daniel: The practice here is very similar to some private major developers such as Hong Yip Service Co Ltd.

Chow: We also have benchmarks with Hong Yip, to share experiences.

Daniel: Yes the practice is quite good.

Chow: They actually started before us.

Daniel: Any more further safety-related information on your website?

Chow: More information is distributed internally. The information I give you here will provide some more detail. Please only use internally and destroy afterwards. Estate management companies are a good idea, as they can screen contractors, which will alert their awareness. It is harder for buildings with just a few owners, as they may not be able to afford to employ an estate management company to oversee their flats.

Daniel: Agree that more accidents occur in those buildings with fewer than twenty flats and without estate management companies.

Chow: Very difficult for them, usually have to pay themselves so things are carried out in the cheapest way, for example a single layer of scaffolding instead of a double layer.

Causes of fall related accidents at workplace

5. What are the situations where working at height is necessary in residential building repair and maintenance works?

Chow: Most flats in Hong Kong are developed upwards, whether it is estates or old flats that are 40-50 years old with possibly 7, 8 or 12 storeys. Activities requiring working at height include roof water leakage and exterior walls being loose. For all components there are maintenance plans, for example for roofs their lifetime is probably fifteen years, so after this time there will be monitor checks, small and large maintenance works, obviously will not leave it to be unrepairable. For walls it is usually seven years, scaffolding will be used to repair loose bits, repaint or replace tiles. So in our case loose bits falling off is rare compared to buildings with no estate management. For larger projects we will outsource the jobs. Gondolas are often used, if they cannot be used scaffolding will be.

Albert: So scaffolding is more preferable?

Chow: For more extensive work yes as gondolas tend to swing. Steel scaffolding is used even less, because it's more expensive and heavy. For civil works maybe more common, but the overall use is not popular in Hong Kong. The advantages of bamboo scaffolding is that it is light and can be tied with nylon string, but for steel scaffolding there are bolts, screws etc. which is more of a hassle.

Albert: But the use is popular in the mainland.

Chow: That is due to cultural differences. Bamboo scaffolding needs to be replaced after some usage as the quality is degraded by splits and holes. But for minor maintenance works bamboo scaffolding is still advantageous.

Daniel: Is scaffolding used for painting works?

Chow: Basically anything above 2m scaffolding is required. If it is just for painting gondolas can be used, but for installations and concrete rework then gondolas are not as suitable. It is better for these works that the workers have a more solid platform to stand on. The cost is similar. Regular 'planned maintenance' is undertaken by HKHS.

6. What do you think are the root causes of accidents in residential building repair and maintenance works?

Daniel: Why 'fall from height'?

Chow: Unknowledgeable, frustration, bad habits and over confidence. For example, safety belts, footwear and hats are not used and ladders are not properly fixed. Therefore proper housekeeping is required, the workers need to be taught, and equipment should be checked periodically to ensure safeness. The main cause is the workers' own awareness towards safety.

7. Can you suggest some measures to reduce fall related construction accidents for repair and maintenance works?

Chow: Step1 is to avoid risk for example use scaffolding instead of ladder even if the job can possibly be done using ladder. Step 2 is to prevent fall for example provide safety belt, guard rail and lifeline. Step 3 is to mitigate the injury consequence of fall by for example safety nets.

Albert: Any designs for working at height?

Chow: Previously considered fixing gondolas ready for use. This is alright for commercial buildings, but for residential buildings often the roof is used for other things and also before each usage the gondolas need to be inspected, the person lowering the gondola also needs to be trained. Therefore this idea was impracticable, as it is unknown when they will be needed, especially in new flats where there should supposedly be no major problems. Initial capital cost and maintenance cost are high and may not compensate for several times usage. Other steps which are used include appropriate supervision, hoping that they carry out their work in a safe manner. Aware of emergency rescue techniques, for example gondola can be blown to wrong position in bad weather. Gondolas are hence not as popular as affected by the location wind speed very much.

Practical solutions to construction safety for working at height

8. How can you increase the awareness of construction workers towards safety for working at height in maintenance works?

Chow: The most practical method is via training to uplift their self awareness and knowledge. Also use inspections, workers are sacked if they don't follow the safety rules, as it is possible that the worker is not only putting his own life at risk but others as well. Whenever a problem arises we will investigate further and demonstrate corrective action to prevent reoccurrence. On site there are safety officers, safety advisors and safety supervisors to oversee the buildings (they also receive periodical safety training). Others include Quality Circle and Excellence Circle.

Daniel: Do you participate in any competitions?

Chow: Yes, ones relating to safety, e.g. organized by OSHC. Competitions include answer and question types and performing role plays.

Daniel: Any bonus schemes for workers?

Chow: Counted in performance assessment scheme.

Daniel: Any competitions between estates?

Chow: Only participate in external corporate competitions.

9. What do you think are the cost-effective and user-friendly technological solutions?

Answered in question 3.

10. Do you find legal controls effective in maintaining a safe workplace? Why/Why not?

Chow: Cannot think what legislation needs to be improved? It is already proper to employ RGBC for maintenance works.

Albert: Any suggestions on the minor works legislation, e.g. registration system for minor works contractors?

Chow: Supportive. Workers should be competent persons. The monitoring aspect involved is also beneficial. For larger organizations like the Housing Society it is easy for the Labour Department to monitor the safety practice. But for small projects there are no ways of knowing, often it is after the accidents that the Labour Department finds out. Interesting observation is that in Mainland China they have undercover neighbours watching works and reporting to the police station.

Roles of concerned parties in construction safety

11. What roles should the following parties play in safeguarding working at height for repair and maintenance works?

a. Client

Chow: Client should focus at design stage giving architects suggestions, i.e. design for safety, for example of installing guard rails surrounding the rooftop water tank. The client should play an interest in the safety aspects, for example by employing safety officers. Workers should be provided the necessary training and given warnings if repetitive safety errors arise.

b. User

Chow: The user (worker) should participate in the training provided and follow safety rules and instructions given.

c. Government

Chow: Cannot think of any suggestions to legislation, the existing ones seem to be quite detailed and complete already.

d. Contractor

Chow: Prepare programme of works, ensure that they are well planned, for example plan works so that all works requiring scaffolding are performed at the same time, rather than having to rebuild the scaffolding. Another problem is that different trades do not respect each other and often cause safety hazards to the opposition, for example a worker may saw away some of the scaffolding if it is an inconvenient place affecting his work progress. Ensure that safety measures are performed. Main contractor possesses the

responsibility as it is their duty to watch the works of the sub-contractors. If there is equipment or technologies which can be used, this would be more beneficial. The contractor should share most of the responsibility out of the ones listed here. Penalty due to malpractice in safety should be aggravated.

e. The general public

Chow: Not their problem. Should wear safety gear and be provided prevention aids such as safety nets and catch fans. They should be provided warning notices (Probably some misunderstanding that the general public is the same as the workers).

Daniel: Any safety accident statistics?

Chow: HKHS formally launched their safety and health management system in June 2004 including records of site accidents. A member of staff (safety advisor – Mr. Simon Ching) will contact Daniel for further discussion on the data collection.

Appendix 16 Minutes of interview dialogue with the Housing Authority

Interview with Housing Department Notes of Meeting on 15 July 2005 (Friday)

Participants:

Mr. B. Wong (Assistant Director (Estate Management) 2, HD)
Ir. Dr. Y.C. Lee (Senior Building Services Engineer / BSM, HD)
Mr. Danny P.M. Cheng (Senior Maintenance Surveyor / ND, HD)
Mr. C.K. Siu (Senior Maintenance Surveyor / SS, HD)
Mr. W.W. Fock (Senior Maintenance Surveyor / SD (Atg.), HD)
Dr. Edmond W.M. Lam (Postdoctoral Fellow, Research Team)
Miss Esther Cheung (Research Associate, Research Team)
Mr. Max C.K. Chan (Research Assistant, Research Team)

Venue:

Conference Room, 5/F., Block 2, Housing Department Headquarters

Time:

10:30 a.m. – 12:40 p.m.

Safety Issues

1. Mr. Fock informed the meeting that MASS was a tool used to measure the performance of term contractors. There was a MASS Working Group monitoring the operation of MASS itself. If the Group identified any room for improvement, they would submit the case to the Contractor Performance Review Committee - Maintenance (CPRCM) for necessary action. Computerization was one of the change items. Mr. Fock kindly agreed to let the Research Team to borrow a copy of the latest version of MASS. At this point, Mr. B. Wong reiterated that customer services were of utmost importance and, therefore, accorded the top priority. An increasing number of parties providing advice on this aspect included Estate Management Advisory Committees (EMACs), Mutual Aid Committee (MAC) chairmen and local representatives.

2. Mr. Fock briefed the meeting about the distribution of the assessment of works and management in MASS. He said that there were 50% works assessment and 50% management assessment. MASS scores were used to compare the overall performance of term contractors. Warning letters would be issued to those under-performed contractors. These letters were taken into account in calculating the overall scores. A Contract Appreciation System was in place whereby contractors were noted for their good performance. On the other hand, the performance review also studied feedback from the contract manager for evaluation purposes.

3. Mr. Fock outlined the weightings assigned to MASS. He observed that in both works and management assessments, the safety components accounted for roughly 10-15 percent of the total MASS scores. Mr. B. Wong added that although the weighting of safety was small and the influence on the overall MASS score might be insignificant, contractors must have immediate follow-up. Great importance was attached to safety components. If contractors failed to comply with the safety requirements, their position as a contractor would be greatly affected. Mr. Fock agreed to provide the Research Team a picture of the accident records for the 1995-2004 period, if available.

4. Meanwhile, the work assessment in MASS was made by technical staff. Before the scores were finalized, their supervisor would conduct a random check to ensure it was properly done. The management assessment part was handled by contract managers as well as project team members. Contractors would be able to participate in the assessment and they were informed of the results immediately. Furthermore, the MASS working group monitored closely with a view to identifying the need of a review.

5. Mr. B. Wong highlighted the main problems with the implementation of MASS: the difficulty in maintaining a consistent standard, constant up-dating, heavy work load, many complicated factors needed to be simplified, and enormous funding required. MASS, in his mind, was not yet a satisfactory enough system. It could be improved through regular reviews and external feedbacks. It is possible, too, that MASS could be used as an effective tool to help assess contractors, in a broadly indicative manner. But it could not, of course, be blindly relied on.

6. Mr. B. Wong believed that a scoring system alone was not enough to raise ones

safety consciousness. Its success relies largely on training, education and self-discipline. Adequate training to contractors, introduction of green card system, contractor's initiative to report accidents were imperative if the industry were prepared to reduce and partly prevent accidents from fall of person from height. In essence, it was hardly inappropriate to rely on MASS only to improve construction safety.

7. Mr. B. Wong reiterated, as was suggested earlier, that the prevention of construction accidents relied heavily on the control and monitoring by the Department's staff and contractor's initiatives and experience. Technology, the commitment of the Department to it was undoubted, needed close attention. No technological solutions could cure all diseases. Technology currently applied to workers at height included the arrest system, which was widely used for working around canopies, flyovers and buildings for cleaning, maintenance or waste collecting purposes. More specifically, it was desirable to prevent accidents at the design stage. Robots were considered in the past, but it did not achieve the desired cost effectiveness. Mr. B. Wong reminded that contractors must follow the safety plan to ensure the safety of their workers. The current practice was that contractors employed a safety manager or an officer to perform periodical safety audits and submit reports to the Department. They normally followed the rules laid out by other government departments.

8. Mr. Fock introduced the incentive of increasing the safety awareness of maintenance contractors. He disclosed that there was a 'pay for safety scheme' for district term contracts. The Pay was a monthly bonus offered to contractors if they had complied with the safety requirements within that month. Mr. B. Wong advised that contractors must cover safety components in pricing their contracts. In his view, there was no doubt that in implementing R&M works the safety of occupants was equally important as the safety of workers.

Appendix 17 Interview questions for the interview with the Buildings Department

Minutes of interview with task force member Mr. CM Tang

On the Construction Safety Involving Working at Height for Residential Building Repair
and Maintenance

6 April 2005; 9:55am – 10:55am

Office of Mr. C.M. Tang, Senior Structural Engineer, BSc(Eng), C(Eng), MStructE,
MHKIE; Buildings Department

1. Any databases / cases provided
2. Scale of the problem
3. Causes of the problem
4. Minor works contractor registration bill
5. Current contractor registration system
6. Licensing and site safety supervision plan
7. Comments on our suggested solution

Drafted by Edward CY YIU

6 April 2005

Appendix 18 Minutes of interview dialogue with the Buildings Department

Minutes of interview with task force member Mr. C.M. Tang and his colleagues

Mr. K.K. Tang, Ms. W.Y. Ng, Mr. S.M. Chow

On the project: Construction Safety Involving Working at Height for Residential Building
Repair and Maintenance

Date, Time and Venue: 28 July, 2005; 10:00a.m.-11:30a.m., Buildings Department

Presence (in alphabetic order):

Mr. Max Chan, Research Assistant, Department of Building and Real Estate, The Hong Kong Polytechnic University

Mr. S.M. Chow, Structural Engineer, Buildings Department

Ir Kwok W.K. Albert, Industrial Centre, The Hong Kong Polytechnic University

Ms. W.Y. Ng, Building Surveyor; Buildings Department

Mr. C.M. Tang, Senior Structural Engineer, BSc(Eng), C(Eng), MIStructE., MHKIE;
Buildings Department

Mr. K.K. Tang, Senior Structural Engineer; Buildings Department

Dr. C.Y. Yiu, Assistant Professor, Department of Building and Real Estate, The Hong Kong Polytechnic University (Tel. 2766 5877, email: bscyiu@polyu.edu.hk)

Minutes:

1. Control for Minor Works

Very often, minor works are carried out without getting prior approval and consent. The owners and the contractors may not well understand whether the works can be exempted from getting approval and consent or not. A minor works control proposal, as part of the Buildings (Amendment) Bill 2003, was tabled to the LegCo in the Year 2003-2004 but was eventually excluded from the Bill. A revised minor works control proposal was being prepared. Tentatively, three categories of minor works namely, Category 1,

Category 2 and Category 3, involving different levels of statutory control, would be designated.

Ms. Denise Ng would liaise with the legal section of Buildings Department to provide us with the some details of the proposed requirements for our research purpose.

2. Safety issue in the current Contractors Registration System

The requirements for registration as a registered contractor are set out in paragraph 8 of PNRC 38. Past records of non-performance of the applicants in the local building industry are one of the major aspects the Building Authority will consider in applications for inclusion, renewal, restoration and change or addition of key personnel. Relevant Government Departments would provide the required data in assessing contractor's performance. (see PNRC 38)

The requirements for renewal of registration of registered contractors are set out at Appendix J of PNRC 38.

Mr. S.M. Chow would help provide statistical data of the percentage of contractors who are required to sit for an interview in the renewal of license.

Appendix 19 Minutes of interview dialogue with Occupational Safety and Health Council

Construction Safety involving Working at Height for Residential Building Repair and Maintenance

Notes of the Occupational Safety and Health Council visit on 10th August 2005 (Wednesday)

Present: PolyU- Albert CHAN
 Esther CHEUNG
 Max CHAN
 OSHC - Wah Shing TANG
 Jason WONG
Venue: Meeting Room, Occupational Safety and Health Council, 19/F,
 China United Centre, 28 Marble Road, North Point.
Time: 10:30 a.m. – 12:00 p.m.

The interview did not follow the flow of the preset question list fully but most of the items were addressed. The following was discussed in the meeting:

Project Background

Albert gave a brief introduction on the project indicating the progress of the research team. He mentioned that the interim report had been submitted, accident data had been collected from various departments, and statistical analysis, workshops and interviews were being carried out. As a result of the collected information a questionnaire would be derived.

Organisation Services and Publicity

Mr. Tang described the services provided by OSHC and the techniques used to promote safety. These include publicity by television, radio, leaflets and posters, education and training. There are two training centres one in Kwun Tong which is larger and another in North Point. The training centres are found to be more effective than the traditional lecture based method. Workers gain more knowledge from hands on experience. These services are mainly organised by OSHC alone. Continuous research is also carried out often by local universities.

No exact figures are given relating to the allocation of resources for the various industries. But Mr. Tang is sure that much work has been carried out to encourage construction safety. Mr. Tang gives an example by the construction safety day which is organized each year on 9th September. A main aspect on the day includes the safe working cycle competition, which looks at appropriate inspections and good housekeeping techniques.

Mr. Tang believes that each person involved in the project must share responsibility and not just the assigned safety officer's. This rule should be applied for all the industries. Often a safety and health committee which includes the employer, employees, external professionals and the government must all be involved to reach decisions.

Traditionally it has been the employers who have paid for their employees to attend safety courses, this has accounted for approximately 90%. In recent years there has been a drop to approximately 80%. These figures apply to all industries. The Works Bureau has encouraged employers to train their employees. Some people are now self-driven, for example there has been a rise in people learning to drive the backhoe. As a result workers are hoping to achieve more skills with recognition to benefit their career prospects.

Albert asked whether the safety and skill aspects are taught separately.

Mr. Tang explained that the courses combine both natures.

Albert questioned the difference between courses offered by CITA.

Mr. Tang clarified that the courses offered by CITA are skill oriented. As the backhoe license is not an additional skill but compulsory for the driver the OSHC have the course.

Albert wondered if the OSHC only taught skills that are required by law.

Mr. Tang believes that the organization would not be able to function with only these courses. The organization favours searching for international practices which can be applied locally. For example, before safety management was enforced by law the OSHC had researched the practice from overseas and ran seminars and courses to promote the advantages. The safe working cycle is another item promoted by OSHC and believed to be beneficial to the local construction industry. The organization favours new developments and movements.

Albert questioned the differences between OSHC and the Labour Department.

Mr. Tang clarified that the Labour Department enforces the law. The OSHC also provides consultancy services which are charged for.

Albert has noticed advertisements promoting construction safety and asked Mr. Tang whether the organization is involved in these.

Mr. Tang informed that the two and a half minutes long advertisement on TVB channel at 7:30 p.m. is OSHC's. In addition there are advertisements on Radio 1 on Mondays, Radio 2, Metro radio, Commercial radio, Road Show on buses and advertisements on the MTR LCD monitors. The organization also develops teaching kits and vcds which are free to the public.

Organisation Resources

Albert questioned where the funding originated.

Mr. Tang clarified that there is no extra funding for these activities. The principal funding source of OSHC is from a levy system. Most training courses are income generating; OSHC organizes these courses for approximately 3000 people a year (for all industries). In addition there is income from conferences and consultancy services. Mr. Tang has found that workers searching for quality training will come to the OSHC but

elsewhere for recognition or certificates. The government has been known to use the OSHC as benchmarks.

Albert asked whether any of the OSHC courses are made mandatory by the Labour Department.

Mr. Tang believes that it is a free market and workers are allowed to choose what is suitable for them. If there are problems with the courses provided by the OSHC or other organizations, the government will consider regulating them. Much of the popular course materials can be downloaded from the OSHC website.

The OSHC have often financed small companies to encourage safety in the workplace. A recent project looked at confined spaces, and selective small companies were purchased gas testing equipment at \$10,000. Another project in line is to subsidise ladders which are safe to use, as figures shown by the Architectural Services Department have shown a large proportion of accidents related to the use of ladders.

Mr. Tang believes that most responsibility should be the contractors. As the contractor possesses the largest authority on-site, so he should also take the largest responsibility on all matters. Most of the incontrollable accidents happen on small construction sites.

Differences between the Public and Private Sector

Albert pointed out that there are more accidents in maintenance works compared to new works. As for new works, the contractors must perform a good safety record in order to get the job in the first place.

Mr. Tang very much agreed. On the construction safety day the larger companies will participate and compete for awards to achieve recognition in the industry.

Albert stated that the private sector possesses more problems than the public sector.

Mr. Tang believes that workers of both sectors must have green cards, indicating some knowledge of construction safety.

Albert agreed that this is the case but very often some ordinary household employers are unaware to check the workers for any type of safety competence.

Mr. Tang believes that the recent failures in scaffolding supported by the steel supporting frame, is a result of the situation raised by Albert.

Albert indicated that the difficulty with the private sector is that often jobs are not reported to the Labour Department hence there are no inspections and the jobs are often completed with a matter of days.

Mr. Tang suggested that due to the numerous numbers of tall buildings in Hong Kong, construction design management could help prevent fall from height accidents. For example, it is common for tall buildings in Japan to include working platforms for repair and maintenance at the design stage.

Albert's concern is that the public in Hong Kong are conscious about security.

Mr. Tang has noticed that the problem of old buildings lie in the areas Mong Kok and Sham Shui Po. He believes that it would be impossible to stop the individual workers or small contractors as it will be a matter of time before they protest against all the jobs going to the larger contractors. In addition there are many faults related to the steel supporting frame, these include the uniformity and standard, as it is possible to buy the frames in local shops. Mr. Tang suggested that to reduce fall from height accidents research is needed in the areas of safety equipment and bamboo scaffolding.

Research and Laboratory Testing

An important problem is that there are walls of different conditions and materials, so it is very difficult to use the same guidelines for scaffolding, hence the OSHC have asked HKUST to perform laboratory tests to compare the difference of walls made using different materials such as brick and concrete and compare the effect of the scaffold loading.

Albert believes that there is difficulty installing the screws of the steel supporting frame on different wall conditions and materials.

Mr. Tang suggested that research could be carried out to redesign the steel supporting frame. And maybe apply the frame above the scaffold rather than below to reduce the difficulty of installation and hence proper installation would reduce accidents.

Albert understands that the steel supporting frame is quite unique in Hong Kong. And maybe international practices could also be adopted in replacement.

Practical Solutions

Mr. Tang has noticed the gondola being a favourite in maintenance and repair works, but the use of these are difficult in old buildings, as the owner of the roof may not permit workers to use it. Another problem is the individual safety belt, this will have to be installed on the roof or the wall, but these may also be owned privately and the owners may not want a hole in their wall or even a hole with repatch work. Often owners may be afraid of their liabilities if an accident occurs when using their territory. The OSHC have considered the possibility of a vertical pole where the safety belt could be attached. Simple engineering solutions are particularly important for small jobs.

Albert believes that drilling holes in building walls is difficult; there are often steel components or loose bits.

Mr. Tang knows that a company in Japan had a good working platform design, but they were unwilling to export their product. But it is not too difficult to reinvent the design locally.

Mr. Tang believes that the OSHC has always been a catalyst in new safety measures. In fact providing companies with safety shoes was a subsidised project these days safety boots have been accepted to be part of the normal routine.

Safety Behaviour in Hong Kong

Research carried out locally has actually found that the Hong Kong public is very educated in safety knowledge but whether they perform what they know is another matter. The local attitude is a social problem which is not easy to change. So in order to reduce accidents monitoring and inspection which are important aspects in the safe working cycle is vital. In Hong Kong unsafe conditions are no more a concern instead the focus is on unsafe acts. Safety management has been effective in reducing accidents in Hong Kong. The OSHC have tools adapted from Japan to teach companies safe behaviour and safe climate. Presently it is the larger companies that participate. Mr. Tang also believes

that Hong Kong's economy is proportional to safety if the economy is bad contractors are less likely to spend money on safety. Hong Kong is actually one of the leading countries in the world in terms of safety. For example the United Kingdom is adopting a 'passport' system for construction sites which is similar to our existing green card.

Although the Buildings department has a small works bill, the 'small' works indicated is actually quite large!

The OSHC holds a safe worker competition, where contractors are asked to nominate a frontline worker to participate, hopefully this will give frontline workers the encouragement from recognition. In addition there is also a project manager award.

Albert wondered if there are any measures such as surveys to evaluate the improvement to workers.

Mr. Tang hopes that this is carried out by the companies themselves. A previous study has shown that the public's view of occupational health and safety is ranked very low. The same survey showed that environmental issues were viewed to be more important. Since the 1970s there has been many improvements in safety, the OSHC were setup in the 1980s and has already seen vast movements. It has only been in recent years that workers rely on the steel supporting frame, the next move will be to use the frame properly and safely.

Albert indicated that the accident figures increase steeply when illegal migrants and the self-employed were included representing the majority of accidents.

Mr. Tang has seen similarities in other countries. The HSE website also shows similar trends in the United Kingdom.

Albert believes that maybe this has been due to low public awareness.

Mr. Tang said that the OSHC had already spent \$500,000 on safety talks to promote awareness.

While there are values in looking into international practices to replace the steel supporting frame could be useful.

Mr. Tang remarked that it may take a long while to convince the local authority to endorse these alternative working practices.

**Appendix 20 Minutes of interview dialogue with Hong Yip Service Company
Limited**

**Construction Safety Involving Working at Height
for Residential Building Repair and Maintenance
Notes of the 1st visit on 30 March 2005 (Wednesday) at 3:00p.m.**

Present: Daniel CHAN, Michael YAM, Albert KWOK, Edmond LAM, Mr. Bill MAN

Venue: Meeting Room, Hong Yip Service Company Ltd.

Time: 3:00p.m. – 4:30p.m.

The following was discussed in the meeting:

1. Daniel introduced the research team members to Bill. Bill said that the guidelines of their company were not limited to construction works, but also the overall safety management.
2. Bill stressed that prevention of accidents came from day-to-day patrolling. Safety officers were employed and risk management was applied to construction works and so the safety awareness can be enhanced to reduce accidents.
3. The accidents concerning fall from height were restricted to those associated with changing lamps and carpark painting. The large-scale maintenance work was out-sourced and so no records of accidents were found in the large-scale maintenance work.
4. Bill said that the company has statistical data on accidents from 1 Nov the former year to 31 Oct the next year. Most accidents came from the clients who changed windows or applied grouting on wall. He asserted that mostly minor accidents occurred in non-construction works. For large-scale maintenance works, most people are knowledgeable and so accidents are reduced.
5. Bill said that there are more than 300 sites managed by his company and 70% of the sites are residential. About 20,000 buildings are not managed by PM

- companies and the market share of Hong Yip is about 1/10. More than 5,000 staff was directly employed by the company and about 500 of them are engaged in construction works. Eighty-seven PM companies joined the Hong Kong Association of Property Management Companies Ltd. but in fact there are more than 200 PM companies in Hong Kong.
6. Three categories of construction works were classified by Hong Yip based on the contract sum (A: <50,000; B: 50,000 – 200,000; C: >200,000). It is easier to control the small-scale contractor works but not the large-scale ones due to sub-contracting and the company requested the large-scale contractors to submit safety plans in order to control them by the use of contracts. Bill believed that accidents can be reduced by the use of contracts and education on the public to increase their safety awareness. The top management level should be committed to safety and the company has raised the safety awareness of the contractors by holding “area competitions” (i.e., by district) in order to spread such awareness over the peer groups. The company has also carried out internal audits with the contractors and conducted site patrols.
 7. At the tender stage, the contractors were invited to prepare tender documents and propose safety plan for endorsement by the company. There was little innovative method for construction works involving working at height due to high cost.
 8. Different trades of works were classified by BD on minor works contractors but Bill pointed out that it is too complicated for the public to identify. It is necessary for the minor works contractors to attend training courses.
 9. Bill was kindly requested to provide details on the contractor lists for both small-scale and large-scale construction works. He was also requested to provide statistical data on accidents over the past 5 years that the company has kept records. It may take two week’s time for data collection. Moreover, Bill has kindly provided the research team with the basic guidelines on occupation health and safety and a toolkit. The research team gratefully thanks Bill for his contribution to the research project.

Appendix 21 Minutes of interview dialogue with Hang Yick Properties Management Limited and Well Born Real Estate Management Limited

Construction Safety involving Working at Height for Residential Building Repair and Maintenance

Notes of the Hang Yick Properties Management Limited and Well Born Real Estate Management Limited Visit on 23rd September 2005 (Friday)

Present: PolyU-Edmond LAM
Esther CHEUNG
Max CHAN
Hang Yick - Ellis Chi-ming IP
Winnie Wai-ling WONG
Alex Kar-keung LEUNG
Emily Wing-yan TAM
Kinson Cheuk-fai LO
Well Born - Kin-ip WONG
Venue: Meeting Room, Hang Yick Properties Management Limited,
21/F Well Tech Centre, 9 Pat Tat Street, San Po Kong, Kowloon
Time: 10:10 a.m. – 12:30 p.m.

The following was discussed in the meeting:

Safety practices and management

12. Please introduce your organization's safety practice/management system.

Mr. Leung explained that Hang Yick has not yet implemented the OHSAS 18000 system, but this will be the anticipated direction. Presently the company

adopts the Labour Department's code of practice with refinements to suit the company. As a result a safety management handbook has been derived covering fourteen elements in order to achieve occupational health and safety. The handbook is used for both in-house staff and contractors. This system began at the beginning of 2005. Mr. Leung further described that maintenance works carried out by contractors are monitored using a monthly assessment form by in-house staff.

Mr. Wong said that Well Born has already implemented the OHSAS 18001 management system and has working instructions guiding the staff when working at height.

Edmond requested for the accident numbers in repair and maintenance works for the in-house staff as well as the contractors employed. However, Mr. Ip pointed out that the management level does not state in their contracts that it is compulsory for contractors to report accidents. Obviously unless the accident is severe or fatal the estate management companies are unaware. Therefore, the number of accidents collected by the project management company cannot reflect the real picture of the actual number of accidents that occur on site. Both Mr. Wong and Mr. Leung agreed that there are no procedures to make contractors report accidents hence there are no records of accidents in year 04/05.

13. Are there any guidelines on preventing fall of person related construction accidents at your company?

Mr. Wong informed that Well Born has used the OHSAS 18001 system for three years. In addition there are safety guidelines provided to the workers, for example safety when working at height, safety when handling chemicals and precautions when working in a confined space. The contractors and sub-contractors are periodically monitored to check whether they have followed the necessary guidelines.

Mr. Leung described that Hang Yick also have similar guidelines distributed to workers. In addition workers are checked for their competence, licenses and certifications wherever possible.

Further to the guidelines Edmond questioned whether legislation in repair and maintenance works could improve safety.

Mr. Leung believes that legislation could help, but there is no need to identify legislation for repair and maintenance works separate from new works, instead legislation could target specific trades such as scaffolding which could be both new and repair works.

Edmond also wondered whether lessons could be learnt from previous accidents such as the San Po Kong one.

Mr. Leung explained that for Hang Yick employees there has always been skill training provided even before the San Po Kong accident, for example how to monitor contractors to build scaffolds.

Mr. Ip described that the more dangerous works are carried out not by the in-house staff but instead outsourced to contractors. The reason is because often dangerous works require a level of competence or skill which in-house staff may not possess. Hence in-house staffs often carry out the minor repair works and supervision duties. For example minor jobs such as erecting working platforms are carried out by in-house staff, but for larger and more skilful jobs such as erecting scaffold will be outsourced to contractors.

Mr. Wong pointed out that both companies encourage their employees to participate in seminars on safety and health organized by organizations such as OSHC.

Mr. Ip added that contractors are assessed by their safety record, competence for the job and recognition in the form of certifications and licenses. There is a large difference between construction companies and estate management companies, often for the latter there is not even a safety officer position as it is not compulsory by law. It is often only for government works that

this is necessary. Another major difference between the two types of companies is that estate management companies deal with projects with residents.

Edmond questioned whether the focus of estate management companies is mainly on the residents.

Mr. Ip responded that the companies look at the public areas. For small jobs in-house staff would carry out the works, but for the larger ones such as repairing the external wall the job will be outsourced. For the larger jobs it is often a consultant will also be employed to monitor the contractor.

Mr. Wong added that Well Born does not need to outsource many projects as most of their buildings are below ten years old hence less large repair and maintenance works are required.

14. Does your company adopt any advanced technology to improve safety for working at height?

Mr. Leung described that the hydraulic platform had recently been adopted. Often if manual labour is required for the construction of working platforms, human error needs to be encountered for, but using the hydraulic platform this is eliminated. The company that produces these products also has a certain level of quality assurance. But it is up to the end user whether they opt for this technology as they will be required to pay the costs involved. Often the end user will pay for the product but the estate management company will help maintain and use the product. The hydraulic platform can be purchased in a range of sizes for both outdoor and indoor works, but obviously for jobs that are too high these are outsourced to contractors.

Mr. Wong added that some hydraulic platforms can even be used inside lift lobbies.

Edmond queried whether traditional methods such as the use of ladders are still mainly adopted.

Mr. Leung believes that for some jobs ladders are required due to space limitation but the companies adopt the use of glass fibre ladders as suggested by

OSHC. These ladders are favoured as they have been tested to show the maximum loading that can be carried.

15. Are there any difficulties in implementing safety measures and procedures for working at height?

Mr. Wong said that some new employees may not have safety training previously, so he insists that all new employees must receive sufficient training to uplift their safety awareness. Often OSHC materials are adopted as education aids, an effective tool found has been to show workers examples of safe and unsafe scenarios with the effect of each. This way the workers can see a clearer picture and have a deeper impression.

Mr. Leung added that besides using training to uplift the workers' awareness the company also adopts poster and leaflets as reminders. In addition the employees are encouraged to participate in safety seminars organized by organizations such as the OSHC.

Edmond questioned whether the employees need to perform regular safety training, for example exercises before work as promoted by OSHC.

Mr. Wong believes that this type of training is not suitable for estate management companies as this may cause inconvenience to the residents who may be disturbed, but for construction sites this is different case as no outsiders are present.

Although daily exercises are not carried out, Mr. Leung informed that workers who need to perform heavy labour are asked to do some simple exercises and stretches beforehand.

Causes of fall related accidents at workplace

16. What are the situations where working at height is necessary in residential building repair and maintenance works?

Mr. Leung believes that works on the external wall such as changing pipes require working at height. Often for works at height these are carried out by using gondolas or scaffold. Gondolas are adopted for office buildings, when the walls are easily accessible with no obstructions and when the cost would be cheaper than erecting a scaffold.

Edmond questioned when working at height was necessary indoors.

Mr. Wong described that often it is for maintenance works of cleaning air filter of the air conditioning system and lighting replacement.

17. What do you think are the root causes of accidents in residential building repair and maintenance works?

Mr. Wong believes that the root causes are due to the workers' negligence, carelessness and bad habits from previous employments.

Mr. Leung expressed similar feelings that the root causes' are due to the workers' carelessness and laziness. It is a lot easier to monitor the safety performance of in-house staff, but when selecting contractors it is important to check their previous safety record, their competence for the job and any relevant licenses, often many employers select contractors just by their tender price which should not be the case.

Edmond questioned whether the safety awareness of workers is sufficient.

Mr. Wong insisted that regular training to continuously remind and raise the workers' safety awareness is required. In addition random inspections should be carried out to check that jobs are carried out according to the safety regulations stated by the company.

Edmond asked whether either company would have an award/penalty system for the contractors' safety performance.

Mr. Wong described that for Well Born contractors, they are assessed annually and if they do not qualify they will be bad listed from the projects.

Mr. Leung described that for Hang Yick they also have an annually assessment to monitor the contractors, but their day to day performance will also be taken into account. If contractors are spotted performing unsafe acts, they will be issued warning letters if the incident is minor, for severe cases the contractor will be asked to stop work immediately.

Edmond queried whether contractors have ever been bad listed due to unsafe behaviour.

Both Mr. Wong and Mr. Leung have seen contractors bad listed but for other reasons than unsafe behaviour.

Therefore Edmond wondered if safety is an important aspect in the assessment.

Both companies agreed that safety is an important aspect in the assessment.

18. Can you suggest some measures to reduce fall related construction accidents for repair and maintenance works?

Mr. Wong suggested using the appropriate protection equipment and clothing.

Whereas Mr. Leung suggested focusing on the continuous training and education of the workers, for example by utilizing seminars organized by the Labour Department and OSHC.

Edmond asked how accidents of the contractors can be reduced.

Mr. Leung explained that the normal procedure is for the safety officer to meet with the contractor to discuss the necessary measures and safety improvements which can be made. On the other hand the contractor can also ask to meet the safety officer to see what the estate management company can do to provide the necessary measures and environment required by the contractor.

Practical solutions to construction safety for working at height

19. How can you increase the awareness of construction workers towards safety for working at height in maintenance works?

From his experience Mr. Wong has found that OSHC have a set of materials showing examples of what would and wouldn't occur if safety measures are performed, these materials have been found to be a lot more effective towards raising the workers' awareness compared to the traditional lectures.

Edmond questioned which party the companies feel should motivate safety.

Mr. Leung believes that all parties should co-operate to push safety movements.

On the other hand, Mr. Wong feels that private companies maybe limited to resources and funding, so instead the government should take the lead to encourage private practitioners to participate.

20. What do you think are the cost-effective and user-friendly technological solutions?

Mr. Wong described that Well Born do not have many jobs that require working at very tall heights, so the use of the hydraulic platform has been found to be sufficient.

Mr. Leung also explained that the case at Hang Yick is similar they also use the hydraulic platform. In addition the workers should be provided with all the necessary protection equipment and clothing required.

Edmond brought up the suggestion of including anchor points at the design stage and whether permanent anchor points would be unappealing visually.

Mr. Wong feels that this will definitely benefit repair and maintenance works. But there is the consideration of who will pay.

Mr. Leung believes that the appearance of the anchor point is not a major concern as they can be easily camouflaged, but instead it is important to consider

whether the anchor points will actually be used and it must be ensured that there will be regular inspections to check that they are still safe to use.

**21. Do you find legal controls effective in maintaining a safe workplace?
Why/Why not?**

Edmond questioned whether issuing workers' with repair and maintenance work licenses would reduce fall from height accidents.

Mr. Leung agreed that this would be an improvement. In addition, he has been aware that the government has wanted to request minor works to be registered, but this movement has been delayed due to the feasibility, effectiveness, cost complications and implementation problems.

Roles of concerned parties in construction safety

22. What roles should the following parties play in safeguarding working at height for repair and maintenance works?

a. Client

Mr. Leung believes that clients often choose contractors dependent of their prices. For example the San Po Kong accident was probably a result of the low contract price that the client could only hire low skilled and lack of experience workers. This would be the only reason a job could be done at such a low price.

Mr. Wong agreed that clients should not only consider the contract price but also should consider the contractor's previous safety record.

b. User/Front-line worker

Mr. Leung suggested that the frontline worker should ensure that he has sufficient protection equipment and clothing. He should also be self motivated and participate in safety seminars to upgrade his safety knowledge whenever possible.

Mr. Wong said that they should concentrate more on the job and should not perform other chores such as smoking or talking on the phone whilst working at height.

c. Government

Mr. Wong encourages the government to provide more education to the public.

Mr. Leung still believes that all parties should share the efforts in improving safety, but as the private sector is often not motivated the government should take the lead.

d. Contractor

Mr. Wong thinks that the contractors should encourage workers to participate in safety seminars organized by the government or other organizations, even if it is during office hours.

Mr. Leung believes that it is important to assess the workers' ability before they are assigned a task and they should also be provided with the necessary personal protection equipment.

e. The general public

Again Mr. Wong reminded that it is important for clients of small jobs to be careful when selecting a contractor and not to choose only according to the lowest price. If the safety standard required by the public is raised, the performance standard of the contractor in safety should also be raised accordingly.

Mr. Leung encourages some type of system, certification or license to be established for contractors of minor works, this way the public can ask to see these as proof of their skill as well as safety competence.

The research team thanked Mr. Ip and his colleagues for their efforts in the interview. Mr. Leung provided the research team with information on the hydraulic platform, and would further forward the guidelines distributed to the workers at Hang Yick for working at height. Mr. Wong will also provide the safety guidelines used at Well Born.

Appendix 22 Minutes of interview dialogue with Synergis Holdings Limited

Construction Safety involving Working at Height for Residential Building Repair and Maintenance

Notes of the Synergis Holdings Limited visit on 8th November 2005 (Tuesday)

Present: PolyU- Albert CHAN
Esther CHEUNG
Synergis – C. H. FAN

Venue: Meeting Room, 3/F, 107-109 Synergis Centre, Wai Yip Street,
Kwun Tong, Kowloon

Time: 10:00 – 11:00 a.m.

The following was discussed in the meeting:

Mr. Fan briefly introduced that Synergis dealt with three areas: construction, public facility management and investment.

Albert introduced CII, previous CII funded research projects such as partnering and healthy buildings, the current project, accident statistics, the reasons behind pursuing this project and the task force members involved in this project.

Mr. Fan informed that Synergis runs a health and safety system. It is the responsibility of the registered safety officer to promote the system to colleagues. The safety officer will also periodically monitor that jobs are carried out safely such as repair and maintenance works and cleaning chores.

More unique is that Synergis has a Centre of Excellence which is in charge of refining and creating designs for products and processes. Initially the company found that employees would come up with worthy solutions but there was a need for refinement hence the establishment of the Centre of Excellence. The Centre is governed by a chairman who will assign the tasks to the relevant expert colleagues. The advantage of

this Centre is that once the product or process is recognized by the Centre the whole company will utilize the product or process. Whereas before an invention may be kept in only one department only. Mr. Fan gave examples of these in-house products in the 'Synergis Annual Report 2004/2005'. Of particular relevance to this project is a device called the 'Safety Railing Cart'. This device provides the worker with protection from fall by a surrounding fence, although the device is simple, it is also handy and convenient to use, it moves by rollers hence is simple to use.

In addition, the safety officers will produce a monthly report submitted to the management. Mr. Fan offered to supply the research team with statistics of the accident numbers from Synergis contracts. Besides the monthly reports there is also an opportunity on a monthly basis for project managers, safety officers and the management to meet and discuss safety and health problems and new legislation or code of practices. The safety officer will use a safety and health checklist to monitor and identify areas where risk can be minimized. Before commencement of a project the safety officer will be provided guidelines and checklists to ensure that the contractor has prepared the necessary health and safety measures insisted by Synergis. Mr. Fan would kindly supply the research team with these checklists after the meeting. The safety officer will also check that the contractor has purchased relevant insurance to protect the workers. Synergis will also encourage contractors to provide the individual tenants sufficient information relating to the works being carried out.

Albert queried how the awareness of individual tenants could be uplifted.

Mr. Fan answered that the normal practice is to provide individual tenants information via notice boards and advertisements such as posters. The information should include clear instructions to how they could help prevent risks. Mr. Fan expressed his concern on small repair and maintenance jobs.

Albert agreed that individual tenants were the largest concern. To minimize the risks there must be a way to detect when the individual tenant will hire a contractor, increase the safety knowledge and awareness of the individual tenant and to provide them continuous advice.

Mr. Fan felt that property management companies could help monitor the contractors but there is more the government could do such as in publicity and education.

Albert questioned how to monitor works that requires a truss-out scaffold.

Mr. Fan believed that it is a lot easier to keep record of external repair and maintenance works as Synergis requires these contractors to request for permission before commencement of the job. If the contractor wishes to erect a truss-out scaffold they need to submit plans detailing the scaffold location as well as the erection and dismantling methods to Synergis. Staff will then be assigned to monitor that the works are performed safely and accordingly.

Mr. Fan informed that a few years ago CityU produced a 'Best Practice in Property Management' report. The report has been useful to the industry as a guideline and the research team could consider a similar approach.

Albert realizes that many jobs are outsourced to contractors and hence queried how Synergis controlled the standard of their contractors.

Mr. Fan explained that the standard of their contractors were controlled and monitored by site inspection, the safety officer, safety checklists and meeting with contractors. If small problems are noted the contractors would be reminded verbally but if the problem is serious the work of the contractor would be seized immediately.

Albert further questioned the normal procedure when choosing contractors.

Mr. Fan explained that the contractors are assessed after each job they perform and their previous accident record is noted. All information related to the contractors is inputted into a self-developed piece of software which will carry out the contractor selection process. The software would generate five contractor choices based on their past performance, work category, workmanship, construction timing and safety and health. All these factors will have a score and the higher the score of the contractor the more likely it is for them to be generated. The management will be given five choices and from these choices it is usually based on cost that they will choose the contractor for the job.

Albert noticed the similarities to Housing Authority's MASS system that is used to monitor contractors.

Mr. Fan further elaborated that for each region there is a technical manager who will monitor the contractors. If for serious issues there is also the headquarter manager to tackle the task.

Albert asked whether accidents needed to be reported to Synergis or just kept within the contractors.

Mr. Fan believed that all accidents are noted by their colleagues and that the contractors must report all accidents as this will affect their assessment score.

Albert questioned the difficulties of preventing fall from height accidents.

Mr. Fan felt that for accidents the problem was down to the lack of safety awareness of the workers. Often protection equipment is available but workers will take convenience over safety and choose not to utilize them or to use them incorrectly. The contract price is also a determining factor, contractors will lower their prices to get the job but will sacrifice the price of workers to compensate for their loss.

Albert realized that there were property management methods to control health and safety, but wondered if there were any technical solutions, such as devices to replace the truss-out scaffold.

Mr. Fan believed that it would be impossible that there are no solutions, and believed it should be the people close to the job such as the contractor who would have the solutions.

Albert was impressed that Synergis handled both repair and maintenance work as well as property management, he questioned how Synergis made these two different departments work together.

Mr. Fan explained that repair and maintenance is part of property management. And that property management also includes the areas cleaning and security.

Mr. Fan has noticed that there is a small profit margin for repair and maintenance works, so often the contractors would not put so much thought in developing new devices or techniques to improve the job. It is possible that NGOs could help these small contractors develop some tools to lower the accident rate.

Albert explained that the research project has been soliciting views via workshops with supervisors and frontline workers. As a result of the views solicited a questionnaire has been developed. As the responses in the workshops were limited to the participant

numbers the views have not been representative, hence the questionnaire hopes to achieve a larger picture. Albert further requested Mr. Fan to help distribute 300 questionnaires to three levels of staff: management, supervisors and frontline workers. In addition the research team would like Mr. Fan to help organize a workshop with supervisors of Synergis contractors by the end of November.

Mr. Fan expressed his willingness to participate in distributing the questionnaire as well as organizing the workshop. In addition he also invited the research team to attend an in-house event called the 'Vision Day' on 26th November. The event is an annually event which will present some in-house tools and devices which have been used to tackle problems.

Albert thanked Mr. Fan for the informative meeting and Esther would contact Mr. Fan to follow up the discussed items.

**Appendix 23 Interview questions for the interview with Legislative
Councillor Mr. Chan Wai-Yip**

**Construction Safety Involving Working at Height for
Residential Building Repair and Maintenance**

Question list for interview with Mr. Albert Chan Wai Yip, LegCo

Provisions on safety legislation

1. Do you find current statutory control effective in maintaining a safe workplace in residential repair and maintenance projects, particularly on working at height? Why/Why not?
2. What other legislation/statutory control systems should be introduced to enhance its safety performance? What is your plan to introduce these systems? What kind of resistance would you anticipate in introducing these systems?
3. Building (Amendment) Bill for Minor Works Contractor Registration System was proposed in 2003-2004, what is your view to this amendment?
4. Similar to new private building construction works; do you think that the Government should enforce the submission of relevant documentation of minor works to BD for obtaining approval and consent before commencement of works?
5. Similar to new private building sector, the Government enacted the Buildings (Amendment) Ordinance in 1996 requiring the contractors, engineers and architects to prepare and submit a new form of document called the ‘Site Safety Supervision Plan (SSSP)’ for approval before any dangerous construction activities are permitted to be carried out. Should a similar supervision plan be extended to cover minor works as well?
6. What is your opinion on “Mandatory Building Inspection Scheme”, e.g. owner corporations should appoint Competent Person to inspect ageing buildings in every ten years and submit inspection reports to BD for record?

Safety management of fall related accidents (optional)

7. What do you think of the root causes of accidents in residential building repair and maintenance works?
8. Can you suggest some measures to reduce fall of person related construction accidents for repair and maintenance works?

**Appendix 24 Minutes of interview dialogue with Legislative Councillor Mr.
Chan Wai-Yip**

**Construction Safety involving Working at Height for
Residential Building Repair and Maintenance**

**Notes of the Interview with Mr. Chan Wai-yip Albert on 5th September 2005
(Monday)**

Present:

Mr. Albert Wai-yip CHAN

PolyU-Dr. Daniel CHAN

Dr. Edmond LAM

Miss Esther CHEUNG

Mr. Max CHAN

Venue: Meeting Room, LegCo Headquarters, Central, Hong Kong

Time: 9:00 a.m. – 10:00 p.m.

The following was discussed in the meeting:

A. Provisions on safety legislation

1. Do you find current statutory control effective in maintaining a safe workplace for workers in residential repair and maintenance projects, particularly on working at height? Why/Why not?

There is currently a licensing system and site supervision by safety supervisors. As there are fewer accidents in old building concrete repair and pipe brackets, the general public has placed little concern on old high-rise building maintenance.

There have been enough and effective statutory control for new construction works whereas insufficient if not no statutory control is exercised on residential repair and maintenance projects, particularly for working at height. The Buildings Department may issue demolition orders for demolition works. Several problems need to be fixed before imposing new legislations. How to define “minor works” has prompted a lot of criticisms and discrepancies in town, e.g. installation of door bell in village house, alteration of air-conditioner, etc. Owners’ Corporations also lack relevant legal and professional knowledge.

2. What other legislation/statutory control systems should be introduced to enhance its safety performance? What is your plan to introduce these systems? What kind of resistance would you anticipate in introducing these systems?

No one would object to statutory control but again it is difficult to define “minor works” such as addition of door bell, addition of clothes hanger in exempted house, etc.

There are many ways to control licensing and it is necessary to define the extent of control, e.g. installation of AC units by registered workers, replacement of exterior wall tiles. It should be made very clear of what is to be exempted from minor works.

Each private residential estate should appoint a property management company to look after and monitor day-to-day repair and maintenance. The introduction of Building Management and Maintenance Scheme (BMMS) by HKHS has proved very successful in assisting tenants in forming owners’ corporations and appointing property management companies for launching R&M works.

3. Building (Amendment) Bill for Minor Works Contractor Registration System was proposed in 2003-2004, what is your view to this amendment?

If we find difficult to define “minor works”, it is impossible to impose new legislations. The Minor Works Contractor Registration System is good in principle and nobody will object to this proposition. Tentatively, three categories of minor

works, namely, Category 1, Category 2 and Category 3 involving different levels of statutory control would be designated.

It is noted that there are currently some kinds of licensing systems for new works but no registration system for minor works, e.g. Contractors Registration System and Construction Workers Registration System depending on type of trade performed in town. There should be a control mechanism or licensing system for undertaking minor works as well.

4. Similar to new private building construction works, do you think that the Government should enforce the submission of relevant documentation of minor works to BD for obtaining approval and consent before commencement of works?

Legislations are not feasible at this moment as fundamental conditions are not mature enough. The Government is in lack of confidence and persistence. The introduction of resource centres is a waste of resources. It is not logical to employ liaison officers to give advice to the general public. The Government should employ lawyers or surveyors to provide professional advice as their monthly salary is comparable.

Not to be necessary, e.g. alteration of water pipes. Minor works may be monitored by implementing the construction workers registration system depending on the type and scope of works to be done.

5. Similar to new private building sector, the Government enacted the Buildings (Amendment) Ordinance in 1996 requiring the contractors, engineers and architects to prepare and submit a new form of document called the 'Site Safety Supervision Plan (SSSP)' for approval before any dangerous construction activities are permitted to be carried out. Should a similar supervision plan be extended to cover minor works as well?

There is no need to establish the control system. For example, submission is not necessary for the change of water pipe. It would create too much subsequent

workload. There is no need for approval of works like the maintenance of building external wall. It would become impossible to do it in this way.

If a safety officer is employed in every working procedure, the cost would be too high. We may define working at height as a dangerous trade. Working at height should be separated from general maintenance works for registration according to the level of danger encountered. A licensing system for workers working at height should be established and the whole working procedures should be supervised by licensed supervisors.

6. What is your opinion on 'Mandatory Building Inspection Scheme', e.g. owner corporations should appoint Competent Person to inspect ageing buildings in every seven years and submit inspection reports to BD for record?

Mandatory building inspection scheme seems to be reasonable but there are no owners' corporations to control the scheme and small owners are usually suppressed. The scheme cannot be launched without the formation of and support from owners' corporations.

The Buildings Department has issued a lot of orders against some building surveying practices that start business immediately even though the owners' corporations haven't appointed them for R&M works. As small owners are in lack of organization, some building surveying firms may charge them a higher price, e.g. from \$10,000 to \$35,000 for similar works. Moreover, the small owners do not have the legal rights to control the appointed consultants and contractors.

There is an existing control mechanism for new building works. But the existing supervision is not adequate for minor works even with the legislation in force. Illegal workers cause problems in site supervision. The Government should establish an effective control mechanism for monitoring minor works.

The Director of Home Affairs Office has authority to appoint a property management company according to the Deeds of Mutual Covenants. However, as time goes by, most property management companies have resigned as the profit of running property management companies is relatively low.

If there are more property management companies, there are better organizations to carry out inspection schemes towards buildings and legislation becomes useful. In the 1990s, the Home Affairs Office liaised with professional bodies to provide advice to small property owners on how to appoint AP and contractors with standard form of agreement.

B. Safety management of fall related accidents (optional)

7. What do you think of the root causes of accidents in residential building repair and maintenance works?

Illegal workers are the root cause of the problems. There can be a research to be carried out and can be related to the issue of a license. But there are in fact a lot of gray areas.

8. Can you suggest some measures to reduce fall of person related construction accidents for repair and maintenance works?

There have been a lot of opinions on this question for the past decade. The citizens have to bear the burden and to protect their interests. Regular site inspections by competent persons, prohibition on employing illegal immigrants and licensing/registration system for workers would be very useful. Licensed workers with professional status need less long-term supervision.

**Appendix 25 Minutes of interview dialogue with the Hong Kong Workers’
Health Centre**

**Construction Safety involving Working at Height for
Residential Building Repair and Maintenance**

**Notes of the Hong Kong Workers’ Health Centre Visit
on 18th August 2005 (Wednesday)**

Present: PolyU-Edmond LAM
 Esther CHEUNG
 Max CHAN
 HKWHC – Karen LO

Venue: Meeting Room, Hong Kong Workers’ Health Centre,
 Room 1429-1437, 14/F Beverley Commercial Centre,
 87-105 Chatham Road South, Tsimshatsui

Time: 10:00 – 11:00 a.m.

The following was discussed in the meeting:

Safety practices and management

**1. Please introduce the services that your organization provides relating to
construction safety for repair and maintenance works.**

There are no specific services for workers of repair and maintenance works, but instead cases are dealt with by trade. The construction industry represents approximately a third of the cases the Centre deals with, because injury in this trade often causes them not to be able to get back to their original job, so often they require help searching for a new job. The Centre does not deal with cases of death, it only deals with workers that are injured.

Often the workers' attitude is that they have been unlucky. Most injury cases in the construction industry are related to external works. Injuries caused inside buildings often are cases where the ceiling is very high and the agent involved in the accident is often ladders. In recent years there has been an increasing trend in the number of construction workers asking for help in various industries. Quite often the workers seek employment due to bad economy. In previous years when the economy was good, much work was available and fewer workers asked for help.

Services at the Centre include:

- Prevention – advertisement, education e.g. visits to construction sites, visits to restaurants where construction workers take their meal and are provided with safety information.
- Specialist help – Doctors and physiotherapists provide workers with free service. Social workers are available to help workers with mental and social problems.
- Community integration – Workers are given help to find employment.

There are three teams at the Tsimshatsui office and another team at the Sham Shui Po office to deal with health problems related to construction dust (pneumoconiosis) to help workers on rehabilitation.

Ways of communication with the practitioners:

- The Centre approaches the employers – especially for prevention services
- Employers approach the Centre – often after accidents to see how the Centre can help their workers
- Workers phone the Centre
- Workers visit the Centre

The Centre's funding originates from:

- Hong Kong Jockey Club & Community Chest
- Private donations

- Project funding from various government departments and charity organizations.

None of the funding is given by the government directly, as the government primarily supports the activities carried out by the OSHC and Labour Department. Still, there is communication between the Centre and the government.

The main difference between other similar worker organizations and the Centre is that the Centre is formed by a group of professionals including doctors, physiotherapists, ergonomic specialists, safety and health professionals, occupational health professionals and social workers. Other differences between the various workers' organizations and the Centre include:

- The Centre focuses on things that are more concrete.
- If there are items that the Centre feels important, it will try to get funding for it and assign employees to that area. For example, a recent project that the centre has focused on is to further investigate the views of workers in respect of health and safety rather than from their companies' points of view.
- Talks offered by the Centre usually involve the participation of frontline workers.
- The Centre does not focus on fighting for workers' compensation, but rather whether they can return to the society after physical or psychological injuries and find employment.

2. Which of these appears to be the most effective and welcomed?

It is difficult to comment on the most effectiveness of the service. When the Centre begins to solve a problem, many of the work done may not show obvious results immediately at first, since it takes time for results to be observed. The Centre involved in the establishment of OSHC. It hopes to convey a message to the government, workers and employers that it is important to take health and safety into more serious consideration.

3. How are your resources allocated for the various industries (e.g. construction, textiles, electrical and mechanical etc.)

The Centre's resources are split equally amongst different industry sectors and different services. It is comparatively easier to get project funding for helping workers to search for employment since this service is rather unique to the Centre.

The construction industry is a top priority of concern. The focus on other industries depends on whether the Centre has identified problems that other organizations have not. The main aim is that the Centre will motivate the Labour Department or OSHC to improve safety for workers by new services or design measures.

Causes of fall related accidents at workplace

4. What are the situations where working at height is necessary in residential building repair and maintenance works?

- Exterior wall repair works involving the use of scaffold or gondola.
- Roof maintenance.
- Removing illegal fixtures and flower brackets.

The Centre classifies the severity of accidents into minor or serious injuries.

However, the Centre did not maintain a complete record.

5. What do you think are the root causes of accidents in residential building repair and maintenance works?

Repair and maintenance works are usually seen as minor compared to new works. For new works there is usually a larger construction site with safety officers, safety management system and workers with green cards. The safety awareness of workers is generally low. They are not concerned with safety and their focus is on getting employment.

6. Can you suggest some measures to reduce fall related construction accidents for repair and maintenance works?

Legislation is readily available to control safety, but it is more important for a body to enforce and actually carry out the law. Especially minor works are harder for the Labour Department to control. Maybe a registration system for all repair and maintenance works would be effective as the Labour Department will be able to monitor them. A registration system could also eliminate illegal workers.

Practical solutions to construction safety for working at height

7. How can you increase the awareness of construction workers towards safety for working at height in maintenance works?

The Centre does not target at workers as they are the most difficult to tackle. Instead a registration system or some other enforcement system would be more effective. It takes a long time to change the attitude of the workers who are often forced to carry out safety.

The Centre has been training workers with previous accidents themselves to be health and safety officers. But the attitude between workers who have been injured and those who have not is very different. Those who have not been injured still think that it is a matter of chance.

Mrs. Lo claimed that OSHC focuses very much on protection equipment and puts the responsibility on the workers. The equipment designed is sometimes uncomfortable. The workers should be given the right to ask their employers for a safer environment and equipment in order to share the responsibility of safety between employers and employees.

8. What do you think are the cost-effective and user-friendly technological solutions?

No particular solutions. The safety of bamboo scaffolding has not been proved.

9. Do you find legal controls effective in maintaining a safe workplace? Why/Why not?

The legal controls as discussed previously are already well developed.

Workers' knowledge on safety is low. Usually they follow the normal practice adopted on site. For example, wearing safety hats and the green cards are well known mandatory requirements. It is difficult to inform workers of the legal controls for safety, as often they are not interested and there needs to be an effective way in familiarizing them with legal controls.

Roles of concerned parties in construction safety

10. What roles should the following parties play in safeguarding working at height for repair and maintenance works?

a. Client

The client would be able to provide more safety information, safety equipment and safety management if their knowledge in health and safety is comprehensive.

b. User

Mrs. Lo considered the user as either the flat occupant or the frontline worker. In the first case the flat occupant is also the customer. The customer therefore has the rights to request the workers to follow safety procedures and utilize safety equipment. Often flat occupants are unaware that they can ask the workers to perform health and safety measures. The main concern of flat occupants is usually the price of the job that they are charged for rather than whether the workers perform safely.

Mrs. Lo also discussed the role of frontline workers, who are claimed to have a large responsibility on safety. Often the frontline workers are blamed for not utilizing safety equipment and following safety measures, but some cases have shown that it is the contractor who does not provide the workers with the necessary equipment, guidelines and environment. And it is difficult for workers to speak up, and request for what they

should be entitled to in terms of safety. In fact, workers have the right to demand a safe working environment.

c. Government

The Labour Department can monitor works more frequently. Although many repair and maintenance works are difficult to keep track of, a specialist group to patrol old districts would alert workers of small jobs and help eliminate accidents.

The government should carry out more promotion in the public and education on specific tasks with clear safety procedures.

The government should also ensure that safety and health is a mandatory requirement when it gives out loans to companies for construction works. Enforcement is important to change the safety attitude of workers, and the government is the body who can perform the work most effectively.

d. Contractor

The contractor can provide a safe working environment, adequate safety equipment, correct safety procedures and frequent monitoring by competent staff, such as a site safety officer.

e. The general public

The public have less duty since they are not familiar with health and safety in construction. Even if there was an unsafe act they may not be able to spot it.

In addition, it would be useful if there is a special hotline available for the public to report to the Labour Department if they spot an unsafe act. A system similar to spotting smoky vehicles would be beneficial to eliminating risks taken especially in repair and maintenance works.

The research team thanked Mrs. Lo for her efforts in the interview. Mrs. Lo would provide the research team with data on the distribution of workers who approached the Centre for help from various industries over the past five years.

Appendix 26 Interview questions for the interview with Wui Loong
Scaffolding Works Company Limited

住宅樓宇維修及保養工程之高空工作安全研究 - 搭棚業問卷調查

受訪者資料

1. 閣下工作職位是甚麼?
2. 閣下從事棚業工作了多少年?
3. 閣下參與有關住宅樓宇維修及保養工程多少年?

公司守則

4. 請介紹貴公司有關防止高空下墜意外的指引.
5. 貴公司有沒有採用一些新科技改進高空工作安全?
6. 搭棚工程中，推行安全措施及程序時，有否遭遇到困難，困難為何？
7. 請畧述貴公司搭棚的檢查程序.

「狗臂架」式棚架的設計

8. 安裝及拆除狗臂架時有什麼考慮因素?
9. 閣下對狗臂架的設計和技術有什麼意見?
10. 在住宅樓宇維修及保養工作時建做及使用狗臂架的飛棚與傳統飛棚有什麼分別?

實際解決高空下墜意外的方法

11. 怎樣增加搭棚工在住宅樓宇維修及保養的安全意識?

12. 怎樣改善高空工作的安全措施?

13. 其他提議 : _____

立法及責任

14. 現行勞工處的竹棚守則對住宅樓宇維修及保養高空工作安全有否足夠監管?

15. 如需加強管制住宅樓宇維修及保養高空工作安全，你有什麼建議?

16. 什麼人仕對住宅樓宇維修及保養高空工作的安全應負上責任?

**Appendix 27 Minutes of interview dialogue with Wui Loong Scaffolding
Works Company Limited**

**住宅樓宇維修及保養工程之高空工作安全研究 - 搭棚業問卷調查記錄
2005 年 8 月 19 日(星期五)**

地點: 香港香港仔黃竹坑業興街 11 號南匯廣場 6 樓 601-6 室

時間: 下午 5 時至 6 時 30 分

香港理工大學建築及房地產學系: 任志浩

郭永強

張泳沁

陳俊傑

滙隆棚業有限公司: 劉錫根

馬世隆

受訪者資料

1.閣下工作職位是甚麼?

總工程監督。

2. 閣下從事棚業工作了多少年?

劉先生從大陸學師到現在已有 38 年的棚業經驗，有 26 年是在香港工作。起初劉先生受訓於飛棚工作，後來從事大型棚業工作，現在則負責管理工作。

3. 閣下參與有關住宅樓宇維修及保養工程多少年?

劉先生已往從事新工程工作，近 3 年來從事維修及保養工作。從他的經驗，他相信維修及保養工作比新工程更安全，原因是維修工程在舊樓進行，總有地方設置安全

帶，但新工程卻沒有地方設置安全措施，況且舊樓的層數較少，而工人較喜歡維修工程，因收錢較快。

公司守則

4. 請介紹貴公司有關防止高空下墜意外的指引。

馬先生說公司會因地盤而設計一套安全計劃，安全主任再會指導工人有關措施。大部份安全計劃有 80% 的相似，只有 20% 因地盤情況而改變。

劉先生舉例若在晚上工作，就必須加設照明，這樣就可提高安全程度。

5. 貴公司有沒有採用一些新科技改進高空工作安全？

馬先生介紹了爬棚，是由滙隆設計，並在內地製造，由電力操控，比傳統的較環保，及可改善公司形象。

劉先生相信爬棚可減少意外達到 1/1000，而在惡劣天氣下，爬棚比傳統竹棚更穩定，但缺點是成本高。

馬先生解釋，爬棚不需很多工人，但需更多操作人員。

劉先生說通常由顧客選擇用那種棚架。

6. 搭棚工程中，推行安全措施及程序時，有否遭遇到困難，困難為何？

劉先生認為執行安全程序是社會問題。澳門正面對廿年前香港的同一問題。本地工人很難接受改變，例如工人需要很久才接受強制性綠卡制度。滙隆現在聘用分判商及自己工友，發覺很難管理分判商，若分判商不滿意，他們就會結束工作而從事其他工程，而自己員工就容易管理，因他們害怕被解僱。大部份內部員工從事維修及保養工作，因分判商的標書不包括這些項目。劉先生解釋若要提高分判商的安全意識，就必需提高標書價錢，通常分判商收得好價錢，就會執行安全職責。

7. 請畧述貴公司搭棚的檢查程序。

劉先生說安全程序包括一般監察及檢查，安全主任會跟隨安全計劃去執行工作。

「狗臂架」式棚架的設計

8. 安裝及拆除狗臂架時有什麼考慮因素？

劉先生強調 80%的意外發生於維修及保養工作。雖然狗臂架容易安裝，但最大的問題是鏢絲，工人未必買合規格的鏢絲。況且他們自己燒狗臂架，沒有一定的標準。牆身的結構亦未必知道，因為 30 年及 40 年樓的結構不同，若釘在厚身的批盪上就一定發生危險，工人亦未必用安全帶。有一個意外，釘上三粒鏢絲也發生事故。官方亦未公佈有關數據，沒有人知道石屎硬度是多少及鏢絲應入牆的長度。根據經驗劉先生發覺給工人的安全指引及工地檢查不足才引指石屎被狗臂架拔出的例子。

9. 閣下對狗臂架的設計和技術有什麼意見？

劉先生相信狗臂架因為安裝快及方便可取代傳統的方法。但最大的問題是沒有政府指引，樓宇結構不清楚和鏢絲質素參差。意外通常發生在安裝或拆卸棚架的時候，而很少發生在棚架受力或在有人工作的時候。

馬先生強調若釘狗臂架在厚身的批盪上，鏢絲不一定入倒石屎牆就可能發生危險。

10. 在住宅樓宇維修及保養工作時建做及使用狗臂架的飛棚與傳統飛棚有什麼分別？

劉先生強調現時分判商在安裝棚架時，他們會自己燒狗臂架，因購買回來的質素很低及沒有政府標準。另一問題是鏢絲，Hilti 的價錢是一般爆炸鏢絲的四倍，工人未必買合規格的鏢絲。已往搭棚的技術比較困難，用大量的竹做支撐，用鏢絲打進牆身 4 至 5 吋深，鐵線會用來穿過竹心，最後會用更多竹來建做竹棚，傳統的建築方法比較安全，因為支持位較多令到倒塌的機會減少。

實際解決高空下墜意外的方法

11. 怎樣增加搭棚工在住宅樓宇維修及保養的安全意識？

劉先生強調合約價錢是一個主要因素，若價錢高，工人就願意提高安全責任。政府亦可加強管理小型維修保養工程及提高罰則，如管制不小心駕駛一樣。

12. 怎樣改善高空工作的安全措施？

劉先生對安全措施沒有甚麼意見，認為設計已經足夠。只是工人會否正確使用而已。

13. 其他提議：_____

劉先生察覺通常只有一人在飛棚工作，但他相信必須要兩個人同時工作，例如一個手持鐵架，另一人鑽孔。若合約價錢吸引就可能解決問題。

立法及責任

14. 現行勞工處的竹棚守則對住宅樓宇維修及保養高空工作安全有否足夠監管？

劉先生相信現行制度並不足夠，勞工署沒有提供指引，應該有鏢絲孔深及牆的規格。

15. 如需加強管制住宅樓宇維修及保養高空工作安全，你有什麼建議？

劉先生提出勞工署必須發出飛棚的許可證，否則工人會遭受檢控，這樣小業主就可受到保障。再者可考慮發出保養及維修棚架許可證，以修補現行條例的不足。還應增加合約造價來提高安全程度。

16. 什麼人仕對住宅樓宇維修及保養高空工作的安全應負上責任？

劉先生對這問題沒有評論。

在見面後研究小組感謝馬先生提供有關爬棚及滙隆的狗臂架及鏢絲指引。

Appendix 28 **Power point presented to participants of the focus group meeting with construction worker**



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



Construction Industry Institute
CIIR

住宅樓宇維修及保養工程時 高空工作的安全

座談會

香港理工大學
建築及房地產學系

香港建造業研究學會

1

2005年7月27日



DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產學系



DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產學系

建築業的工業意外

意外數目



Year	Number of Accidents
2000	11925
2001	9296
2002	6230
2003	4367
2004	3833

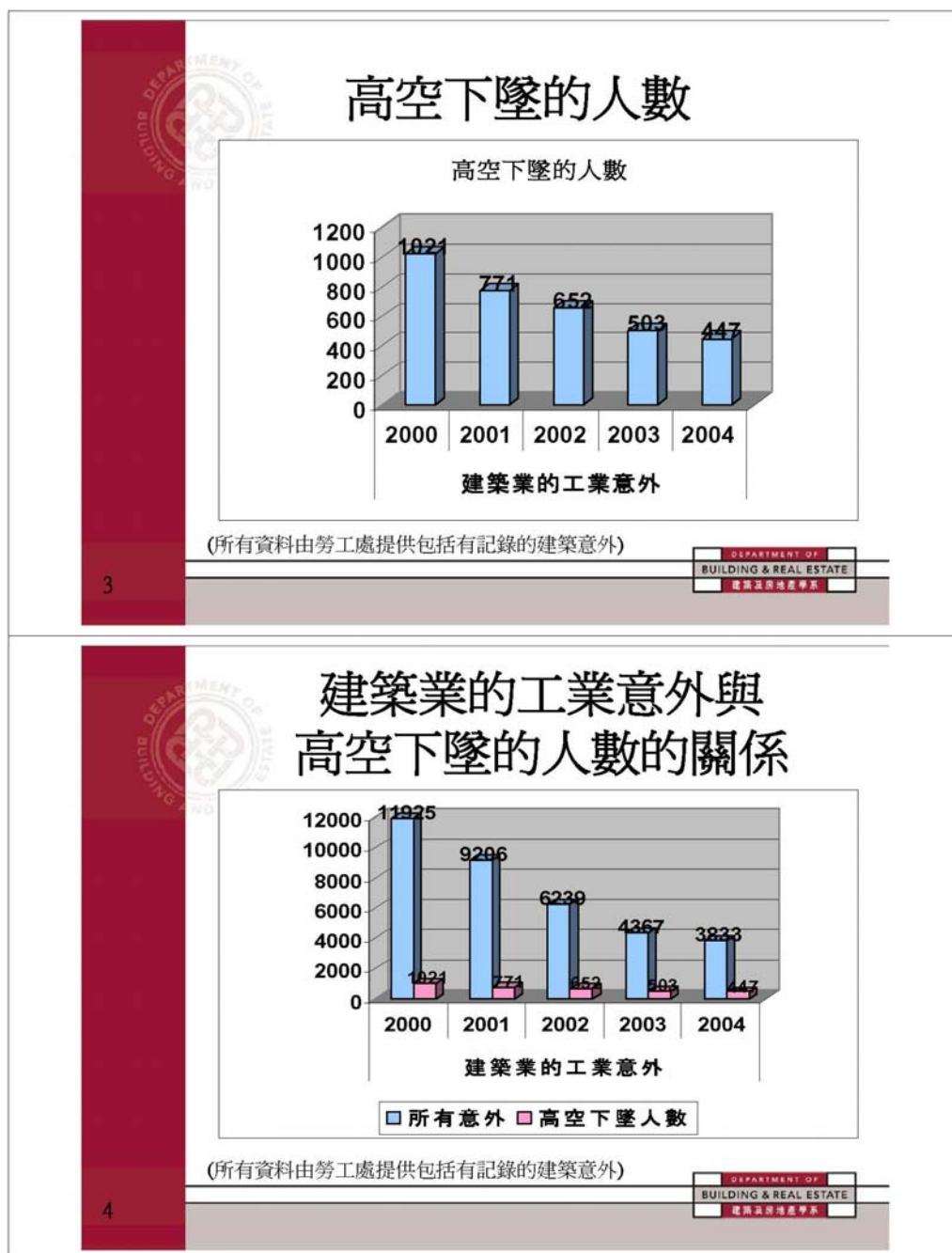
建築業的工業意外

(所有資料由勞工處提供包括有記錄的建築意外)

2



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高空下墜的人數與 所有意外人數的關係(非死亡)

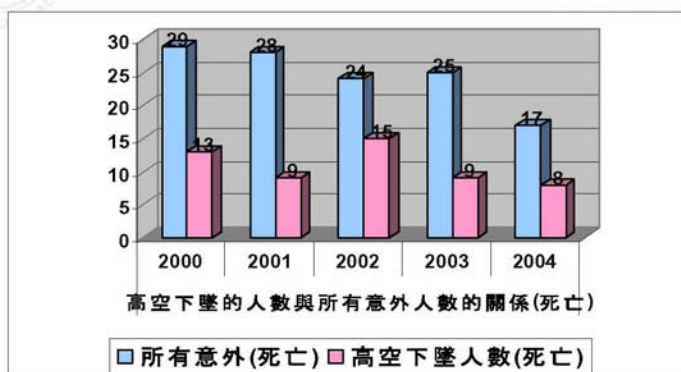


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5

高空下墜的人數與 所有意外人數的關係(死亡)

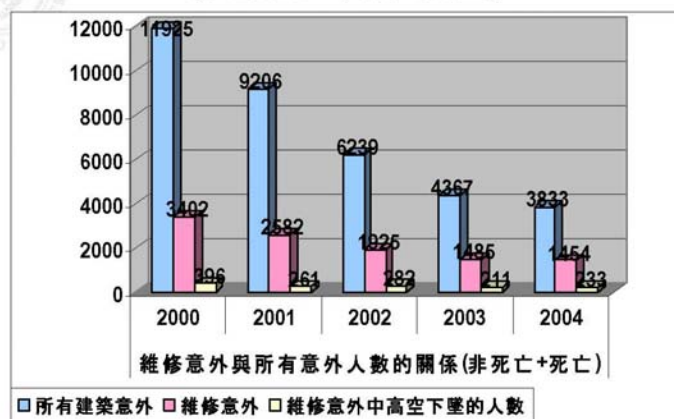


(所有資料由勞工處提供包括有記錄的建築意外)

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6

維修意外與所有意外人數的關係 (死亡+非死亡)

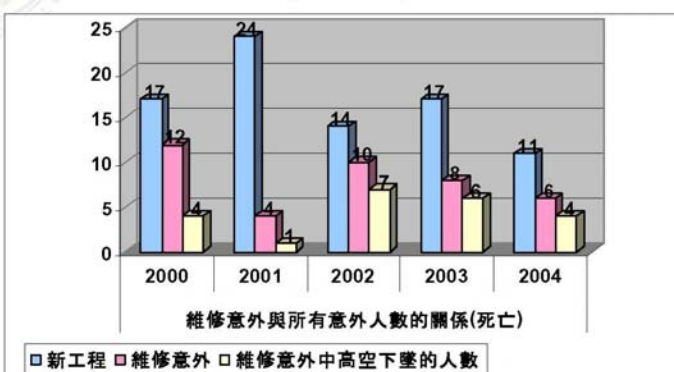


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(所有資料由勞工處提供包括有記錄的建築意外)

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維修意外與所有意外人數的關係 (死亡)

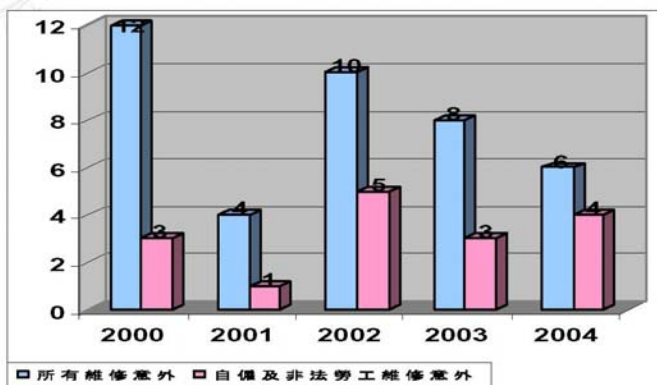


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(所有資料由勞工處提供包括有記錄的建築意外)

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維修意外與自僱及非法勞工維修意外的關係(死亡)

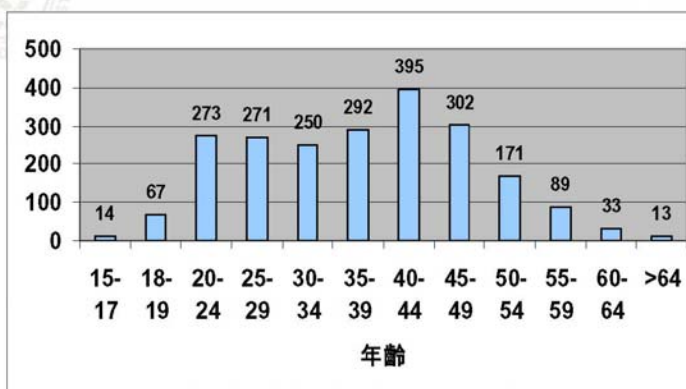


(所有資料由勞工處提供包括有記錄的建築意外)

9

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年齡分類 - 維修工程的工業意外



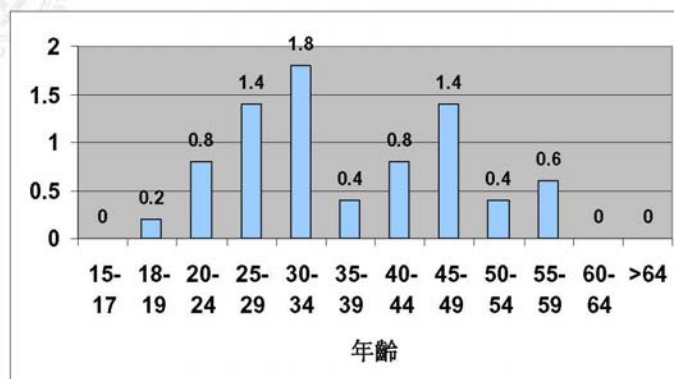
(所有資料由勞工處提供包括有記錄的建築意外)

10

(這圖片顯示2000-2004年的平均數值)

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年齡分類 - 維修工程意外的死亡



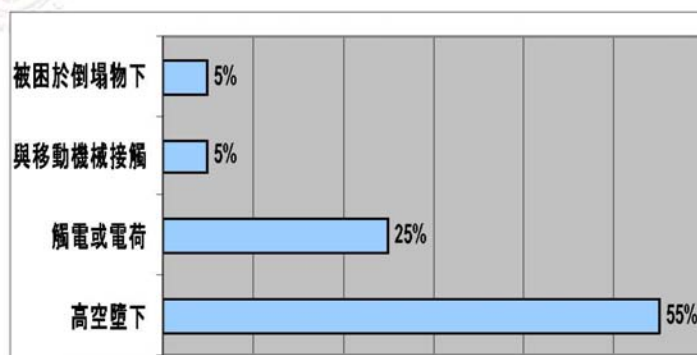
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11

有關維修及保養的最高致命意外原因



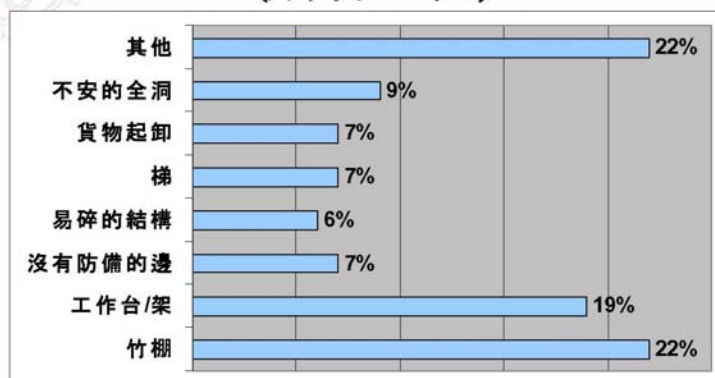
(所有資料由勞工處提供包括有記錄的建築意外)

(這圖片顯示2000-2004年的平均數值)

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12

媒介引致高空下墜死亡意外 (所有工程)



(所有資料由勞工處提供包括有記錄的建築意外)

(這圖片顯示2000-2004年的平均數值)

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13

媒介引致高空下墜死亡意外 (公共工程)



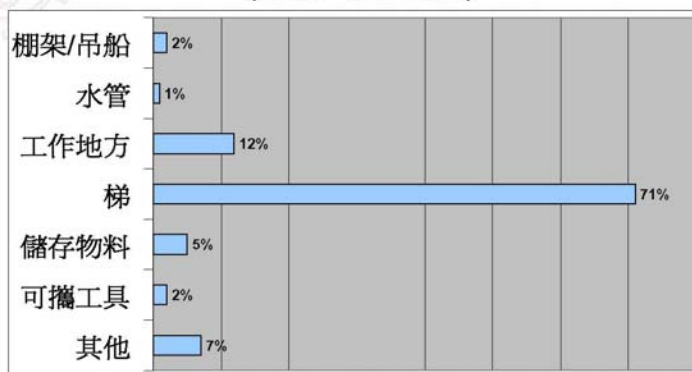
(所有資料由建築署提供只包括公共工程的建築意外)

(這圖片顯示2001-2004年的平均數值)

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14

媒介引致高空下墜意外 (公共工程)



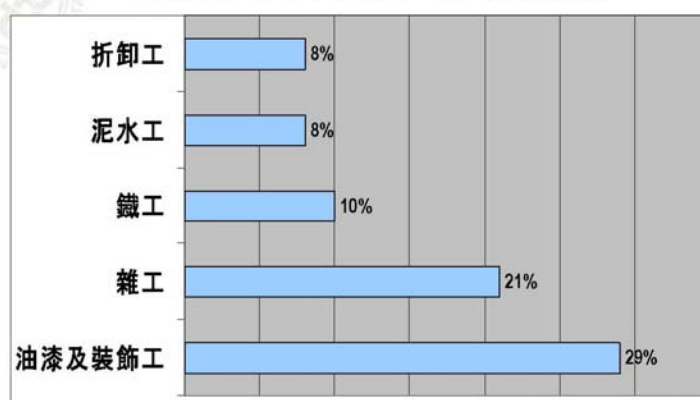
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(這圖片顯示1995-2004年的平均數值)

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15

高空下墜的工人類別



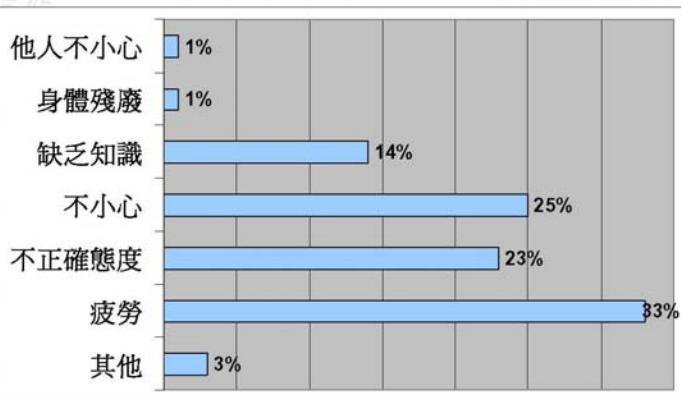
(所有資料由建築署提供只包括公共工程的建築意外)

(這圖片顯示1995-2004年的平均數值)

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16

個別因素引致高空下墜意外



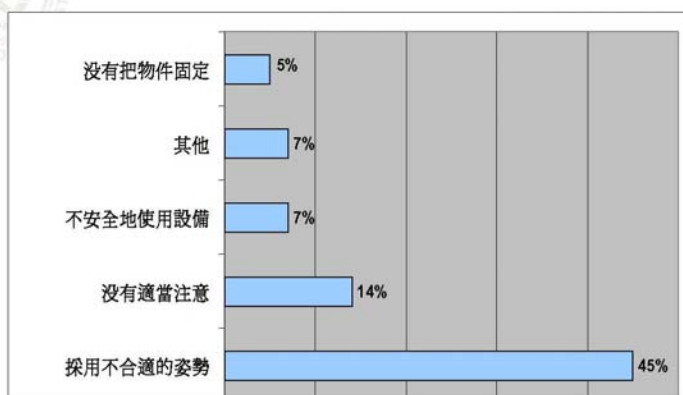
(所有資料由建築署提供只包括公共工程的建築意外)

(這圖片顯示1995-2004年的平均數值)

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17

不安全行動引致高空下墜意外



(所有資料由建築署提供只包括公共工程的建築意外)

(這圖片顯示1995-2004年的平均數值)

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不安全環境引致高空下墜意外

原因	百分比
不合適保護欄	6%
不合適衣著	7%
不充分工作空間	10%
不正當程序	11%
其他	22%
不安全工作程序	33%

(所有資料由建築署提供只包括公共工程的建築意外)

(這圖片顯示1995-2004年的平均數值)

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小組討論時間

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Appendix 29 Question list for focus group meeting with construction workers

香港理工大學建築及房地產學系和香港建造業研究學會聯合研究
住宅樓宇維修及保養工程時高空工作的安全座談會
討論項目

I. 受訪者資料

1. 請列出你所屬的工種: ☐ 油漆及裝飾工
 ☐ 拆卸工
 ☐ 竹棚工
 ☐ 金屬棚架工
 ☐ 幕牆工
 ☐ 水喉工
 ☐ 窗框工
 ☐ 架空電線技工
 ☐ 金屬模板裝嵌工
 ☐ 其他_____
2. 工作組別: ☐ 判頭
 ☐ 工人
 ☐ 其他_____
3. 在建造業之工作經驗 _____年

II. 建築署和勞工處工作意外調查結果的討論

4. 為何自僱及非法勞工佔了致命意外極高比率？(圖表 9)
5. 涉及最多意外的年齡組別是 40-44 之間，但最高死亡率的年齡組別則是 30-34 之間，兩者因何有差距？(圖表 10&11)

6. 為何人體高空下墜的致命意外佔了超過五成總致命意外的比率？(圖表 12)
7. 為何使用梯子，竹棚及工作台佔了接近五成人體高空下墜致命意外的比率？(圖表 13，14&15)
8. 為何油漆工及裝飾工佔了接近三成維修保養工程人體高空下墜的工種，而雜工則接近二成？(圖 16)

III. 高空工作意外發生的原因及其解決辦法

9. 甚麼是導致樓宇維修高空工作意外的根本原因？
10. 請說明高空工作的安全措施及程序。
11. 當履行高空工作安全措施及程序時，會遇到甚麼困難？
12. 如何能夠提高工人對高空工作的安全意識？
13. 請提出解決工人高空下墜的建議。

❧ 多謝閣下的意見 ❧

Appendix 30 Minutes taken at focus group meeting with construction workers

**Construction Safety involving Working at Height for
Residential Building Repair and Maintenance**

Notes of the Workshop on 27th July (Wednesday)

Venue: 4/F, On Yip Building, 395 Shanghai Street, Yau Ma Tei, Kowloon

Time: 8:00 p.m. – 10:20 p.m.

PolyU team members: Michael YAM

Daniel CHAN

Albert KWOK

Edmond LAM

Esther CHEUNG

Max CHAN

Construction Industry Employees General Union (CIEGU): Ming-Tung KAN

Kwok-Tseung CHENG

Kai CHO

The following was discussed in the workshop:

I. Information of participants

	Name	Contact No.	Type of Trade	Group
1	梁二常	90323549	Carpenter	1
2	陳健華	90318127	Carpenter	1
3	李發	91867388	Carpenter	1
4	鄭國檣	23886887	CIEGU	1
5	杜宇深	90311434	Carpenter Union	1
6	伍兆坤	90157106	Carpenter	1
7	王新德	98518661	Plasterer Union	1
8	范曉祥	90257928	Carpenter	2
9	謝利鴻	90934060	Painter	2
10	鐘銳輝	96061348	Decorator	2
11	何偉華	90332379	Labourer	2
12	馮志興	92182660	Decorator	2
13	曹楷	23886887	CIEGU	2

Group 1: Daniel, Max

Group 2: Albert, Esther

II. Discussion on the accident statistics sourced from LD and ASD

4. Why do self-employed and illegal migrants make up the highest proportion of fatalities? (Graph 9)
 - Self-employed workers are usually inadequate in equipment provision as finance is not enough. Besides, it is difficult to buy insurance from the company.
 - Self-employed are often very skilled so are over confident.

- Self-employed take up more jobs to increase their profits due to poor market. Jobs are often done quickly and carelessly, working hours are also often long. Self-employed are more likely to take risks to increase profit margins.
 - There are an increasing number of employees switching to self-employers to avoid MPF contribution.
 - The majority of illegal migrants have never received proper safety training. Many of them did not even work in the construction industry in the mainland.
 - Illegal migrants are often employed for repair and maintenance works as no skills are required just tough labour, hence more accidents occur in this area.
 - Government building sites should set an example by eliminating illegal migrants. Although 'green' card and ID card are checked at the entrance, illegal migrants often enter building sites via a back entrance.
5. Workers in the age group 40-44 years old are more likely to have accidents but the highest fatality figures fall in to the age group 30-34 years old, why is this? (Graphs 10&11)
- Workers between the ages of 40-44 years old have a heavier family burden, hence are always rushing their work to earn sufficient income in supporting their living.
 - Workers in the age group 40-44 are more mature and experienced therefore are less likely to take risks and have more safety awareness, their accidents are often minor ones only.
 - The age group 30-34 is physically the fittest hence they are always over confident and more likely to take risks.
6. What are the reasons that over fifty percent of the total fatalities a result of 'fall of person from height'? (Graph12)
- Whenever 'fall from height' occurs, the accident is always serious hence the fatality rate is also increased.
 - Most repair and maintenance works are at height, these often include works for external wall and removal of illegal fixtures.

7. Why are ladders, bamboo scaffolding and working platforms the agents that contribute almost fifty percent of the total fatalities? (Graphs 13, 14&15)

- The quality of ladders can vary depending on the type of wood. The quality is not as good as before hence the function of ladders fails easily when used excessively. In addition their weight is not enough for stability.
- Repair and maintenance works often use ladders for convenience, to save time and in order not to obstruct passer-bys. This is very different from new works, where often the job schedule is not as demanding, the area is more spacious and there are few people to obstruct.
- When painters have accidents the agent involved is usually ladders as this is a necessary tool for their job.
- Scaffolding often relies on the steel supporting frame. As there is no unique application technique and there are differences in application, it is easier for accidents to occur. Whenever there is a problem it is often fatal.
- Traditional scaffolders consider strength and stability, whereas recent years have seen young scaffolders lacking of experience and relying too much on the steel supporting frame. The safety consciousness of traditional scaffolders is much higher as they do not have anything to rely on but their own experience. As a result the traditional methods are lost and scaffolding accidents have increased.
- Most workers only apply two screws to the steel supporting frame rather than the demanded three. They believe that the third screw (the bottom one) is impossible to apply when working at height, and there would be more of a risk of falling if they insist. The design of the steel supporting frame should therefore consider realistic situations.
- Often there is lack of communication for example, the scaffolding may not be ready for use, but a worker may be using it already.

8. Thirty percent of ‘fall of person from height’ in repair and maintenance works are either painters or decorators, whereas twenty percent are labourers, why is this? (Graph 16)

- Insufficient labour resources to carry out a particular task.
- Over-tight programme of work
- Inadequate site supervision
- Many repair and maintenance works require painters and labourers for external wall repairs, hence these workers are more likely to get injured.

III. Reasons for ‘fall of person from height’ and practical solutions to prevent

9. What are the main reasons for ‘fall of person from height’?

- The tradition of ‘lower bid win’ bars the provision of adequate safety equipment and insurance to workers.
- No one is willing to make scaffold for safety provision as the profit margin is lowered (especially for minor works).
- Using scaffolds will lose face to most of the skilled workers, it is difficult to change the attitude of workers within a short period of time.
- Maintenance contracts are different in nature compared to new work contracts. Developers have money whereas small property owners are limited.
- The duration of maintenance contracts is relatively short and the attitude of government is not positive. The government should treat new works and maintenance works separately with different provisions.
- The figures in accident number may not be accurate as most minor accidents may not be reported to the Labour Department.
- Often only one rivet is used in assembling framework. Better quality rivets such as Hilti are not used due to higher cost.
- Workers are unaware that using rivets in old buildings the façade may detach.
- Workers of all trades try to cut back (cut corner) on safety to increase profits.
- Most commercial buildings only allow work to be carried out on Saturdays and

Sundays hence workers often rush work during these days and work overnight; lack of sleep and rest.

- Workers simply think that they can work without risk and not buy insurance (Bet their luck!).
- Supervisors cut out safety procedures without informing workers.
- Management aims for fast completion at the lowest cost and underestimates the risk involved.
- Workers are willing to risk their lives when the tender price is too low to cover the cost of the works.
- Workers always think that they can escape danger in work at height as the number of deaths is small.
- No one is willing to wear safety belt as it slows down work progress. Workers wearing safety belts may face pressure and discrimination from peers without.
- Unskilled workers are not aware of the danger on construction site.
- Lack of knowledge and training in safety; lack of site inspection
- Lack of time to get familiar with the working environment due to short programme of maintenance works
- Workers rely on steel supporting frames too much to support scaffolding, so when accidents occur it is usually serious.

10. What are the equipments and procedures adopted for working at height?

No comments.

11. What difficulties are faced when implementing safety procedures and equipments?

- The management simply recruits more safety officers when accidents are higher.
- Peer pressure and discrimination
- Lack of safety awareness by workers
- Difficult to install the lowest level of rivets while setting up a scaffolding working

platform at height

- Cannot separately install safety belt during repair and maintenance works.

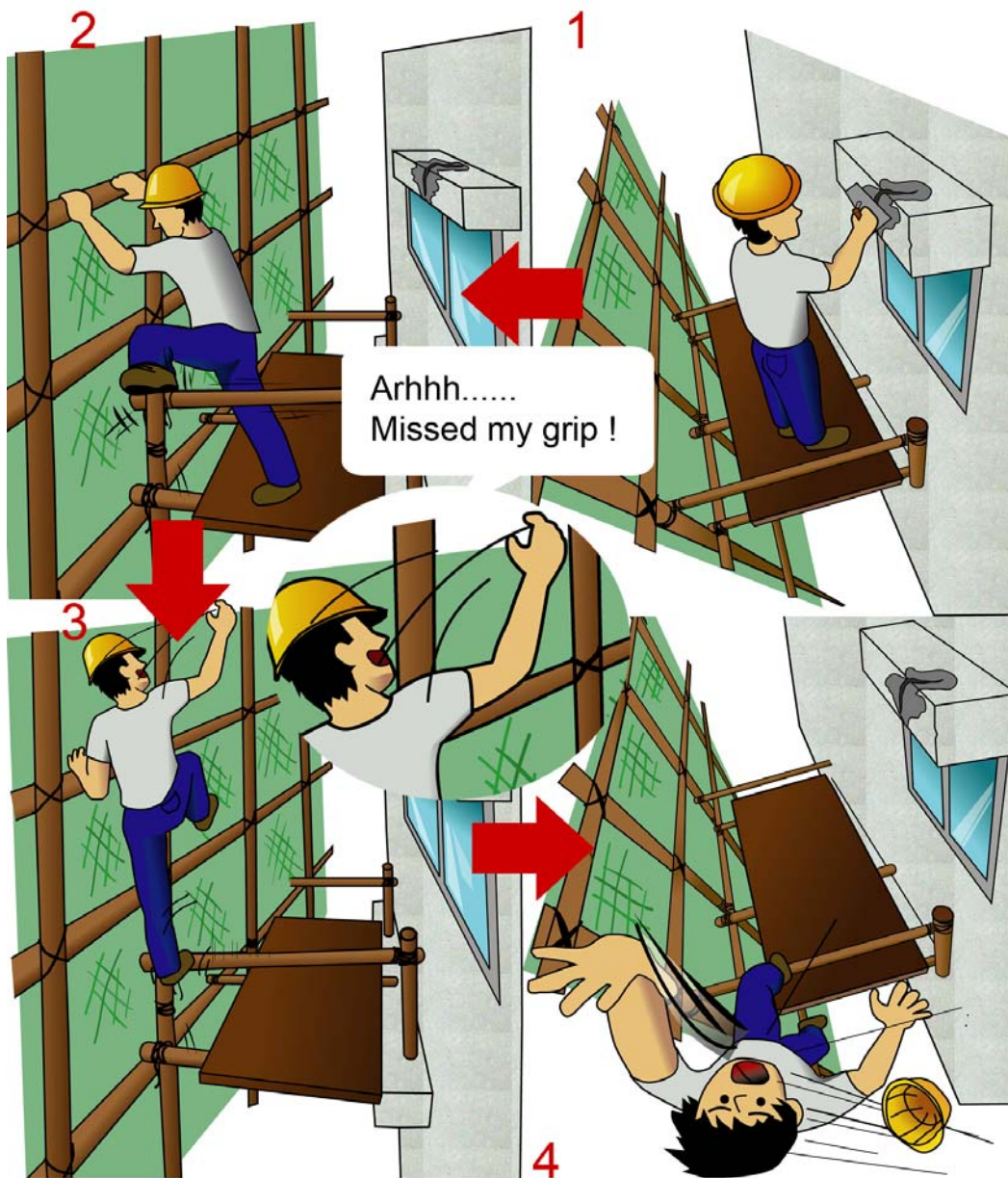
12. What ways are there to improve the workers' safety knowledge on working at height?

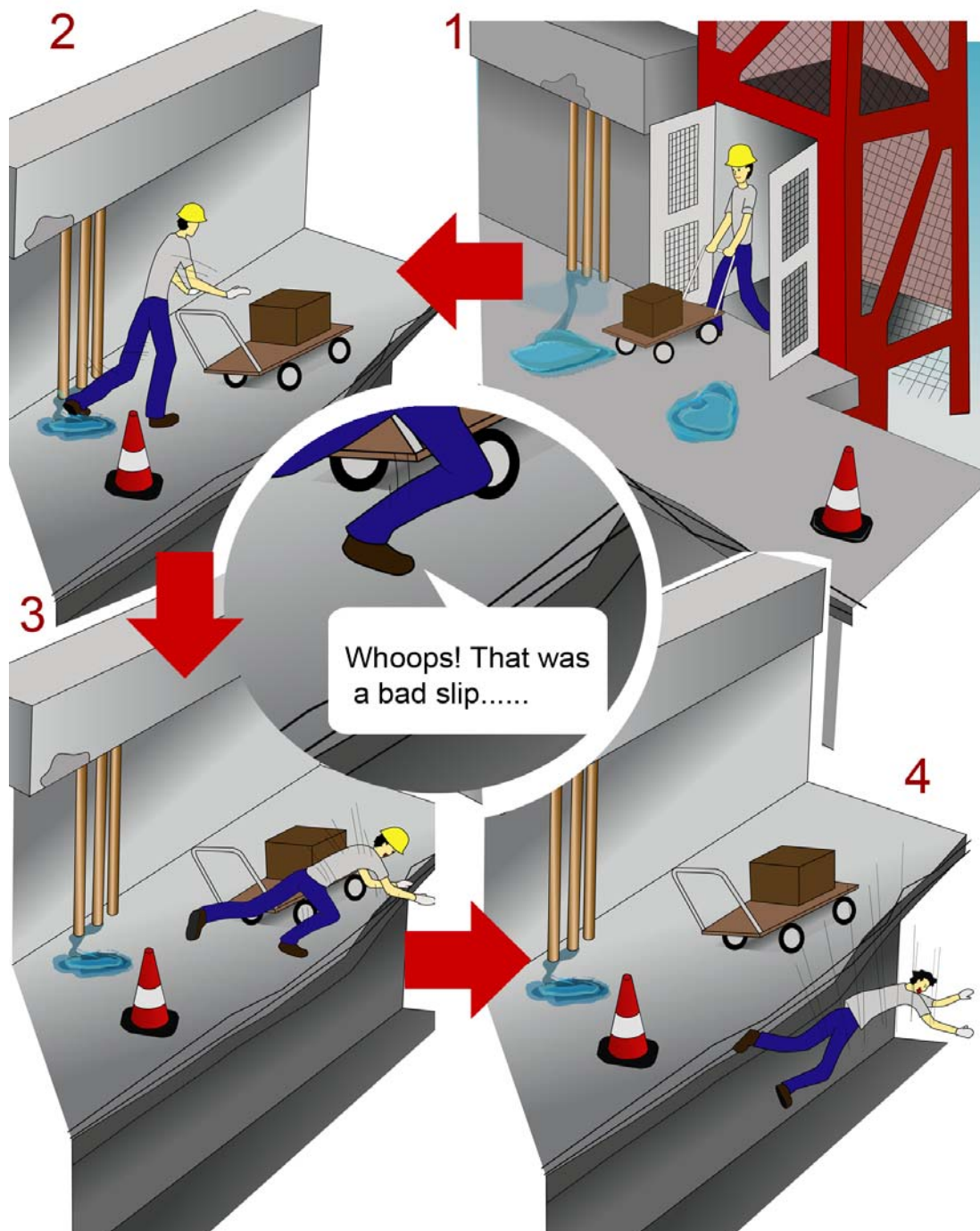
- Education and training should be provided to workers.
- Safety awareness can be increased by more education and training.

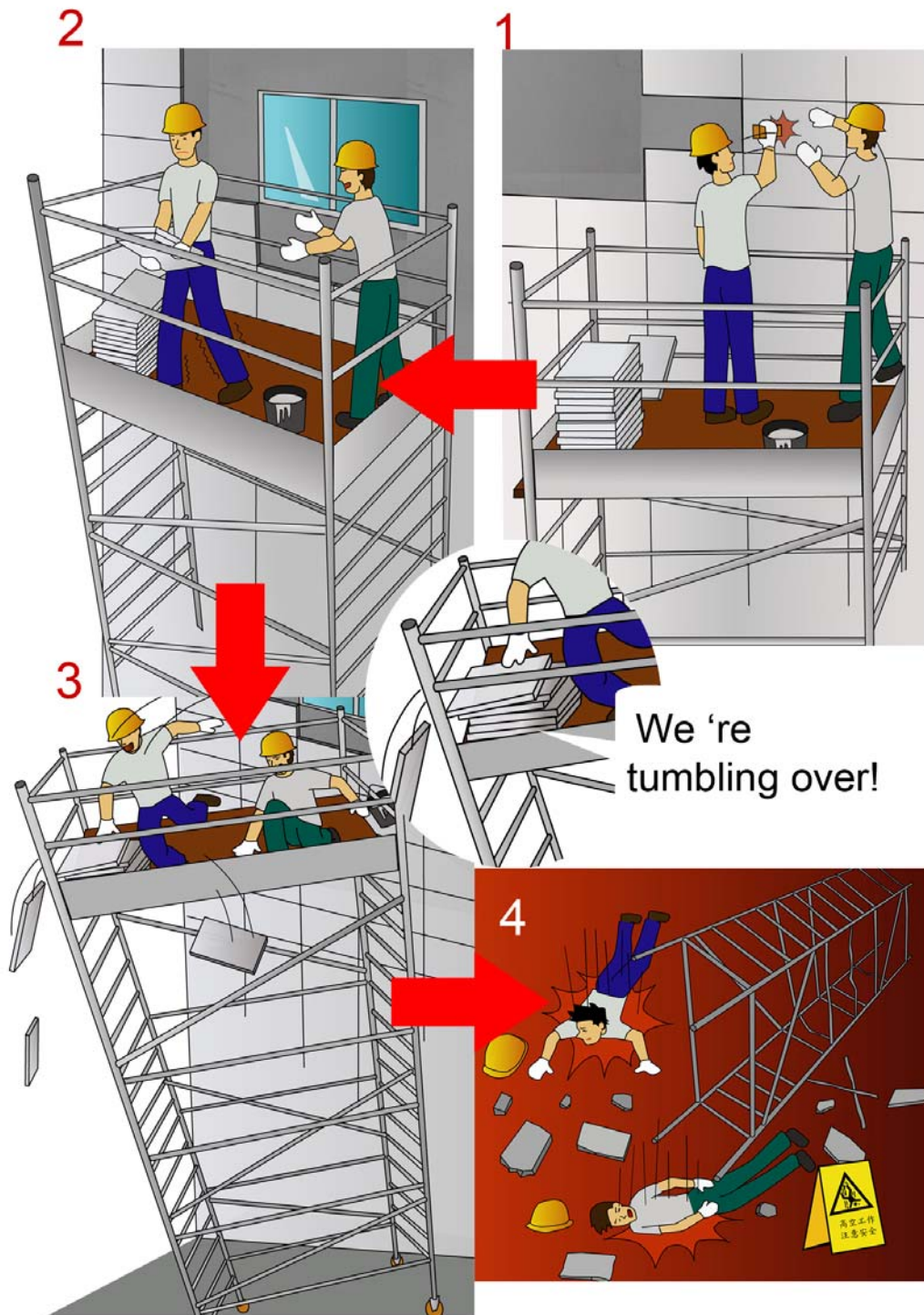
13. Please suggest how to eliminate the problem of 'fall of person from height'?

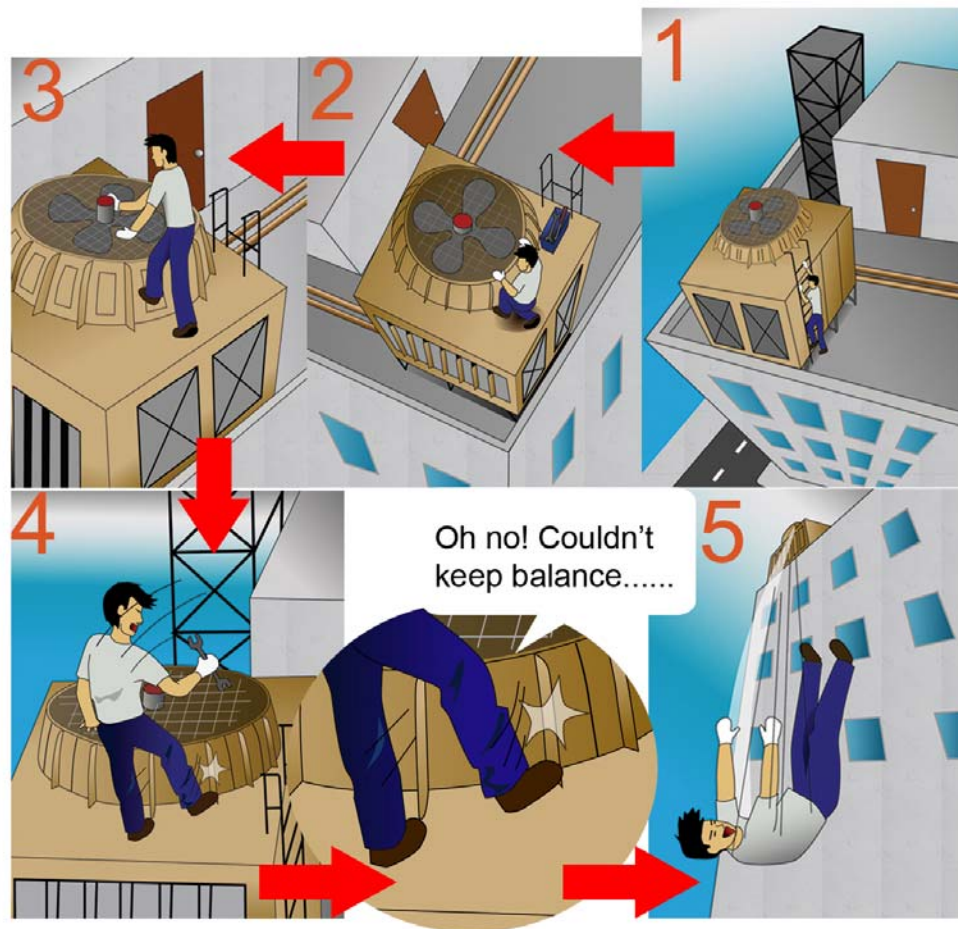
- Property management imposes a stringent control and periodical monitoring.
- Consumers are willing to pay for the provisions in safety.
- To cultivate social awareness and responsibility in safety culture.
- Impose new legislation for site supervision and inspection by Government
- Licensing system should be imposed for carrying out maintenance works, e.g. construction trade worker registration system for new comers to the industry; renew license in every three years like EMSD
- To allow 20% in the contract sum for provision of safety.
- Promote the legal liability of property owners in town that they need to compensate for any site accidents or fatalities occurred
- Safety protection gear especially safety belt should be used during work.
- Specific regulations for repair and maintenance works should be considered.
- Increasing the pay of workers would mean they need not rush their jobs and can spend more time on safety aspects.
- The government should consider issuing licenses to different trade workers. The Electrical and Mechanical Services Department is a good example.
- For each job undertaken the workers must sign an agreement to perform safety, by doing this the workers will have to take legal responsibility and hence will be more safety conscious.
- The government should advertise that the owner needs to pay if their employees are injured, so that the public are aware of their responsibility.

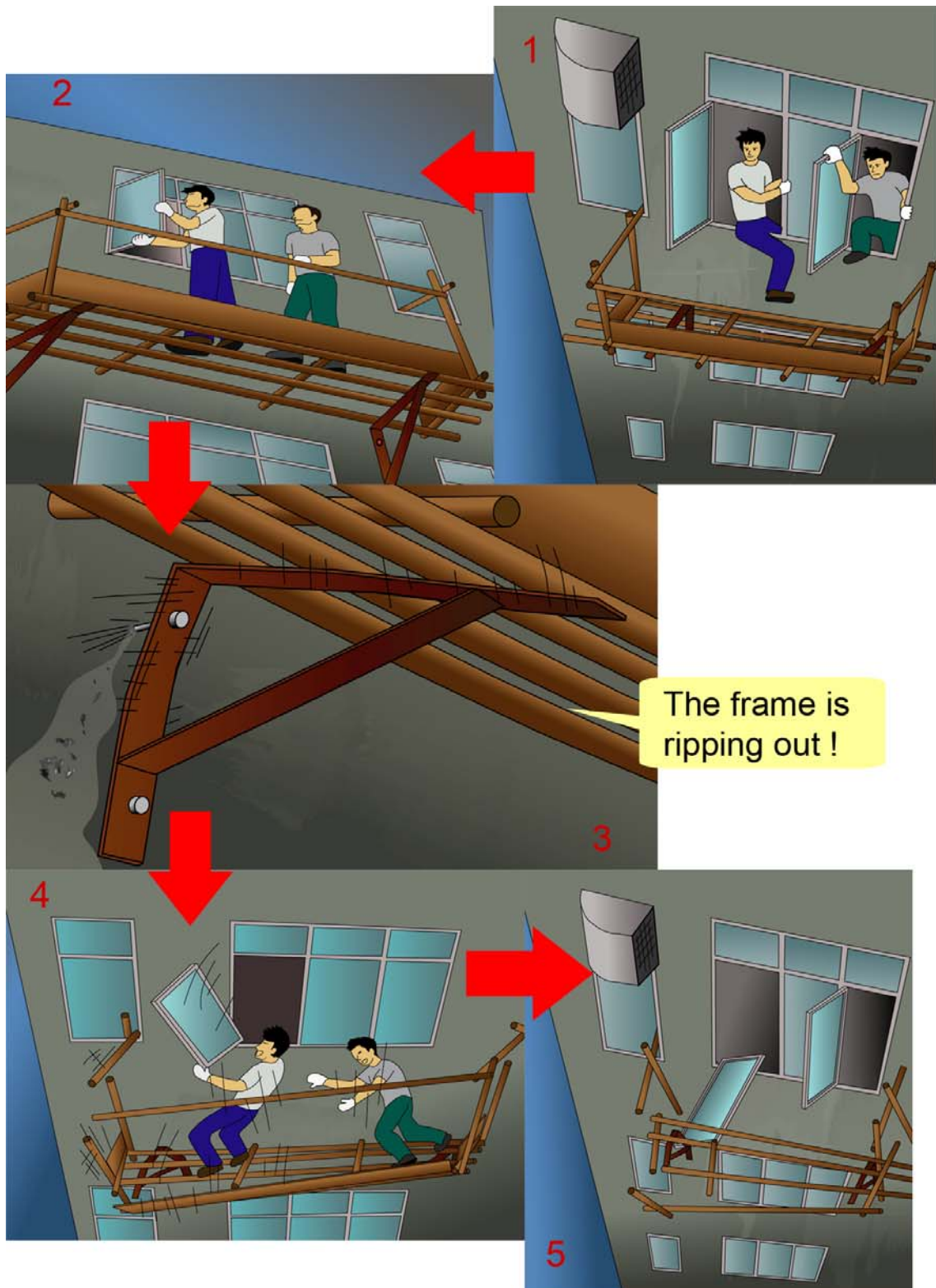
Appendix 31 Cartoon strips of fall accidents

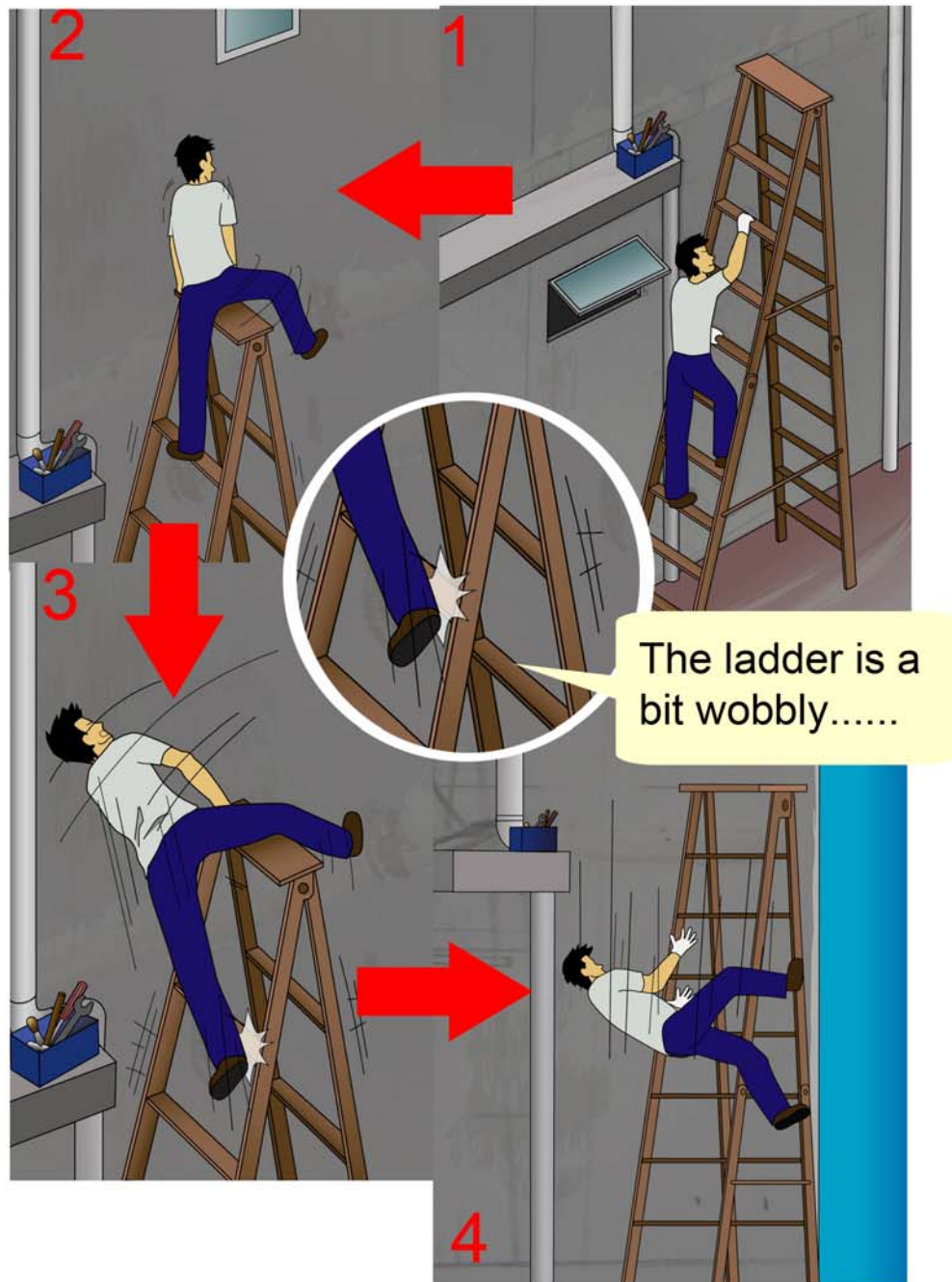


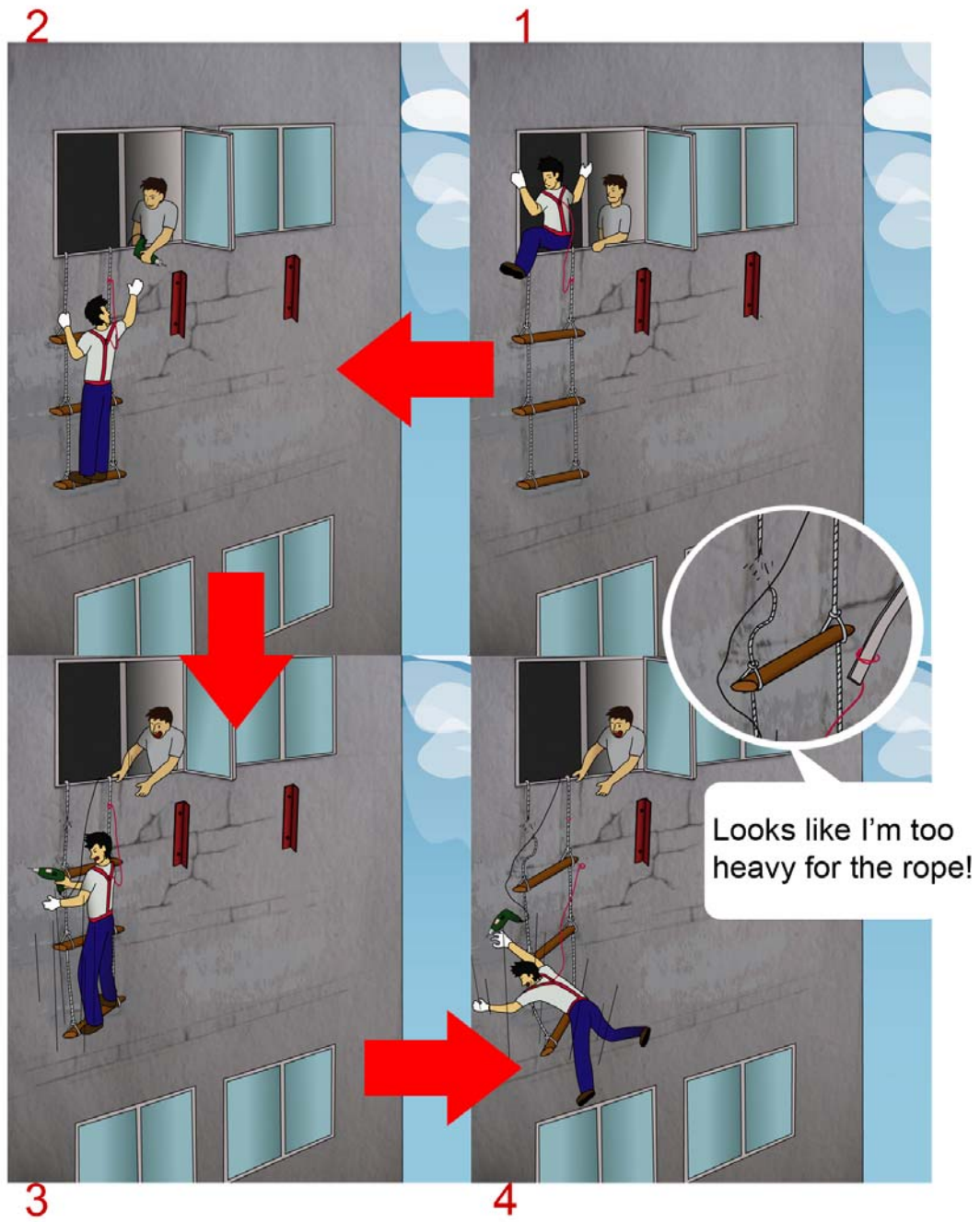


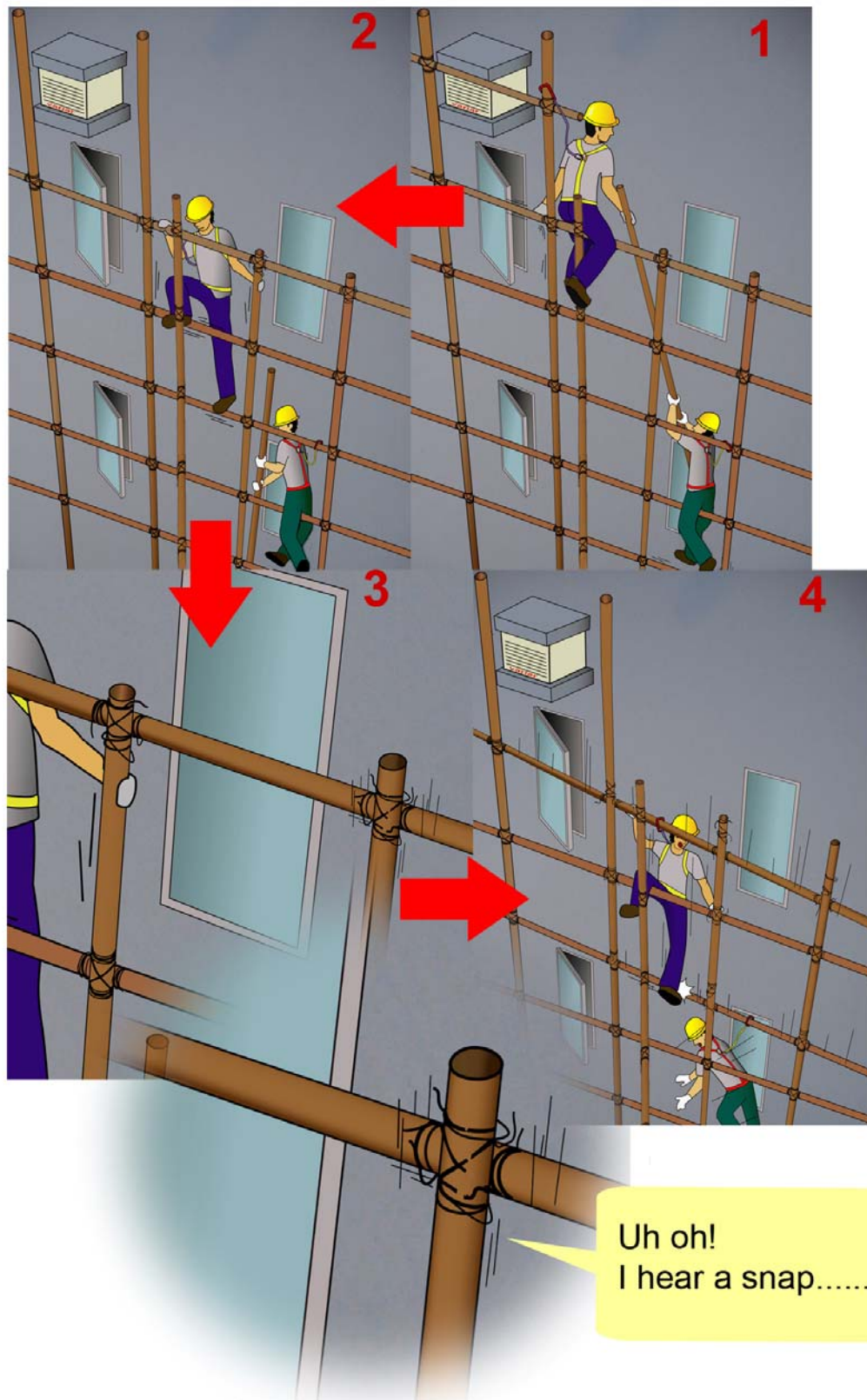












Appendix 32 Case histories of the cartoon strips

Case 1

Summary

A worker fell from a bamboo scaffold at the 7th floor of an exterior wall of a building when he was carrying out renovation work he fell to death.

Scenario

A worker was carrying out maintenance work to the external wall of a building at 7th floor. He stepped on the bamboo scaffold outside and did not wear any safety belt. When climbing to the bamboo scaffold, he slipped and fell to death.

Case Analysis

Single row bamboo scaffolding was erected outside the building. The temporary working platform where the deceased stood consisted of loosely placed bamboo tubes. He did not wear safety belt at the time when performing jobs. It was believed that when the deceased was climbing out the working platform, he lost balance and fell down the working platform and hit the ground.

Legal Implication

The contractor responsible for this site could be found in breach of the following provisions of the Construction Sites (Safety) Regulations:

Regulation 38L

The contractor responsible for a construction site shall ensure that a safe working platform is provided. Every working platform from which a person is liable to fall a distance of more than 2 metres shall be either closely boarded, planked or plated, or is a platform consisting of open metal work having interstices none of which exceeds 3800 square mm in areas.

Every board or plank forming part of a working platform shall be no less than 200mm in width and not less than 25mm in thickness, or, not less than 150mm in width when the plank exceeds 50mm in thickness.

Regulation 38N

Every side of a working platform from which a person is liable to fall a distance of more than 2 metres shall be provided with a suitable guard-rail of adequate strength to a height between 900mm and 1150mm.

Lessons to Learn

Suitable and sufficient working platform that are properly designed, constructed and maintained should be available and used by workers

Working platforms must be closely planked to prevent workers from falling.

Every plank forming part of a working platform should have sufficient strength.

If provision of suitable working platform is not feasible, the contractor should erect and keep in such provisions as to be effective to protect persons carrying on the work suitable

safety nets or safety belts or other suitable and sufficient equipment of such a design and so constructed and installed as to prevent so far as practicable injury to persons.

Case 2

Summary

A female worker fell from the podium of a building under construction when she was walking out of a lift. She slipped and fell down to earth for a distance of 4m.

Scenario

A worker took the lift to the podium at the 3/F of a building under construction. She walked out the lift at 3/F and slipped when stepping on the water accumulated on the floor. There was no temporary barrier built at the floor opening. She fell from the floor to the ground and sustained fatal injury.

Relevant regulations to be considered

The contractor responsible for the site could be found in breach of the following provision of the Construction Sites (Safety) Regulations:

Regulation 38A

The contractor responsible for any construction site shall ensure that, so far as is reasonably practicable, suitable and sufficient safe access to and egress from every place on the site at which any person at anytime works, which access and egress shall be properly maintained.

Regulation 38P

The contractor responsible for a construction site shall ensure that every opening, corner, break, edge or other dangerous place through or from which any person on the site is liable to fall a distance of more than 2 metres is provided with either:

A suitable guard-rail or guard-rails of adequate strength to a height of between 900mm and 1150mm above the surface across which persons are liable to pass so erected as to prevent as far as possible the fall of persons

A covering so constructed as to prevent the fall of persons, materials or articles; any such covering shall be clearly and boldly marked to show its purpose or be securely fixed in position.

Regulation 50D

At a construction site where any workman is required or authorized to be in the vicinity of any dangerous opening, the contractor responsible for the site shall ensure that the place, approach, part or opening is adequately and suitably lit to the extent necessary to secure that workman's safety.

Lessons to learn

Suitable and sufficient working platforms that are properly designed, constructed and maintained should be available and used by workers.

Every opening from which any person on the site is liable to fall a distance of more than 2 metres shall be provided with a suitable guard-rail of adequate strength to a height of between 900mm and 1150mm above the surface to prevent the fall of persons.

Suitable and adequate lighting to secure worker's safety should be provided on site. Safe means of access and egress should be provided and properly maintained.

Case 3

Summary

Two workers fell from a 3m high working platform when the working platform collapsed. The workers fell down and suffered injuries.

Scenario

Two workers worked on a 3m high working platform in a new site under construction. The area of the working platform was 6 sq. ft x 4 sq. ft. When the workers transported stones on the platform, the working platform lost balance and collapsed. The two workers fell together and subsequent injuries.

Relevant regulations to be considered

The contractor responsible for the site could be found in breach of the following provisions of the Factories & Industrial Undertakings Ordinance:

Section 6A(2)(a)

The provision and maintenance of plant and systems of work that are, as far as is reasonably practicable, safe and without risks to health.

Section 6A(2)(c)

The provision of such information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of all persons employed by him at the industrial undertakings.

Lessons to learn

A safe system of work should be established and maintained to ensure the safety of work engaged on the working platform. This includes:

The working platform should be properly designed, constructed, inspected and regularly maintained to ensure its structural stability before any person is allowed to work on it.

Activities that may affect the stability of the working platform should be avoided whenever practicable.

Training should be provided to all workers to ensure that they are aware of the danger associated with the work at height and they can properly use personal protective equipment.

A monitoring system should be devised to ensure that all workers who work at height will follow the site safety procedure.

Case 4

Summary

An electrician fell when working on the roof. He lost balance and was killed when hitting ground.

Scenario

An electrician was repairing an air conditioning unit on a roof at the fourth floor. He lost balance and fell to the ground. He was dead when arriving hospital.

Relevant regulations to be considered

The contractor responsible for the site could be in breach of the following provision of the Construction Site (Safety) Regulations

Regulation 38A(a)

There is, so far as is reasonably practicable, suitable and sufficient safe access to and egress from every place on the site at which any person at any time works, which access and egress shall be properly maintained.

Regulation 38Q(1)

The contractor responsible for a construction site shall erect and keep in such positions as to be effective to protect persons carrying on that part of the work in the site suitable safety nets or safety belts or other suitable and sufficient equipment of such a design and so constructed and installed as to prevent so far as practicable injury to persons.

Lessons to learn

A safe system of works should be provided and properly maintained for working at height. Proper supervision of the repair work is necessary.

Adequate training on safety should be given to all workers especially when there is a risk of fall of persons.

Safety harness, safety nets and other safety means should be provided to protect workers from falling when they are required to work at height.

Case 5

Summary

Two workers fell five floors to their death after the scaffolding they were working on collapsed at an industrial building.

Scenario

Two men had not been wearing safety belts while working outside the window of a fifth-floor unit in an industrial building. After the scaffolding they were working on collapsed, they died.

Case Analysis

Two workers were working on the external wall to replace aluminum windows of an industrial building. They did not wear safety belts while working outside. The 4-by-4-metre scaffolding structure collapsed when screws from a metal frame that was supporting the scaffolding came loose.

Relevant regulations to be considered

The contractor responsible for the site could be found in breach of the following provisions of the Construction Sites (Safety) Regulations:

Regulation 38A(b)

The contractor responsible for any construction site shall ensure that every place on the site at which any person at any time works shall, so far as is reasonably practicable, be made and kept safe for any person working there.

Regulation 38B

Where work cannot safely be done on or from the ground or from part of a building or other permanent structure, the contractor responsible for the construction site concerned shall provide, place and keep in position for use and properly maintain either scaffolds or, where appropriate, ladders or other means of support, all of which shall be sufficient, strong and suitable for the purpose.

Regulation 38Q(1)

The contractor responsible for a construction site shall erect and keep in such positions as to be effective to protect persons carrying on that part of the work in the site suitable safety nets or safety belts or other suitable and sufficient equipment of such a design and so constructed and installed as to prevent so far as practicable injury to persons.

The contractor responsible for this site could also be found in breach of the following provisions of the Factories and Industrial Undertakings Ordinance. Chapter 59:

Section 6A(1)

It shall be the duty of every proprietor of an industrial undertaking to ensure, so far as is reasonably practicable, the health and safety at work of all persons employed by him at the industrial undertaking.

Lessons to learn

Suitable precautions should be taken to prevent workers engaged in construction work from being fallen from unsafe working platform.

Suitable scaffolds or other means of support should be provided so as to enable workers on the site to carry out their work safely.

Workers should check the conditions of external building wall before carrying out any work.

When the provision of suitable scaffold or other means of support is impracticable, safety harness with secure attachment should be provided for workers working at height.

Adequate training on safety should be given to all workers especially when there is a risk of fall of persons.

Case 6

Summary

A worker fell down from a 10 ft. high ladder and died when hitting the ground.

Scenario

He was a new worker and joined the maintenance works for a couple of days. He climbed on a 10 ft. high ladder to carry out maintenance work on external wall. He lost balance and fell on the ground. He died on the way to hospital.

Relevant regulations to be considered

The contractor responsible for the site could be found in breach of the following provision of the Construction Sites (Safety) Regulations

Regulation 38N(1)- The contractor responsible for a construction site shall ensure that every side of a working platform, working place, gangway, run or stair being a side from which a person is liable to fall a distance of more than 2 metres is provided with a suitable guard-rails of adequate strength to a height between 900mm and 1150mm.

Lessons to learn

Suitable and sufficient scaffolds should be provided, placed and kept in position for use. Every part of the scaffold should be of good construction, made of strong and sound materials, free from patent defects. The scaffold should also be fixed, secured or placed in position so as to prevent accidental displacement.

Movable tubular scaffold should be placed as close as possible to the working area in order to avoid the leaning out of the workers from the working platform.

Suitable and safe access to and egress from the working platform of the movable tubular scaffold should be provided to the workers.

Case 7

Summary

A boss aged 44 of a scaffolding company fell to death when using a self-made rope to climb down from the external wall of 11th floor to install metal scaffolding. He fell to die on the fourth podium. He wore a safety belt and using the self-made rope. When the rope was broken, he fell to death.

Scenario

He was a boss of a scaffolding company and was undergoing drainage maintenance work. The victim climbed out the external wall and his partner handed over him the tools. When the rope linking the safety belt of the victim was broken, the victim fell to death.

Relevant regulations to be considered

The contractor responsible for the site could be found in breach of the following provisions of the Construction Sites (Safety) Regulations.

Regulation 38L

The contractor responsible for a construction site shall ensure that a safe working platform is provided. Every working platform from which a person is liable to fall a distance of more than 2 metres shall be either closely boarded, planked or plated, or is a platform consisting of open metal work having interstices none of which exceeds 3800 square mm in areas.

Every board or plank forming part of a working platform shall be no less than 200mm in width and not less than 25mm in thickness, or, not less than 150mm in width when the plank exceeds 50mm in thickness.

2. Regulation 38N

Every side of a working platform from which a person is liable to fall a distance of more than 2 metres shall be provided with a suitable guard-rail of adequate strength to a height between 900mm and 1150mm.

Lessons to Learn

Suitable and sufficient working platform that are properly designed, constructed and maintained should be available and used by workers

Working platforms must be closely planked to prevent workers from falling.

Every plank forming part of a working platform should have sufficient strength.

If provision of suitable working platform is not feasible, the contractor should erect and keep in such provisions as to be effective to protect persons carrying on the work suitable safety nets or safety belts or other suitable and sufficient equipment of such a design and so constructed and installed as to prevent so far as practicable injury to persons.

Case 8

Summary

3 workers were falling to ground from 10 feet high and received injuries when the bamboo scaffold collapsed. It was found that the plastic fasteners became loose and lost strength. The workers were wearing safety belts at the time when the bamboo scaffold collapsed.

Scenario

The area of bamboo scaffold was about 5m times 10m and the five workers were working at the site. Three workers were climbing on the bamboo scaffold and dismantling it. The bamboo scaffold suddenly collapsed and the 3 workers fell from it.

Relevant regulations to be considered

The contractor responsible for the site could be found in breach of the following provisions of the Construction Sites (Safety) Regulations.

Regulation 38L

The contractor responsible for a construction site shall ensure that a safe working platform is provided. Every working platform from which a person is liable to fall a distance of more than 2 metres shall be either closely boarded, planked or plated, or is a platform consisting of open metal work having interstices none of which exceeds 3800 square mm in areas.

Every board or plank forming part of a working platform shall be no less than 200mm in width and not less than 25mm in thickness, or, not less than 150mm in width when the plank exceeds 50mm in thickness.

Regulation 38N

Every side of a working platform from which a person is liable to fall a distance of more than 2 metres shall be provided with a suitable guard-rail of adequate strength to a height between 900mm and 1150mm.

D. Lessons to Learn


Suitable and sufficient working platform that are properly designed, constructed and maintained should be available and used by workers

Working platforms must be closely planked to prevent workers from falling.


Every plank forming part of a working platform should have sufficient strength.

If provision of suitable working platform is not feasible, the contractor should erect and keep in such provisions as to be effective to protect persons carrying on the work suitable safety nets or safety belts or other suitable and sufficient equipment of such a design and so constructed and installed as to prevent so far as practicable injury to persons.

Appendix 33 Power point presented to participants of the focus group meeting with repair and maintenance workers



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學




Construction Industry Institute
HONG KONG


住宅樓宇維修及保養工程時 高空工作的安全



香港建造業
總工會




H.K. General Building Contractors Association
香港建築業承建商聯會



DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產署

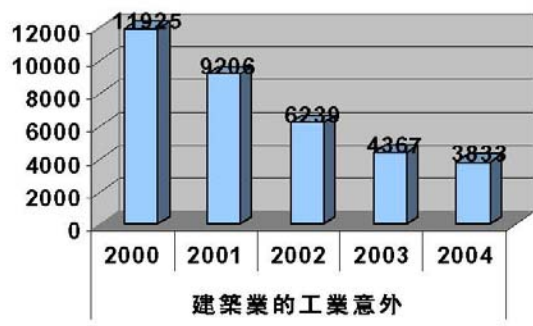
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2005年11月8日



建築業的工業意外

意外數目



Year	Number of Accidents
2000	11925
2001	9206
2002	6230
2003	4367
2004	3833

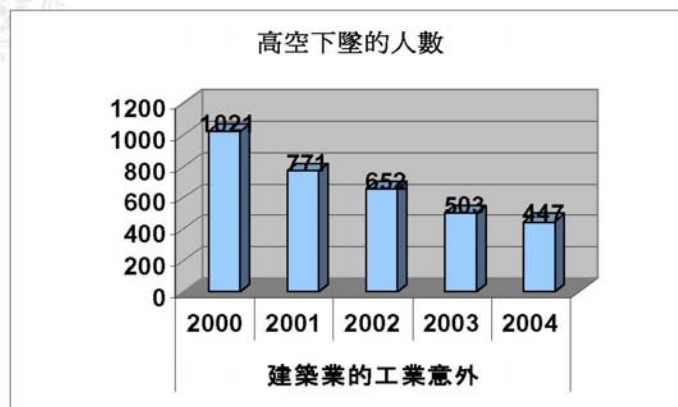
建築業的工業意外

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2

DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產署

高空下墜的人數

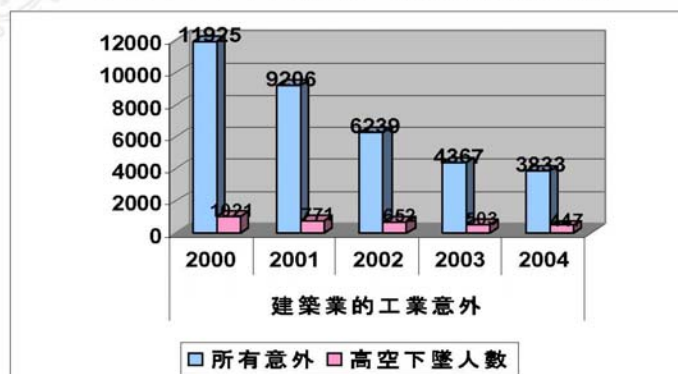


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3

DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產署

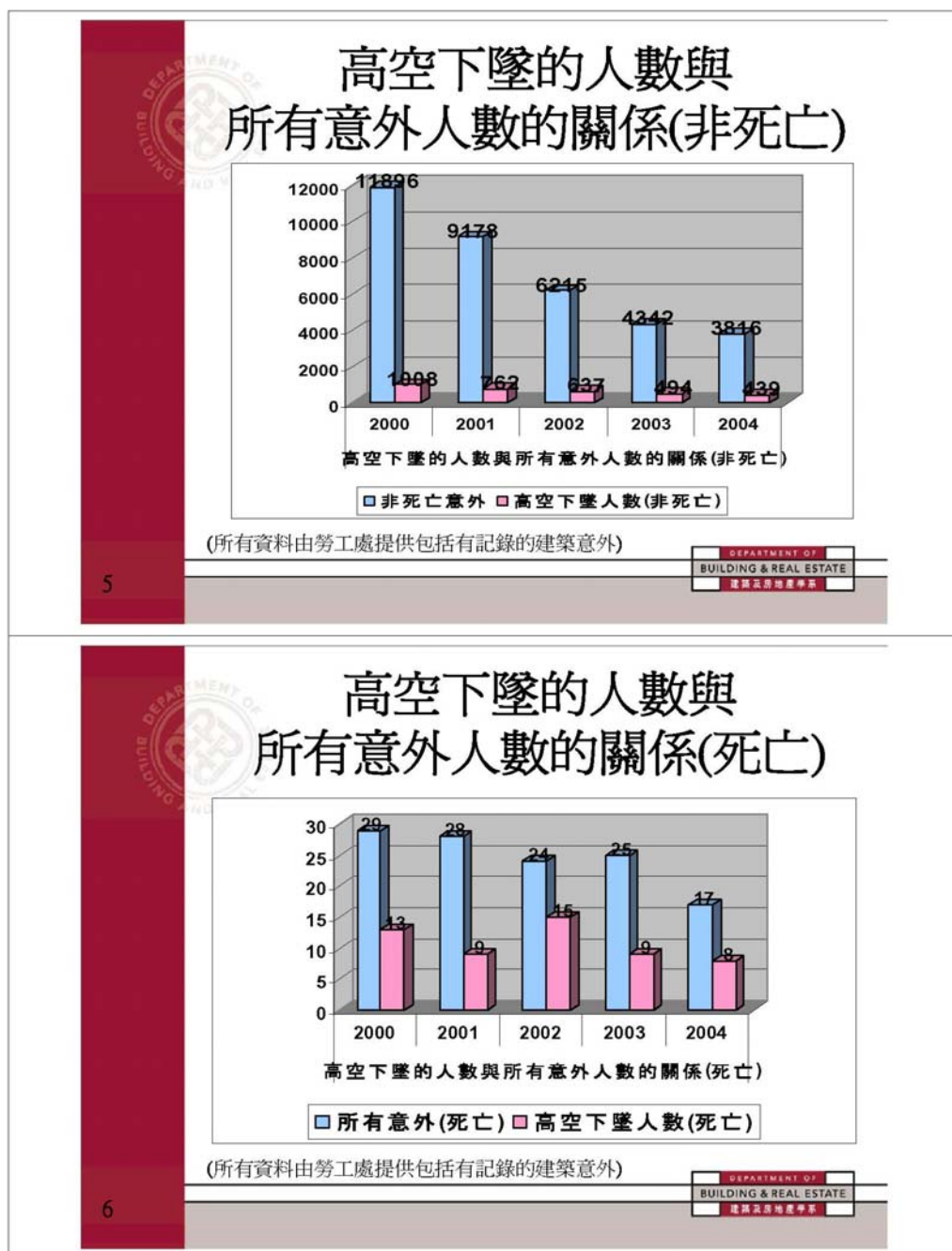
建築業的工業意外與 高空下墜的人數的關係



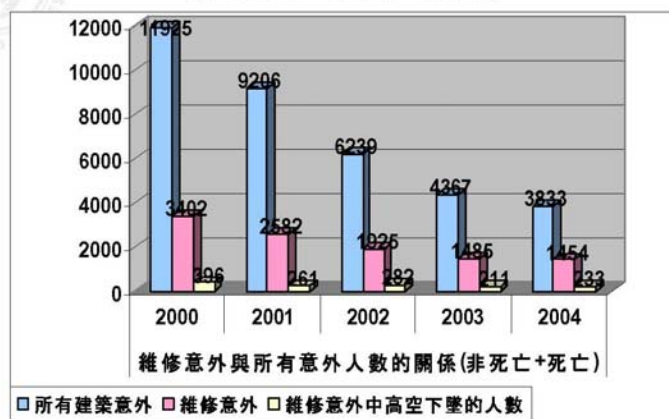
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4

DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產署



維修意外與所有意外人數的關係 (死亡+非死亡)

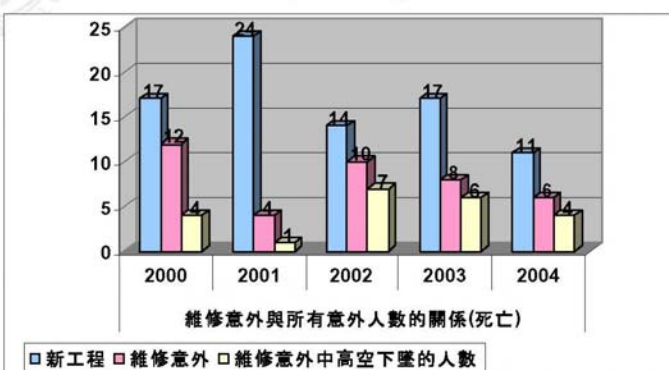


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DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產署

維修意外與所有意外人數的關係 (死亡)



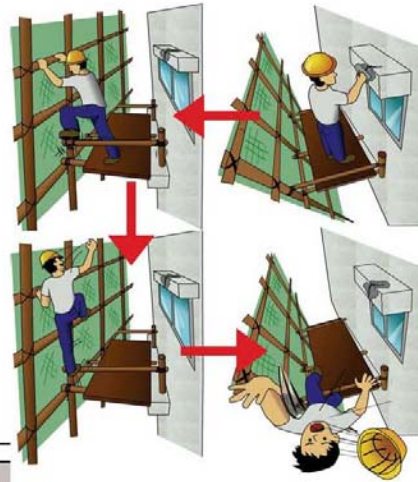
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DEPARTMENT OF
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個案一

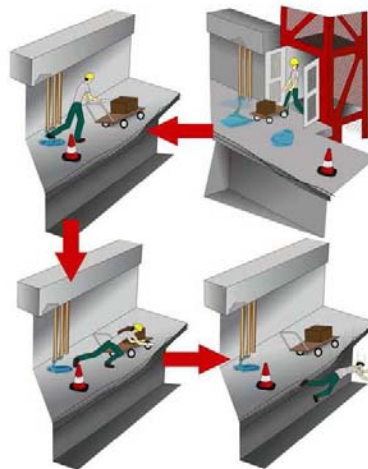
一名工人從7樓的竹棚墮下，並即時死亡。當時他進行外牆維修工作，沒有配戴安全帶。



9

個案二

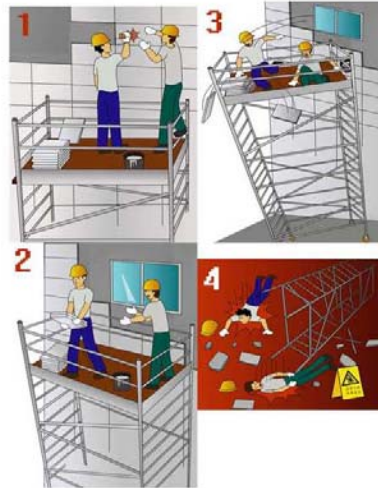
一名女工從3樓的平台跌落地下，當場死亡。當時她走出升降機，並踏在積水上，突然失足而跌下死亡。當時地盤並沒有加設臨時圍欄。



10

個案三

兩名工人從三米高的工作台跌下，當時工人正在搬運石頭，他們失去平衡及跌下，兩名工人即時受傷。



11

個案四



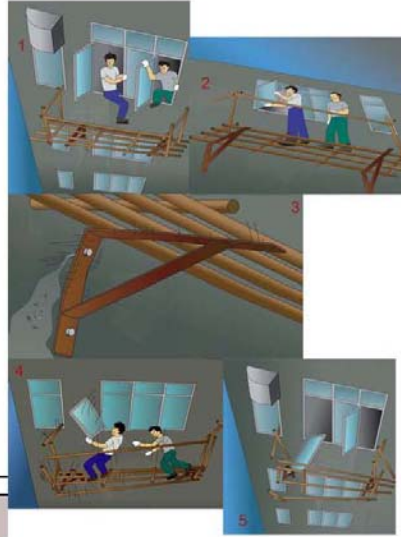
一名電工在天台跌下死亡，當時他正在天台維修冷氣機。

12

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BUILDING & REAL ESTATE
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個案五

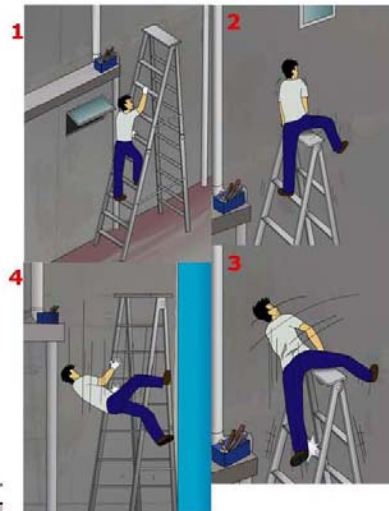
兩名工人從五樓的外牆棚架墮下，並即時死亡意外。懷疑是狗臂架鬆脫致。



13

個案六

一名工人從10呎高的木梯跌下死亡，當時正進行外牆維修工作，他是新入行，從事建築行業才不過數天。



討論問題

- 1) 請指出意外的原因。
- 2) 誰要對意外負責?
- 3) 如何從工地程序及設施避免意外發生的方法?
- 4) 如何從管理立法及科技解決有關意外的辦法?

14

DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產署

小組討論時間

15

DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產署

Appendix 34 Question list for focus group meeting with repair and maintenance workers

香港建造業研究學會 香港理工大學建築及房地產學系

香港建造業總工會 香港建築業承建商聯會 香港建造業分包商聯會 合辦

住宅樓宇維修及保養工程時高空工作的安全座談會

地點: 香港理工大學建築及房地產學系 W 座 W610 室

日期: 二零零五年十一月八日(星期二)

時間: 晚上 7 時 30 分至 10 時

討論項目

多謝工會及聯會數日前提提供之出席者名單。現已跟據他們的工種分為六組。每組將討論一個近期在住宅樓宇維修及保養工程時高空工作的死亡意外個案。個案分別發生在以下的地方:

1. 竹棚
2. 沒有安全保護的邊緣
3. 工作台
4. 天台
5. 飛棚
6. 梯子

每組將獲派發其中一宗意外的相關資料，請用三十分鐘時間討論個案的:

1. 意外原因;
2. 權責問題;
3. 如何從工地程序及設施避免意外發生的方法;
4. 如何從管理立法及科技起解決有關意外的辦法

並於小息後由組長報告討論結果。

**Appendix 35 Minutes taken at focus group meeting with repair and
maintenance workers**

香港建造業研究學會 香港理工大學建築及房地產學系
香港建造業總工會 香港建築業承建商聯會 香港建造業分包商聯會 合辦
住宅樓宇維修及保養工程時高空工作的安全座談會

會議記錄

2005 年 11 月 8 日(星期二)

地點: 香港理工大學建築及地產學系
 紅磡香港理工大學W座W610 室
時間: 晚上 7 時 30 分至 10 時

香港理工大學建築及房地產學系: 黃君華教授
 陳炳泉博士
 任志浩博士
 陳煒明博士
 林偉明博士
 張泳沁小姐
 陳惠英小姐
 陳俊傑先生

受訪者資料:

	姓名	聯絡電話	工會/聯會	所屬的工種
1	朱育青	2393 9955	建造業總工會	電器
2	陳開順	2393 9955	建造業總工會	招牌/油漆
3	陳鍾宜	2393 9955	建造業總工會	霓虹/招牌
4	陳光厚		承建商聯會	棚業
5	陳栢成	9206 7037	分包商聯會	油漆
6	陳炳光(組長)	8106 9022	建造業總工會	搭棚
7	陳錫輝		承建商聯會	泥水
8	陳少龍		承建商聯會	外牆雲石
9	陳子正		承建商聯會	水喉/渠務
10	陳偉棠	9078 0052	分包商聯會	維修
11	張國權	9490 0263	分包商聯會	雲石
12	張炳發	9078 0052	分包商聯會	油漆
13	張社田		承建商聯會	鑽孔
14	張偉強	2264 6547	建造業總工會	空調
15	蔡振華		建造業總工會	
16	蔡集庭	9487 6232	分包商聯會	維修
17	鐘蔴琪		承建商聯會	油漆
18	費榮富		承建商聯會	
19	馮麗光		承建商聯會	棚業
20	何鏡福		分包商聯會	電工
21	何偉華		承建商聯會	
22	許錫強	2264 6547	建造業總工會	空調
23	招國樑(組長)		港九搭棚同敬工會理事長	搭棚
24	簡銘東		建造業總工會	

25	郭志強	2264 6547	建造業總工會	空調
26	郭慶祺	9023 7892	分包商聯會	雲石
27	黎炎朋(組長)		承建商聯會	鋁窗
28	林志成	2393 9955	建造業總工會	招牌/鐵器
29	林潔儀	2264 6547	建造業總工會	空調
30	劉建華		承建商聯會	鑽孔
31	劉日新		建造業總工會	搭棚
32	李卓南		建造業總工會	搭棚
33	李鴻恩		承建商聯會	管工
34	李家恩		承建商聯會	拆卸
35	李錦昌	9092 6232	建造業總工會	搭棚
36	李廣生		建造業總工會	搭棚
37	李龍生		承建商聯會	廣告安裝
38	梁榮光	2393 9955	建造業總工會	霓虹/招牌
39	梁永順	2393 9955	建造業總工會	霓虹/招牌
40	盧焯來		承建商聯會	拆卸
41	勞紹佳		承建商聯會	管工
42	盧太	9360 1062	分包商聯會	雲石
43	盧潤波		建造業總工會	搭棚
44	樂承國(組長)		承建商聯會	管工
45	雷國華		承建商聯會	外牆滲水
46	麥永康	9498 0077	分包商聯會	棚業
47	巫錦文		建造業總工會	搭棚
48	林炳業(JOE)		承建商聯會	螺絲
49	吳家明		承建商聯會	外牆雲石
50	吳金城	2393 9955	建造業總工會	招牌/油漆

51	伍槐枝	9076 0728	分包商聯會	棚業
52	吳少明	9232 0890	分包商聯會	泥水
53	伍新華(組長)	9833 6313	分包商聯會	雲石
54	蕭永成	9495 5669	分包商聯會	泥水
55	宋偉清	2264 6547	建造業總工會	空調
56	陶開國		承建商聯會	
57	曾炳雄		分包商聯會	泥水
58	曾日順	9487 3725	分包商聯會	棚業
59	謝志剛		分包商聯會	
60	謝振源(組長)	9099 7580	分包商聯會	泥水
61	溫俊建		承建商聯會	打炮,石屎
62	黃海船		建造業總工會	搭棚
63	Kelvin Wong	9042 8446	分包商聯會	雲石
64	王德餘		承建商聯會	棚業
65	楊偉森		承建商聯會	油漆
66	葉小燕	9029 9055	分包商聯會	棚業
67	袁國強		承建商聯會	拆卸
68	刁月強			
69	盧焜增			雲石
70	郭志偉			
71	陳勁恒			

第一組: 黃君華教授; 第二組: 陳炳泉博士; 第三組: 任志浩博士;

第四組: 陳煒明博士; 第五組: 林偉明博士; 第六組: 張泳沁小姐

個案一 (第一組)

一名工人從 7 樓的竹棚墮下，並即時死亡。當時他正進行外牆維修工作，沒有配戴安全帶。

問題一：請指出意外的原因。

答案一：

- 身上有十多斤重的東西，卻沒戴安全帶。
- 工具應輕便點。
- 東西太重、窗太小、(工人)貪方便、一日工(臨時工人)沒有責任。
- 不用、打工不用，明知故犯，只是罰僱主，(解釋一：工人明知故犯，不使用安全設施，卻只是懲罰僱主)(解釋二：工人不需負上責任，是僱主明知故犯，不提供安全措施，應只罰僱主)。
- 安全簿、影相，罰錢是罰工人，(應有安全簿記錄意外的相關資料，拍下相關照片，以找出事件起因及責任誰屬，懲罰違規的工人)。
- 有安全牌、綠卡也不用，罰錢也沒用。
- 多散工，勞工署未扣也罰，(可能解釋：工作的有很多是臨時工人，勞工署未對僱主罰款，僱主已在臨時工人的薪金中扣掉罰款)。
- 沒有配戴安全帶。

問題二：誰要對意外負責？

答案二：

- 工人本身需負責任。
- 僱主需提供安全設施。
- 有人剪鐵線、鋸棚，(在施工前，其他工種如維修水喉或裝修外牆的工人，可能把阻礙他們工作的安全工具或設施破壞)。
- 勞工處不容許、貪方便：鋸棚一定要通知總公司、不能自己鋸，不能零意

外，(勞工處應立例禁止一些貪方便而擅自破壞竹棚的行為，鋸竹棚前應先通知管業處，以達致零意外的目標)。

- 罰錢，誰犯事罰誰，僱主負責，(解釋一：僱主負責懲罰犯事工人；解釋二：僱主及犯事工人均需負責)。
- 廣告應在黃金時間播放，不是在晚上十一、二時。
- 散工三千元一個棚，(散工以低價爭生意)。
- 不能跟 SHK、SINO (不能依大發展商的標準)。
- 一條生路：廿、三十年牆身很難做工程。
- 管理處的態度是”少做少錯”。
- 見鬼，要掙管工，手作仔。
- 綠卡、師傅牌自己負責(有專業資格的人需對自己行為負責)。
- 清楚指引、各有觀點，無授權書(需有清楚指引，及授權書以定相關人士的權力及責任，以避免各持己見的情況發生)。
- 各區不同(各區的管業處的要求各有不同)。
- 大公司標準。
- 浪費納稅人錢。
- 管理處的指引不清楚。

問題三：如何從工地程序及設施避免意外發生的方法？

答案三：

- 加重工人罰則。
- 十年、二十年的工作經驗也不夠。
- 犯了的才罰，不是罰僱主。
- 只是票控僱主，勞工處怕被人打(勞工處的監管只針對管理層)。
- 各區(標準)不同，如灣仔跟中環區不同。
- 二米怎會有安全設施(二米高的工作環境，工人認為不需安全措施/僱主不會提供安全措施)。

- 只是注重大地盤(宣傳/巡查只針對大地盤，一般維修工作不被重視)。
- 有些地方很難有安全設施：如設施太笨重、商場管理處與住宅管理處(容許使用的設備)不同。
- 各處地方(包括不同地區、大廈用途)的標準不同。
- 配合不同、工人同管理處(不同的管理處提供與工人的配合都不同)。
- 少工程少意外。

問題四：如何從管理立法及科技解決有關意外的辦法？

答案四：

- 法例應更明確、針對犯法者。
- 不敢問工人、找老總。
- 住家維修很難安裝設施。
- 樓上樓下很難配合：如樑只有八吋寬，很難打螺絲。
- 多新人入行：搭棚人多了，意外隨之增多。
- 牆身厚度不夠：入釘四吋長。
- 新指引有問題。
- 舊樓牆身有問題，螺絲很平。
- 現在不准用其他方便(工具)，一定要用狗臂架。
- 不可能用沉箱做戲棚。

個案二 (第二組)

一名女工從 3 樓的平台跌落地下，當場死亡，當時她走出升降機，並踏在積水上，突然失足而跌下死亡。當時地盤並沒有加設臨時圍欄。

問題一：請指出意外的原因。

答案一：

- 邊緣沒有圍欄。
- 地面有積水。
- 標語沒有貼在當眼處。
- 分派工作者沒有注意工作環境的安全。
- 工人沒有安全意識。

問題二: 誰要對意外負責?

答案二:

- 承建商: 沒有提供基本安全設施。
- 管工: 沒向公司反映問題所在。
- 工人: 見到工作環境有問題 (沒有圍欄), 沒有向管工報告。

問題三: 如何從工地程序及設施避免意外發生的方法?

答案三:

- 加強工人入職時的安全意識訓練。
- 向工人講解地盤環境的實際危險性。
- 獎賞計劃: 鼓勵其他工種同事看到工作環境有不足之處提出反映(提出意見者有賞)。

問題四: 如何從管理立法及科技解決有關意外的辦法?

答案四:

- 政府加強宣傳/廣告來提倡安全。
- 地盤範圍內增加標語。
- 政府加強發牌制度。

個案三 (第三組)

兩名工人從三米高的工作台跌下，當時工人正在搬運石頭，他們失去平衡及跌下，兩名工人即時受傷。

問題一：請指出意外的原因。

答案一：

- 工作台沒有支撐點(懷疑不是原裝的工作台，是隨意拿到一些散件裝嵌而成的)。
- 堆放過重物料。
- 懷疑工作台不是由合資格人仕搭建。
- 物料處理(放置)不平均。
- 施工過程缺乏管理。

問題二：誰要對意外負責？

答案二：

問題三：如何從工地程序及設施避免意外發生的方法？

答案三：

- 施工過程(搭設工作台)應由合資格人仕進行。

問題四：如何從管理立法及科技解決有關意外的辦法？

答案四：

- 對施工者進行強制培訓。

個案四 (第四組)

一名電工在天台跌下死亡，當時他正在天台維修冷氣機。

問題一：請指出意外的原因。

答案一：

- 工人及承判商為縮短工程時間及減輕成本而忽略安全措施(很多時因減輕成本而買入質素較差的工具/材料，容易引致意外)。
- 現時很多舊工廠大廈天台沒有圍欄。
- 最初大廈設計天台沒有冷氣設施，而業主其後加設(由於大廈興建時並沒有考慮會安裝冷氣機，故並沒有為保養維修冷氣機提供安全環境)。

問題二：誰要對意外負責？

答案二：

- 承判商及工人。
- 業主(立案法團)。

問題三：如何從工地程序及設施避免意外發生的方法？

答案三：

- 舊工廠大廈應加設圍欄。
- 於施工前須先視察環境及計劃(施工程序)，確保工程於安全環境進行。

問題四：如何從管理立法及科技解決有關意外的辦法？

答案四：

- 可利用傳媒加強安全意識的教育(包括業主及施工者)。
- 現時很多樓宇並沒有業主立案法團，導致維修時計劃不足，政府應加以協助。

個案五 (第五組)

兩名工人從五樓的外牆棚架墮下，並即時死亡。懷疑是狗臂架鬆脫導致。

問題一：請指出意外的原因。

答案一：

- 棚架不乎合標準。
- 工人沒有任何安全設備。
- 懷疑牆身結構有問題。

問題二：誰要對意外負責？

答案二：

- 業主。
- 裝修公司，(由於棚架可能被別的工人，如水喉工人因工作關係而鋸斷，故在施工前應派人檢查棚架是否安全)。
- 棚公司、搭棚工人。
- 裝修工人。

問題三：如何從工地程序及設施避免意外發生的方法？

答案三：

- 裝修公司嚴選棚公司。
- 開工前提交所需文件 (保險、牌照、工人大工牌等)。
- 竹棚交收需驗收。
- 確定工人有安全設備。

問題四: 如何從管理立法及科技解決有關意外的辦法?

答案四:

- 現職工人加強培訓。
- 提高工人安全意識。
- 設立吊棚考牌制度 (因搭建吊棚難度較高)。
- 加強對管理公司的培訓，訂立清晰指引。
- 宣傳小業主責任，(讓小業主知道若有意外，他們亦須負上責任，如物件掉下亦不只是工人的事)。
- 政府應加強宣傳業主責任及管業處培訓，(讓管業處有足夠知識判別維修的工作環境是否安全，從而對有關公司提出意見及有助選擇承辦商。如管業處遇有疑難，能有政府相關部門提供意見)。

個案六 (第六組)

一名工人從 10 呎高的木梯跌下死亡，當時正進行外牆維修工作，他是新入行，從事建築行業才不過數天。

問題一: 請指出意外的原因。

答案一:

- 工人經驗不足。
- 沒有相關(使用梯子)的安全課程。
- 梯子太高，應用工作台。
- 不應有過高的梯子出售。
- 不該單獨工作，應有伙伴扶著木梯，讓工作者安心。

問題二: 誰要對意外負責?

答案二:

- 政府責任:『梯』的由來及監管(由於地面不平,以前常用的木梯本身不是太穩固,在地面上使用卻相對較平穩;現在常用的鐵/鋁梯本身很平穩,但放在不平的地面上,卻又變得搖晃)。
- 領班及工作分派人。
- 工程監管者。

問題三: 如何從工地程序及設施避免意外發生的方法?

答案三:

- 使用工作台。
- 應有檢查清單。

問題四: 如何從管理立法及科技解決有關意外的辦法?

答案四:

- 檢查及監管。

Appendix 36 **Power point presented at the focus group meeting with supervisors and contractors of Hong Yip Service Company Limited**



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



Construction Industry Institute
CIIR

住宅樓宇維修及保養工程時 高空工作的安全

座談會

香港理工大學
建築及房地產學系

香港建造業研究學會

1

2005年10月21日



DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產學系



DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產學系

建築業的工業意外

意外數目



Year	Number of Accidents
2000	11,925
2001	9,296
2002	6,230
2003	4,367
2004	3,833

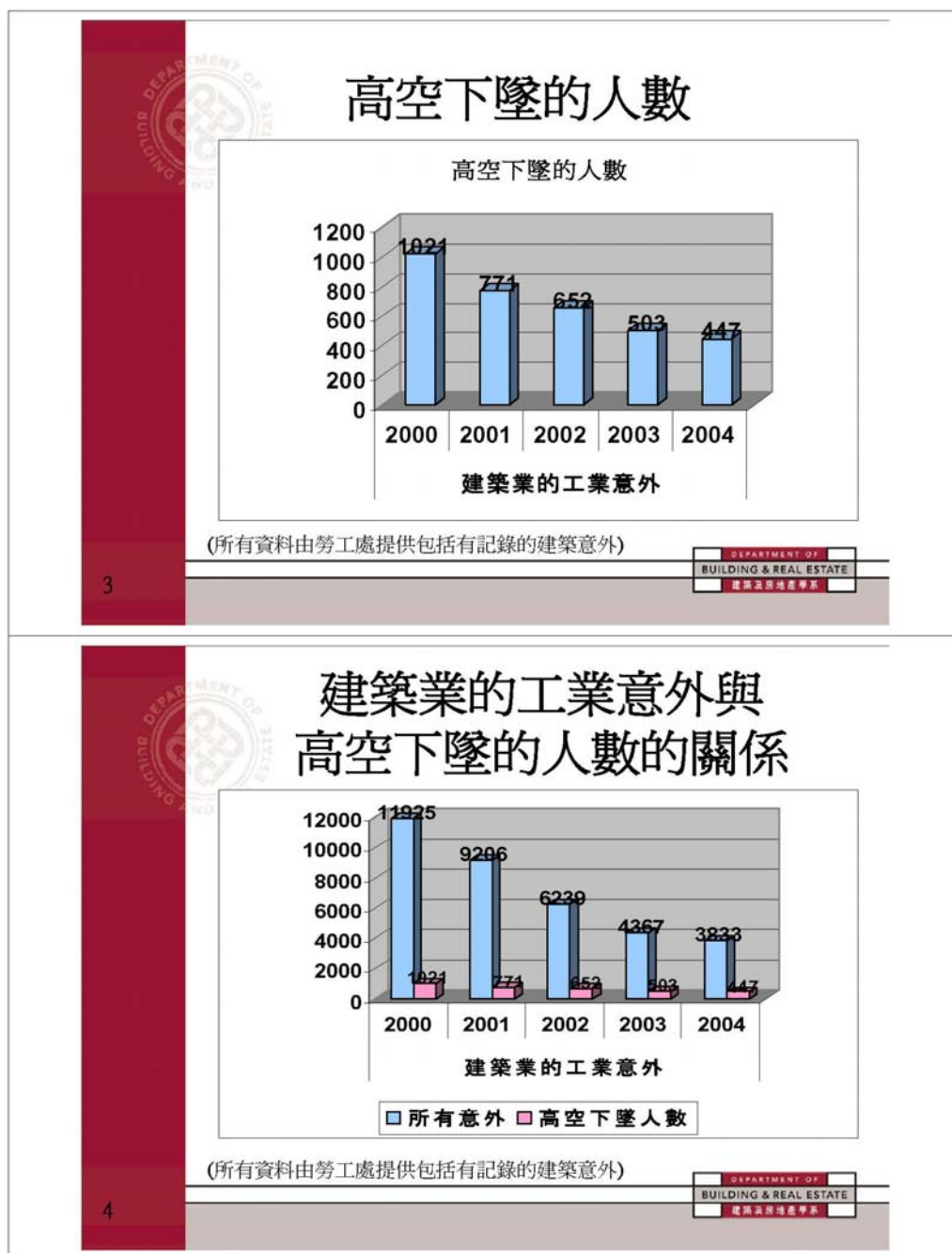
建築業的工業意外

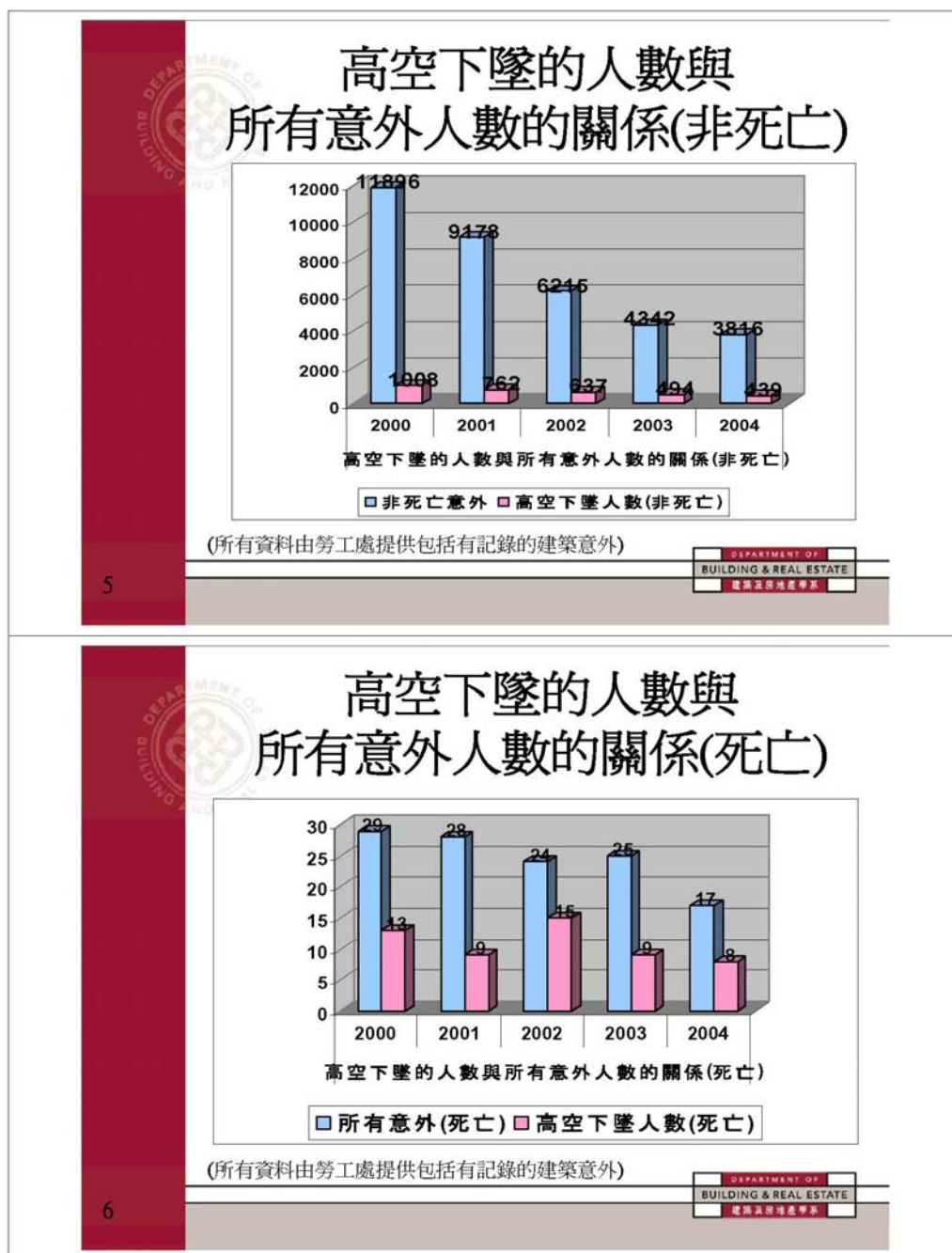
(所有資料由勞工處提供包括有記錄的建築意外)

2

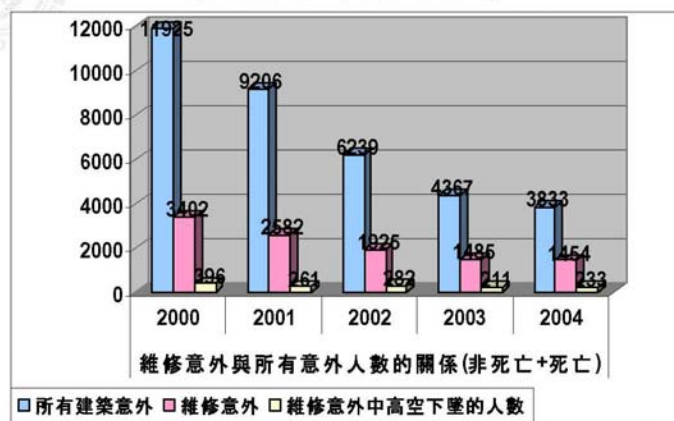


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維修意外與所有意外人數的關係 (死亡+非死亡)

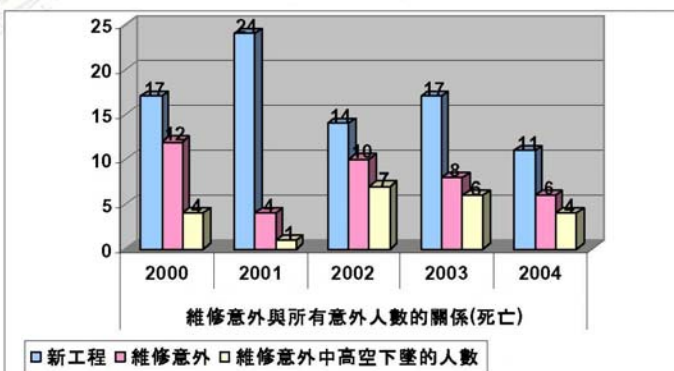


7

(所有資料由勞工處提供包括有記錄的建築意外)

DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產署

維修意外與所有意外人數的關係 (死亡)

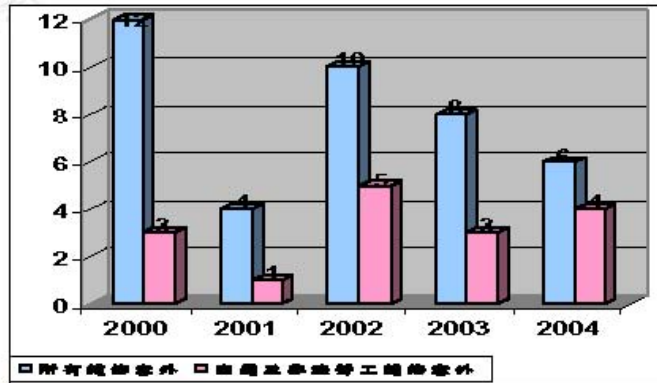


8

(所有資料由勞工處提供包括有記錄的建築意外)

DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產署

維修意外與自僱及非法勞工維修意外的關係(死亡)



(所有資料由勞工處提供包括有記錄的建築意外)

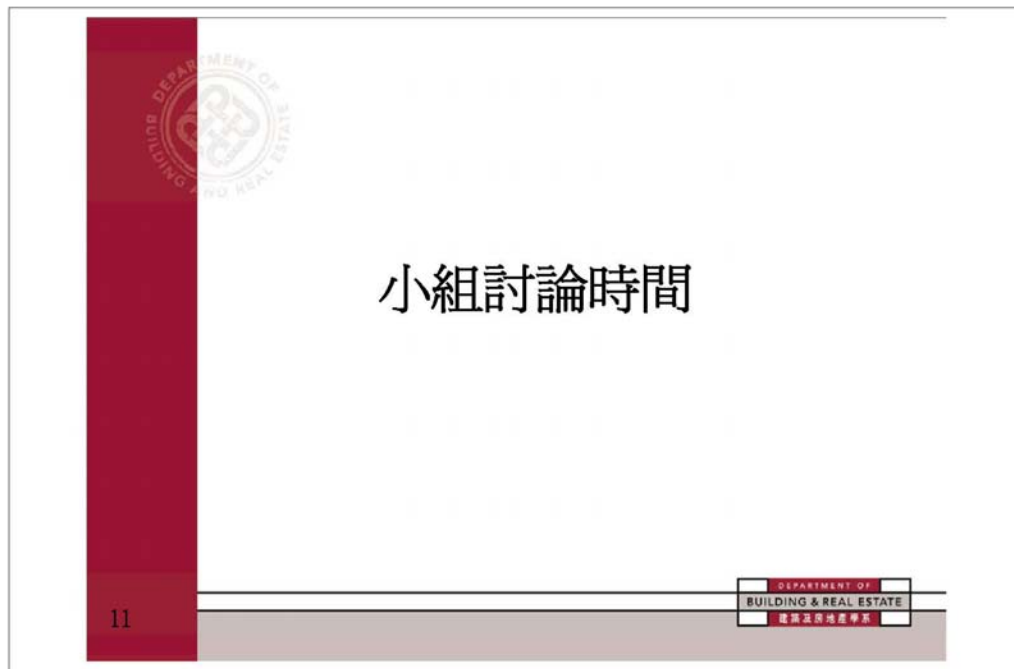
9

DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產處

高空安全做到足
家人放心享幸福

10

DEPARTMENT OF
BUILDING & REAL ESTATE
建築及房地產處



**Appendix 37 Question list for focus group meeting with supervisors and
contractors of Hong Yip Service Company Limited**

香港理工大學建築及房地產學系和香港建造業研究學會聯合研究

住宅樓宇維修及保養工程時高空工作的安全座談會

討論項目

A 組

- A1. 請介紹貴公司有關防止高空下墜意外的指引。
- A2. 甚麼是導致住宅樓宇維修時高空工作意外的根本原因？
- A3. 小業主在高空工作的安全責任是甚麼？

B 組

- B1. 請提出解決工人高空下墜的建議。
- B2. 你相信那一些科技是成本效益高及方便使用，有可以改進高空工作安全？
- B3. 前線員工在高空工作的安全責任是甚麼？

C 組

- C1. 貴公司有沒有採用一些新科技改進高空工作安全？
- C2. 如需加強管制住宅樓宇維修及保養高空工作安全，你有什麼建議？
- C3. 政府在高空工作的安全責任是甚麼？

D 組

- D1. 作為管理人士當提供高空工作安全措施及執行安全程序時，會遇到甚麼困難？
- D2. 如何能夠提高工人對高空工作的安全意識？
- D3. 承建商在高空工作的安全責任是甚麼？

Appendix 38 Minutes taken at focus group meeting with supervisors and contractors of Hong Yip Service Company Limited

**Construction Safety involving Working at Height for
Residential Building Repair and Maintenance**

Notes of the Hong Yip Focus Group Meeting on 21st October (Friday)

Venue: Room R508, 5/F, Block R, The Hong Kong Polytechnic University, Hung Hom,
Time: 2:30p.m. – 5:00p.m.

Information of participants

	公司名稱	姓名	聯絡電話	所屬的工種	組別
1	康業	梁偉龍	2828-0783	管理公司	A
2	東源	陳志浩	2415-1299	水喉及渠務工程	A
3	東源	溫建凱	2415-1299	水喉及渠務工程	A
4	國建寶	Mr. Sam LO	2795-4248	裝修及維修	A
5	力佳	Mr. Stanley CHAN	2627-0888	裝修及維修	B
6	力佳	Mr. Patrick CHEUNG	2627-0888	裝修及維修	B
7	力佳	Mr. LI Wai Tat	2627-0888	裝修及維修	B
8	利達	Ms. Helen Wong	2411-3238	裝修及維修	B
9	利達	Mr. HO Chung Shing	2411-3238	裝修及維修	B
10	美豐行	陳浩峰	2976-9980	裝修及維修	C
11	益記	林益土	2493-9546	裝修及維修	C
12	約克	Mr. WAN Hau Leung	2331-9286	機電工程	C
13	約克	Mr. KONG Chi Wai	2331-9286	機電工程	C

14	嘉恆	陳劍峰	2643-0868	裝修及維修	C
15	利豐	朱楚明	2427-8673	水喉及渠務工程	D
16	耀發	王榮基	2695-8928	裝修及維修	D
17	耀發	何志賢	2695-8928	裝修及維修	D
18	德志	李子健	2275-4757	裝修及維修	D
19	德志	林潤洲	2275-4757	裝修及維修	D

Group A: Michael; Group B: Albert; Group C: Max; Group D: Esther

The following was discussed in the meeting:

A1 Please introduce the guidelines on preventing fall of person related construction accidents at your company?

Most safety procedures for working at height are carried out according to the guidelines published by the Labour Department. For some larger projects a safety plan with special arrangements may be insisted by the client.

A2 What do you think are the root causes of fall from height accidents in residential building repair and maintenance works?

1. Factors affecting accidents include money, time, amount of work at height and supervision.
2. Profit is a constant issue that affects safety.
3. There are no particular guidelines for working at height the current LD guidelines are vague.
4. For jobs with below 50 workers no safety plan is required.
5. Workers take risk to save time.
6. For longer duration jobs the risk is lower as there is more time to prepare safety measures and perform safety procedures, but for projects of short

durations the opposite is the case.

A3 What role should individual owners play in safeguarding working at height for repair and maintenance works?

1. Individual owners should be responsible for choosing competent people to do the job and should also follow government and legal requirements.
2. Legislative controls may affect the behaviour of individual owners.

B1 Can you suggest some measures to reduce fall related construction accidents for repair and maintenance works?

1. Provide safety equipment.
2. Educate individual owners on safety and the related costs.
3. Educate contractors on safety and related costs.
4. Companies should assign in-house safety inspectors for monitoring the safety performance of workers.
5. The project agreement must insist on competent workers.
6. Part of the contract sum to be used for implementing safety.
7. Small contractors should be monitored and inspected.
8. The government should supervise small jobs and educate owners about their responsibilities and insurance matters.
9. The safety requirement for carrying out works should be adjusted according to the age of the building.

B2 What do you think are the cost-effective and user-friendly technological solutions?

Truss-out scaffolds supported by steel frames and installed by anchor bolts.

B3 What role should frontline workers play in safeguarding working at height for repair and maintenance works?

Workers should be responsible for the safety of the public.

Workers should also ensure that they are competent for the job by receiving sufficient training.

C1 Does your company adopt any advanced technology to improve safety for working at height?

1. Truss-out bamboo scaffold, steel brackets, safety belt, and life line.
2. Regular signing of form 5
3. Third party insurance
4. Metal scaffold
5. Aluminum scaffold
6. Gondola
7. Safety policy and guideline
8. Proper usage of safety equipment

C2 If it is necessary to increase controls for the safety of working at height for residential repair and maintenance works, what suggestions do you have?

1. Only competent persons to carry out jobs at height.
2. Inspection of scaffolding on a daily basis.
3. Experienced scaffolders only.
4. Safety nets.
5. ISO adoption.
6. Costs for safety procedures and measures should be included in the contract sum.

7. To ensure safety should be included in the contract as one of the conditions.
8. Safety measures and procedures to be carried out according to government legislation and guidelines.
9. A point's deduction system should be created to assess the performance of the contractors.
10. Warning letters and verbal warnings for unsafe acts.
11. Photograph unsafe acts of workers as proof to aware them.
12. Sufficient personal protection equipment.
13. Increase safety knowledge and awareness of workers.
14. Certification and recognition of competence by organizations like the CITA.
15. Safety instructions labeled on to scaffolding.

C3 What role should the government play in safeguarding working at height for repair and maintenance works?

1. Labour department should provide more detailed guidelines.
2. Provide more safety training courses.
3. More inspection and monitoring.
4. More advertisement.
5. Awards and recognition for good safety performance.

D1 For supervisors are there any difficulties in implementing safety measures and procedures for working at height?

There are two types of projects the larger and smaller ones. For larger projects there will be a safety management plan and safety officers to monitor the safety performance of the workers, hence there are no difficulties in implementing safety procedures. But for the small projects implementing safety is extremely difficult as there is no inspection or monitoring carried out, and often workers need to be watched and checked to perform as supposed to. Whether safety can be

implemented is very much dependent on the profits involved, if the workers are being paid well or being paid to carry out safety they will do so. But when the contract price is low the workers will skip safety measures and procedures to save cost and time.

In addition, for some cases safe practices cannot be carried out, for example it is extremely time consuming and inconvenient to construct a working platform for a small job such as changing a light bulb, other times there may not be enough room for a working platform to be used. Although many of the equipments, measures and procedures suggested by the government would ensure safety, often it is just not possible to apply them as it is very dependent on the site conditions.

D2 How can you increase the awareness of construction workers towards safety for working at height in maintenance works?

There is much the government can do to help increase the awareness of workers. For example, the green card course can be taken in a number of organizations, the standards can vary dramatically. From experience the green card course is a lot more informative and useful when organized by private centres. The reason being is that if they do not keep the level of their training courses they will not be permitted to carry on, but the disadvantage is that these centres usually charge a lot more to increase their profit margins. Some of the worse green card training courses have been organised by unions, often the student is probably a foreign frontline worker who can't even read Chinese or English, but will still be able to pass the course by indications from the teacher or further chances to repeat the multiple choice test. The standard to these courses should be unique and also there should be a set syllabus that needs to be kept to. The centres should be inspected by people in the government to ensure the standard of the course. The aim of the green card course is to give the worker a basic knowledge of the dangers on a building site so that he or she can protect themselves and others, it is

important that this intention should be kept to. The green card should be issued by the standard of the student's safety knowledge and not by the fee they pay.

In addition, to increase the awareness of workers the penalty system should be enforced to penalize workers and employers.

D3 What role should contractors play in safeguarding working at height for repair and maintenance works?

Contractors should take all responsibility as they are paid for the job so should be responsible for all matters of the project.

In addition group D discussed that often accidents are due to the low contract prices which do not encounter for the cost for safety procedures and equipment. Hence the group believed that the government should take the lead by abolishing the lowest bidder gets the job tradition. Instead contractors should be considered for their work quality and previous safety record. It is likely that if the government will take lead, contractors in the private sector will also follow.

**Appendix 39 Minutes taken at focus group meeting with supervisors and
contractors of Synergis Holdings Limited**

香港建造業研究學會和香港理工大學建築及房地產學系
住宅樓宇維修及保養工程時高空工作的安全座談會

會議記錄

二零零五年十一月二十八日(星期一)

地點: 香港理工大學 R 座 R507 室

時間: 下午 2 時 30 分至 4 時 30 分

香港理工大學建築及房地產學系: 黃君華教授

陳炳泉博士

陳煒明博士

林偉明博士

張泳沁小姐

受訪者資料:

	姓名	公司名	職位	所屬的工種	組別
1	Andy Mak	建澤工程有限公司	副管工	維修/保養	A
2	Carrie Cheng	建澤工程有限公司	副測量員	維修/保養	A
3	譚銘康	卓領工程有限公司	工程監督		A
4	周靄年	多寶德物業保養有限公司	工程經理		B
5	顏經偉	多寶德物業保養有限公司	科文		B
6	鄧康雲	貝登工程有限公司	高級工程主任	防水維修	B
7	李長順	永興建设工程有限公司	工程經理		C
8	李金傑	永明工程公司	科文	工程	C
9	萬春明	寶威工程(保養)有限公司	測量員	維修/保養	C
10	鍾健文	寶威工程(保養)有限公司	副管工	維修/保養	C
11	Josephine Cheng	新景象工程有限公司			C
12	譚敏儀	友成工程五金有限公司	文員	水泵保養及 水喉工程	D
13	吳佩平	寶豐建築工程(國際)有限公司	董事總經理		D
14	侯穎聖	寶豐建築工程(國際)有限公司	管工		D

A 組: 陳煒明博士; B 組: 林偉明博士; C 及 D 組: 陳炳泉博士;

A 組

A1. 請介紹貴公司有關防止高空下墜意外的指引。

- 主要棚架, 有獨立救生繩, 都需要用三口釘去釘實架。
- 有給予簡單訓練給員工。
- 文件指引。
- 安全計劃, 防止下墮。
- 安全主任講解, 監督員工工作情況。

A2. 甚麼是導致住宅樓宇維修時高空工作意外的根本原因?

- 貪快, 怕麻煩。
- 工具方面用得太耐。
- 工期短, 價錢低。
- 員工疏忽, 輕視安全。
- 獨立救生繩:
 - 位置難選擇
 - 難固定
 - 建議顧客提供固定位置〔新樓宇〕
 - 常利用拉爆縲絲

A3. 小業主在高空工作的安全責任是甚麼?

- 法律責任:
 - 無途徑証小業主知道其責任
 - 宣傳方面需提供
- 合資格的技工。
- 法律不清淅, 大部份只是指引, 不是法例。

B 組

B1. 請提出解決工人高空下墜的建議。

- 立例強制執行措施。
- 個人裝備。
- 救生繩規格，等等。
- 業界要自律。

B2. 你相信那一些科技是成本效益高及方便使用，有可以改進高空工作安全？

- 吊船。
- 高空工作台。

B3. 前線員工在高空工作的安全責任是甚麼？

- 參加安全及健康訓練課程。
- 認識個人防護裝備。
- 選擇按全帶穩固點。
- 防止物件下墜。
- 避免棚架載物超重。

C 組

C1. 貴公司有沒有採用一些新科技改進高空工作安全？

- 升降車。
- 吊船。

C2. 如需加強管制住宅樓宇維修及保養高空工作安全，你有什麼建議？

- 需要安排富經驗及合資格大工及中工。

- 外牆工作需要合資格人士及專業人士〔如考牌制度〕。

C3. 政府在高空工作的安全責任是甚麼？

- 強制性，要業主必須聘用有合資格公司去處理有關工種。
- 發牌〔立例〕。

D 組

D1. 作為管理人士當提供高空工作安全措施及執行安全程序時，會遇到甚麼困難？

- 指示不足。
- 棚工工序不清。
- 執行困難。
- 工人不按照指示工作。
- 起棚不按安全措施。
- 透明度不足。
- 難找穩固點。
- 無人監管搭棚。

D2. 如何能夠提高工人對高空工作的安全意識？

- 課程。
- 搭棚要咭〔證書〕。
- 工人亦應有責任。
- 可用扣分制。
- 長工制。

D3. 承建商在高空工作的安全責任是甚麼？

- 勞工處罰款。
- 確定以下：
 - 綠咭
 - 安全設備
 - 監察 + 警告信

Appendix 40 Industry based questionnaire



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



Construction Industry Institute
HONG KONG

香港建造業研究學會和香港理工大學建築及房地產學系 住宅樓宇維修及保養工程之高空工作安全研究 - 業界人士意見調查

二零零五年十二月

致業界人士：

有關參與住宅樓宇維修及保養工程之高空工作安全研究之邀請

香港住宅樓宇日趨老化，所以樓宇維修及保養工程的數目也有所增加。在維修及保養工程進行中經常發生意外，因此引起了業界及學術界的關注。

香港理工大學建築及房地產學系聯同香港建造業研究學會，共同進行一項研究名為“住宅樓宇維修及保養工程之高空工作安全”，其中一項的目的旨在探討業界人士在樓宇維修工程上的各種問題，從而提出改善住宅樓宇維修之高空工作安全的建議。

我們誠意邀請閣下參與是次研究，協助我們完成是次問卷調查。閣下的寶貴意見對學術界及建造業來說是十分重要的。為確保個人私隱，閣下所提供的資料將會被保密及只作學術研究之用。

閣下只需花 10 分鐘，在空格內填上✓號，並把填妥之問卷於一星期內交回公司有關同事或直接傳真至 2764 5131。如有任何查詢，請致電 2766 4309 張小姐或電郵 bsesther@inet.polyu.edu.hk。謝謝！

香港理工大學
建築及房地產學系
陳炳泉教授上

香港建造業研究學會和香港理工大學建築及房地產學系 住宅樓宇維修及保養工程之高空工作安全研究 - 問卷調查

I. 受訪者資料

1. 公司名稱: _____
2. 工作組別: I) 管理層: ☐ 工程經理 ☐ 項目經理 ☐ 安全經理 ☐ 工程師
II) 中層管理: ☐ 管工 ☐ 監督 ☐ 監工 ☐ 安全主任
III) 前線員工: ☐ 技工 ☐ 工人, 請列出您所屬的工作種類:
☐ 油漆及裝飾工 ☐ 散工 ☐ 鐵工 ☐ 泥水工 ☐ 拆卸工 ☐ 其他 _____
IV) 其他 ☐ _____
3. 從事建造業之工作經驗: ☐ 5 年或以下 ☐ 6-10 年 ☐ 11-20 年 ☐ 21-30 年 ☐ 31-40 年 ☐ 41 年或以上
4. 從事維修及保養工程之工作經驗: ☐ 5 年或以下 ☐ 6-10 年 ☐ 11-20 年 ☐ 21-30 年 ☐ 31-40 年 ☐ 41 年或以上
5. 你屬於以下那一個年齡組別: ☐ 16-25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56-65 ☐ 66-75

II. 安全教育與訓練

6. 你上一次參加安全訓練課程至今有多久?
☐ 3 個月或以下 ☐ 4 個月至 6 個月 ☐ 7 個月至 1 年 ☐ 2 年 ☐ 3 年 ☐ 4 年或以上
7. 你覺得那一類安全訓練最迎合工作要求? ☐ 演講 ☐ 研討會 ☐ 工作訓練 ☐ 其他 _____

	非常不同意	不同意	中立	同意	非常同意
8. 你是自願參與安全訓練的。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. 工人大多已忘記在安全及健康訓練課堂上所學得的安全知識。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. 一天的綠卡安全訓練課程, 足以應付我參與維修及保養的工作。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. 綠卡安全訓練課程應教授個人防護裝備的使用方法。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. 綠卡安全訓練課程應教授選擇安全帶的繫穩點的方法。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. 訓練課程應教授搭建飛棚及安裝狗臂架的方法。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. 應改善個人防護裝備的設計。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. 穿戴安全帶會妨礙我的工作進度。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. 獨立救生繩不容易使用。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. 應多開辦有關維修及保養的訓練課程。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. 一般大廈很難找出合適位置安裝安全帶的繫穩點。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. 一般業主不容許在他們的地方設置安全帶的繫穩點。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. 一般大廈沒有為安全帶的繫穩點而設的設施。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. 我不知道怎樣找出安全帶的繫穩點。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. 使用個人防護裝備會妨礙我的工作進度。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. 我不知道怎樣正確使用個人防護裝備。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. 應提供有關戶外高空工作的特別安全訓練。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

III. 維修意外

25. 你在工作時曾否遇上意外? ☐ 有 ☐ 沒有

26. 如你曾因工作遇上意外，是怎樣的傷害? ☐撞傷 ☐骨折 ☐扭傷 ☐多部分受傷 ☐其他_____
27. 如你曾因工受傷，你的傷勢有多嚴重?
 I) 不需要住院但是需要休息: ☐1 天或以下 ☐2-7 天 ☐8 天或以上
 II) 需要住院: ☐1 天或以下 ☐2-7 天 ☐8 天或以上
28. 你在高空工作時曾否遇上意外? ☐有 ☐沒有
29. 如你曾因高空工作遇上意外，是怎樣的傷害? ☐挫傷 ☐骨折 ☐扭傷 ☐多部分受傷 ☐其他_____
30. 如你曾因高空工作而受傷，你的傷勢有多嚴重?
 I) 不需要住院但是需要休息: ☐1 天或以下 ☐2-7 天 ☐8 天或以上
 II) 需要住院: ☐1 天或以下 ☐2-7 天 ☐8 天或以上

	非常不同意	不同意	中立	同意	非常同意
31. 意外後之調查主要是用來追究責任。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. 工作效率常被視為比健康及安全更重要。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. 在維修及保養工程中發生的意外通常會被呈報。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. 差點構成意外的維修及保養事故也經常被呈報。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. 當我因工受傷，我知道如何處理賠償 / 索償問題。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IV. 安全信息

36. 在收音機或電視等上常留意到建築安全信息。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. 上述的建築安全信息的效果非常有用。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. 有關維修及保養工程的高空工作的健康及安全指引並不足夠。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

V. 維修工人的安全態度

39. 如我尋求健康及安全的意見時，我的直屬上司都能提供協助。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. 管理層要求員工，為了完成工作，不惜違反健康及安全守則。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. 公司真正關注員工的工作健康及安全。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. 有些健康及安全守則未能實際地反映施工的需要。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. 這裏的監督人員對確保健康及安全所作的努力不是太有效。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. 我所接受的訓練已提供足夠技能去應付我工作上所可能遇到的危險。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. 我再不能改善現有健康及安全的制度。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. 在這裏的工人有時會冒險工作，而這些有危險的工作是我不會嘗試的。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. 公司很少推行對改善健康及安全的意見。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. 管理層有時會對違反安全的行為視而不見。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. 我擔心會失業。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. 我的工作沉悶及重覆性的。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. 在這裏發生的意外通常會被呈報。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

VI. 法律與責任

52. 現有的立法管制可減少高空下墮的意外。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. 政府應立法加強管制住宅樓宇維修及保養的高空工作安全。	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

54. 政府必須發牌予從事搭建飛棚工作的人士，以減低意外發生的機會。

☐ ☐ ☐ ☐ ☐

VII. 實際解決高空下墜意外的方法

55. 高空下墜意外的主因是工人的安全意識薄弱。

☐ ☐ ☐ ☐ ☐

56. 業界應該重新檢討工人在高空工作的保護設備是不適當及足夠。

☐ ☐ ☐ ☐ ☐

57. 業界應該檢討現時用狗臂架支撐的飛棚設計。

☐ ☐ ☐ ☐ ☐

58. 政府應該加強檢查及巡查工地以減少高空下墜的意外。

☐ ☐ ☐ ☐ ☐

59. 未來建築設計上工程顧問應考慮提供維修安全的設施，才能減低意外的發生。

☐ ☐ ☐ ☐ ☐

60. 工程合約上應強制要求承建商撥出部份工程費用，作為安全設備及程序的費用

☐ ☐ ☐ ☐ ☐

61. 香港應該引進外國在高空工作的安全保護設備及程序。

☐ ☐ ☐ ☐ ☐

62. 政府應該檢控及重罰不安全地進行高空工作的人。

☐ ☐ ☐ ☐ ☐

63. 設立從事飛棚工作工人的註冊制度，可減少高空下墜的意外。

☐ ☐ ☐ ☐ ☐

64. 應為需從事高空戶外工作的工人提供特別的訓練課程。

☐ ☐ ☐ ☐ ☐

65. 業界應該向公眾加強宣傳，指出高空工作潛在危險的途徑。

☐ ☐ ☐ ☐ ☐

66. 你可否提供減少高空下墜意外的方法？

☞ 問卷完畢! 多謝閣下的意見 ☞

Appendix 41 Flat owner/tenant questionnaire



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學



Construction Industry Institute
HONG KONG

香港建造業研究學會和香港理工大學建築及房地產學系 住宅樓宇維修及保養工程之高空工作安全研究 - 單位業主/住客意見調查

二零零六年一月

致單位業主/住客：

有關參與住宅樓宇維修及保養工程之高空工作安全研究之邀請

香港住宅樓宇日趨老化，所以樓宇維修及保養工程的數目也有所增加。在維修及保養工程進行中經常發生意外，因此引起了業界及學術界的關注。

香港理工大學建築及房地產學系聯同香港建造業研究學會，共同進行一項研究名為“住宅樓宇維修及保養工程之高空工作安全”，其中一項的目的旨在探討業主及住客在樓宇維修工程上的角色，從而提出改善住宅樓宇維修之高空工作安全的建議。

我們誠意邀請閣下參與是次研究，協助我們完成是次問卷調查。閣下的寶貴意見對學術界及建造業來說是十分重要的。為確保個人私隱，閣下所提供的資料將會被保密及只作學術研究之用。

閣下只需花 5 分鐘，在空格內填上✓號，並把填妥之問卷於一星期內放入閣下屋苑的收集箱內或直接傳真至 2764 5131。如有任何查詢，請致電 2766 4309 張小姐或電郵 bsesther@inet.polyu.edu.hk。謝謝！

香港理工大學
建築及房地產學系
陳炳泉教授上

I. 受訪者資料

1. 性別：☐男 ☐女
2. 年齡：☐≤25 歲 ☐26-35 歲 ☐36-45 歲 ☐46-55 歲
☐56-65 歲 ☐≥65 歲
3. 職業：_____
4. 婚姻狀況：☐單身 ☐已婚 ☐其他 _____
5. 教育程度：☐小學以下 ☐小學 ☐中學 ☐大專 ☐大學或以上
6. 居住區域：☐香港 ☐九龍 ☐新界
7. 居住年期：☐≤1 年 ☐1-5 年 ☐6-10 年 ☐11-15 年 ☐16-20 年 ☐≥20 年
8. 同住人數：☐1 人 ☐2 人 ☐3 人 ☐4 人 ☐5 人 ☐6 人 ☐≥6 人
9. 每月家庭總收入：☐≤\$10,000 ☐\$10,000-20,000 ☐\$20,001-30,000
☐\$30,001-40,000 ☐\$40,001-50,000 ☐≥\$50,000

1. II. 屋苑資料

1. 屋苑名稱：_____
2. 類別：☐公型 ☐私型
3. 樓齡：☐≤1 年 ☐1-5 年 ☐6-10 年 ☐11-15 年 ☐16-20 年
☐21-25 年 ☐26-30 年 ☐≥30 年

2. II. 屋苑資料(續)

4. 閣下單位建築面積(平方尺)：☐≤429 ☐430-752 ☐753-1,075
☐1,076-1,720 ☐≥1,720
5. 所住樓宇高度：☐≤10 樓 ☐11-20 樓 ☐21-30 樓 ☐31-40 樓 ☐≥40 樓
6. 閣下單位層樓：☐≤10 樓 ☐11-20 樓 ☐21-30 樓 ☐31-40 樓 ☐≥40 樓
7. 物業管理模式(可✓多項)：
☐業主立案法團 ☐物業管理公司
☐兩者皆無 ☐不清楚
8. 閣下為單位的：☐業主 ☐租客 ☐其他 _____

3. III. 維修情況及法律責任

1. 在過去五年內，府上曾否進行下列維修工程?(可✓多項)
☐窗框維修 ☐外牆防水 ☐外牆紙皮石 ☐更換冷氣機 ☐水喉及渠務
☐其他 _____ ☐沒有(請回答第 9 題。)
2. 進行這些工程時有沒有發生工業意外? ☐沒有

- ☐有；a. 受傷程度：☐輕傷 ☐重傷 ☐死亡 ☐不知道
b. 你是否需要為是次意外負上責任？☐是 ☐否 ☐不知道
3. 你清楚業主/住客在樓宇維修工程上需付的法律責任嗎？
☐知道 ☐有少許認知 ☐不知道
4. 當選擇維修工程承建商時，你會考慮什麼因素？（可✓多項）
☐口碑 ☐工程造價 ☐完工時間 ☐質素保證 ☐安全紀錄 ☐環保意識 ☐其他 _____
5. 你是否知道維修工程承建商有否為維修工程購買保險？☐知道 ☐不知道
6. 你有否為上列的維修工程購買保險？☐沒有；原因 _____
☐有；金額： _____
7. 你有否要求維修承辦商為工程購買保險？☐有 ☐沒有；原因 _____
8. 物業管理公司有否提供任何有關住宅維修的資料？☐沒有
☐所住大廈沒有物業管理公司 ☐有；請註明 _____
a. （如有資料提供）請✓出你對這資料的滿意程度。
☐非常滿意 ☐滿意 ☐尚可接受 ☐不滿意 ☐非常不滿意
9. 你有否接受以下由政府提供給業主/住客維修工程的協助？（可✓多項）
☐沒有 ☐貸款計劃 ☐指引及專業意見 ☐廣告宣傳 ☐小冊子
☐光碟資料 ☐其他 _____
a. （如有接受協助）請✓出你的滿意程度。
☐非常滿意 ☐滿意 ☐尚可接受 ☐不滿意 ☐非常不滿意
10. 你認為政府在樓宇維修工作安全上的宣傳是否足夠？請✓出你的意見。
☐非常足夠 ☐足夠 ☐尚可接受 ☐不足夠 ☐非常不足夠

☞問卷完畢！多謝閣下的意見☞

Appendix 42 Cross tabulation table of Q3-6 with Q25 and Q28 of the industry based questionnaire

			Q25. Have you ever been injured due to work?		
			yes	no	Total
Q3. Years of experience in the construction industry	0-5 years	Count	20	101	121
		% within Q3. Years of experience in the construction industry	16.5%	83.5%	100.0%
		% within Q25. Have you ever been injured due to work?	10.9%	19.9%	17.5%
	6-10 years	Count	23	129	152
		% within Q3. Years of experience in the construction industry	15.1%	84.9%	100.0%
		% within Q25. Have you ever been injured due to work?	12.6%	25.4%	22.0%
	11-20 years	Count	70	172	242
		% within Q3. Years of experience in the construction industry	28.9%	71.1%	100.0%
		% within Q25. Have you ever been injured due to work?	38.3%	33.9%	35.0%
	21-30 years	Count	44	88	132
		% within Q3. Years of experience in the construction industry	33.3%	66.7%	100.0%
		% within Q25. Have you ever been injured due to work?	24.0%	17.3%	19.1%
	31-40 years	Count	17	16	33
		% within Q3. Years of experience in the construction industry	51.5%	48.5%	100.0%
		% within Q25. Have you ever been injured due to work?	9.3%	3.1%	4.8%
	above 41 years	Count	9	2	11
		% within Q3. Years of experience in the construction industry	81.8%	18.2%	100.0%
		% within Q25. Have you ever been injured due to work?	4.9%	.4%	1.6%
Total	Count	183	508	691	
	% within Q3. Years of experience in the construction industry	26.5%	73.5%	100.0%	
	% within Q25. Have you ever been injured due to work?	100.0%	100.0%	100.0%	

			Q25. Have you ever been injured due to work		Total
			yes	no	
Q4. Years of experience in repair and maintenance works	0-5 years	Count	44	181	225
		% within Q4. Years of experience in repair and maintenance works	19.6%	80.4%	100.0%
		% within Q25. Have you ever been injured due to work?	25.7%	39.0%	35.4%
	6-10 years	Count	38	129	167
		% within Q4. Years of experience in repair and maintenance works	22.8%	77.2%	100.0%
		% within Q25. Have you ever been injured due to work?	22.2%	27.8%	26.3%
	11-20 years	Count	54	110	164
		% within Q4. Years of experience in repair and maintenance works	32.9%	67.1%	100.0%
		% within Q25. Have you ever been injured due to work?	31.6%	23.7%	25.8%
	21-30 years	Count	25	35	60
		% within Q4. Years of experience in repair and maintenance works	41.7%	58.3%	100.0%
		% within Q25. Have you ever been injured due to work?	14.6%	7.5%	9.4%
	31-40 years	Count	8	7	15
		% within Q4. Years of experience in repair and maintenance works	53.3%	46.7%	100.0%
		% within Q25. Have you ever been injured due to work?	4.7%	1.5%	2.4%
	above 41 years	Count	2	2	4
		% within Q4. Years of experience in repair and maintenance works	50.0%	50.0%	100.0%
		% within Q25. Have you ever been injured due to work?	1.2%	.4%	.6%
	Total	Count	171	464	635
		% within Q4. Years of experience in repair and maintenance works	26.9%	73.1%	100.0%
		% within Q25. Have you ever been injured due to work?	100.0%	100.0%	100.0%

			Q25. Have you ever been injured due to work?		Total
			yes	no	
Q5. Which of the following age groups do you belong to?	16-25 years old	Count	4	32	36
		% within Q5. Which of the following age groups do you belong to?	11.1%	88.9%	100.0%
		% within Q25. Have you ever been injured due to work?	2.3%	6.6%	5.4%
	26-35 years old	Count	37	163	200
		% within Q5. Which of the following age groups do you belong to?	18.5%	81.5%	100.0%
		% within Q25. Have you ever been injured due to work?	21.3%	33.5%	30.3%
	36-45 years old	Count	64	171	235
		% within Q5. Which of the following age groups do you belong to?	27.2%	72.8%	100.0%
		% within Q25. Have you ever been injured due to work?	36.8%	35.1%	35.6%
	46-55 years old	Count	55	111	166
		% within Q5. Which of the following age groups do you belong to?	33.1%	66.9%	100.0%
		% within Q25. Have you ever been injured due to work?	31.6%	22.8%	25.1%
	56-65 years old	Count	13	9	22
		% within Q5. Which of the following age groups do you belong to?	59.1%	40.9%	100.0%
		% within Q25. Have you ever been injured due to work?	7.5%	1.8%	3.3%
	66-75 years old	Count	1	1	2
		% within Q5. Which of the following age groups do you belong to?	50.0%	50.0%	100.0%
		% within Q25. Have you ever been injured due to work?	.6%	.2%	.3%
Total		Count	174	487	661
		% within Q5. Which of the following age groups do you belong to?	26.3%	73.7%	100.0%
		% within Q25. Have you ever been injured due to work?	100.0%	100.0%	100.0%

			Q25. Have you ever been injured due to work?		Total
			yes	no	
Q6. How long ago was the last time you attended a safety training course? (Pilot 1+2 - Q7)	3 months or less	Count	52	164	216
		% within Q6. How long ago was the last time you attended a safety training course?	24.1%	75.9%	100.0%
		% within Q25. Have you ever been injured due to work?	28.0%	32.3%	31.2%
	4 - 6 months	Count	29	103	132
		% within Q6. How long ago was the last time you attended a safety training course?	22.0%	78.0%	100.0%
		% within Q25. Have you ever been injured due to work?	15.6%	20.3%	19.0%
	7 months - 1 year	Count	63	141	204
		% within Q6. How long ago was the last time you attended a safety training course?	30.9%	69.1%	100.0%
		% within Q25. Have you ever been injured due to work?	33.9%	27.8%	29.4%
	2 years	Count	24	68	92
		% within Q6. How long ago was the last time you attended a safety training course?	26.1%	73.9%	100.0%
		% within Q25. Have you ever been injured due to work?	12.9%	13.4%	13.3%
	3 years	Count	5	10	15
		% within Q6. How long ago was the last time you attended a safety training course?	33.3%	66.7%	100.0%
		% within Q25. Have you ever been injured due to work?	2.7%	2.0%	2.2%
	4 years or more	Count	13	21	34
		% within Q6. How long ago was the last time you attended a safety training course?	38.2%	61.8%	100.0%
		% within Q25. Have you ever been injured due to work?	7.0%	4.1%	4.9%
Total	Count	186	507	693	
	% within Q6. How long ago was the last time you attended a safety training course?	26.8%	73.2%	100.0%	
	% within Q25. Have you ever been injured due to work?	100.0%	100.0%	100.0%	

			Q28. Have you ever been injured due to working at height?		Total
			Yes	No	
Q3. Years of experience in the construction industry	0-5 years	Count	7	94	101
		% within Q3. Years of experience in the construction industry	6.9%	93.1%	100.0%
		% within Q28. Have you ever been injured due to working at height?	10.4%	20.4%	19.2%
	6-10 years	Count	12	96	108
		% within Q3. Years of experience in the construction industry	11.1%	88.9%	100.0%
		% within Q28. Have you ever been injured due to working at height?	17.9%	20.9%	20.5%
	11-20 years	Count	20	160	180
		% within Q3. Years of experience in the construction industry	11.1%	88.9%	100.0%
		% within Q28. Have you ever been injured due to working at height?	29.9%	34.8%	34.2%
	21-30 years	Count	17	82	99
		% within Q3. Years of experience in the construction industry	17.2%	82.8%	100.0%
		% within Q28. Have you ever been injured due to working at height?	25.4%	17.8%	18.8%
	31-40 years	Count	5	23	28
		% within Q3. Years of experience in the construction industry	17.9%	82.1%	100.0%
		% within Q28. Have you ever been injured due to working at height?	7.5%	5.0%	5.3%
	above 41 years	Count	6	5	11
		% within Q3. Years of experience in the construction industry	54.5%	45.5%	100.0%
		% within Q28. Have you ever been injured due to working at height?	9.0%	1.1%	2.1%
	Total	Count	67	460	527
		% within Q3. Years of experience in the construction industry	12.7%	87.3%	100.0%
		% within Q28. Have you ever been injured due to working at height?	100.0%	100.0%	100.0%

			Q28. Have you ever been injured due to working at height?		Total
			Yes	No	
Q4. Years of experience in repair and maintenance works	0-5 years	Count	18	143	161
		% within Q4. Years of experience in repair and maintenance works	11.2%	88.8%	100.0%
		% within Q28. Have you ever been injured due to working at height?	30.5%	32.3%	32.1%
	6-10 years	Count	15	124	139
		% within Q4. Years of experience in repair and maintenance works	10.8%	89.2%	100.0%
		% within Q28. Have you ever been injured due to working at height?	25.4%	28.0%	27.7%
	11-20 years	Count	13	124	137
		% within Q4. Years of experience in repair and maintenance works	9.5%	90.5%	100.0%
		% within Q28. Have you ever been injured due to working at height?	22.0%	28.0%	27.3%
	21-30 years	Count	9	42	51
		% within Q4. Years of experience in repair and maintenance works	17.6%	82.4%	100.0%
		% within Q28. Have you ever been injured due to working at height?	15.3%	9.5%	10.2%
	31-40 years	Count	2	8	10
		% within Q4. Years of experience in repair and maintenance works	20.0%	80.0%	100.0%
		% within Q28. Have you ever been injured due to working at height?	3.4%	1.8%	2.0%
	above 41 years	Count	2	2	4
		% within Q4. Years of experience in repair and maintenance works	50.0%	50.0%	100.0%
		% within Q28. Have you ever been injured due to working at height?	3.4%	.5%	.8%
Total	Count		59	443	502
	% within Q4. Years of experience in repair and maintenance works		11.8%	88.2%	100.0%
	% within Q28. Have you ever been injured due to working at height?		100.0%	100.0%	100.0%

			Q28. Have you ever been injured due to working at height?		Total
			Yes	No	
Q5. Which of the following age groups do you belong to?	16-25 years old	Count % within Q5. Which of the following age groups do you belong to?	1 4.0%	24 96.0%	25 100.0%
		% within Q28. Have you ever been injured due to working at height?	1.6%	5.2%	4.8%
	26-35 years old	Count % within Q5. Which of the following age groups do you belong to?	15 9.3%	146 90.7%	161 100.0%
		% within Q28. Have you ever been injured due to working at height?	24.6%	31.6%	30.8%
	36-45 years old	Count % within Q5. Which of the following age groups do you belong to?	24 13.1%	159 86.9%	183 100.0%
		% within Q28. Have you ever been injured due to working at height?	39.3%	34.4%	35.0%
	46-55 years old	Count % within Q5. Which of the following age groups do you belong to?	14 10.6%	118 89.4%	132 100.0%
		% within Q28. Have you ever been injured due to working at height?	23.0%	25.5%	25.2%
	56-65 years old	Count % within Q5. Which of the following age groups do you belong to?	7 35.0%	13 65.0%	20 100.0%
		% within Q28. Have you ever been injured due to working at height?	11.5%	2.8%	3.8%
	66-75 years old	Count % within Q5. Which of the following age groups do you belong to?	0 .0%	2 100.0%	2 100.0%
		% within Q28. Have you ever been injured due to working at height?	.0%	.4%	.4%
Total		Count % within Q5. Which of the following age groups do you belong to?	61 11.7%	462 88.3%	523 100.0%
		% within Q28. Have you ever been injured due to working at height?	100.0%	100.0%	100.0%

			Q28. Have you ever been injured due to working at height?		
			Yes	No	Total
Q6. How long ago was the last time you attended a safety training course? (Pilot 1+2 - Q7)	3 months or less	Count	19	133	152
		% within Q6. How long ago was the last time you attended a safety training course?	12.5%	87.5%	100.0%
		% within Q28. Have you ever been injured due to working at height?	28.4%	28.6%	28.6%
	4 - 6 months	Count	5	82	87
		% within Q6. How long ago was the last time you attended a safety training course?	5.7%	94.3%	100.0%
		% within Q28. Have you ever been injured due to working at height?	7.5%	17.6%	16.4%
	7 months - 1 year	Count	26	168	194
		% within Q6. How long ago was the last time you attended a safety training course?	13.4%	86.6%	100.0%
		% within Q28. Have you ever been injured due to working at height?	38.8%	36.1%	36.5%
	2 years	Count	12	47	59
		% within Q6. How long ago was the last time you attended a safety training course?	20.3%	79.7%	100.0%
		% within Q28. Have you ever been injured due to working at height?	17.9%	10.1%	11.1%
	3 years	Count	2	11	13
		% within Q6. How long ago was the last time you attended a safety training course?	15.4%	84.6%	100.0%
		% within Q28. Have you ever been injured due to working at height?	3.0%	2.4%	2.4%
	4 years or more	Count	3	24	27
		% within Q6. How long ago was the last time you attended a safety training course?	11.1%	88.9%	100.0%
		% within Q28. Have you ever been injured due to working at height?	4.5%	5.2%	5.1%
Total	Count	67	465	532	
	% within Q6. How long ago was the last time you attended a safety training course?	12.6%	87.4%	100.0%	
	% within Q28. Have you ever been injured due to working at height?	100.0%	100.0%	100.0%	

Appendix 43 Results of Discriminant Analysis

Discriminant

Analysis Case Processing Summary

Unweighted Cases		N	Percent
Valid		541	93.1
Excluded	Missing or out-of-range group codes	5	.9
	At least one missing discriminating variable	33	5.7
	Both missing or out-of-range group codes and at least one missing discriminating variable	2	.3
	Total	40	6.9
Total		581	100.0

Group Statistics

Q25.		Mean	Std. Deviation	Valid N (listwise)	
				Unweighted	Weighted
yes	Q39. My immediate boss would be very helpful if I asked for advice on safety and health matters. (Pilot 2 - Q27)	3.60	.689	147	147.000
	Q40. Management would expect me to break safety and health procedures/instructions/rules to get the job done. (Pilot 2 - Q28)	2.48	.871	147	147.000
	Q41. The company really cares about the safety and health of the people who work here. (Pilot 2 - Q29)	3.61	.745	147	147.000

	Q42. Some safety and health procedures/instructions/rules do not reflect how the job is now done. (Pilot 2 - Q30)	3.45	.821	147	147.000
	Q43. Supervisors here are not very effective in ensuring safety and health. (Pilot 2 - Q31)	2.95	.817	147	147.000
	Q44. The training I had covered all the safety and health risks associated with the work for which I am responsible. (Pilot 2 - Q32)	3.46	.743	147	147.000
	Q45. There is nothing I can do to further improve safety and health here. (Pilot 2 - Q33)	2.81	.830	147	147.000
	Q46. People who work here sometimes take risks at work which I would not take myself. (Pilot 2 - Q34)	3.65	.764	147	147.000
	Q47. Suggestions to improve safety and health are seldom acted upon. (Pilot 2 -Q35)	2.69	.801	147	147.000
	Q48. Management sometimes turn a blind eye to safety and health procedures/instructions/rules being broken. (Pilot 2 -Q36)	2.63	.854	147	147.000
	Q49. I am worried about my job security. (Pilot 2 - Q37)	3.38	.946	147	147.000
	Q50. My job is boring and repetitive. (Pilot 2 - Q38)	3.11	1.028	147	147.000
	Q51. Accidents which happen here are always reported. (Pilot 2 - Q39)	3.71	.561	147	147.000
no	Q39. My immediate boss would be very helpful if I asked for advice on safety and health matters. (Pilot 2 - Q27)	3.59	.723	394	394.000

Q40. Management would expect me to break safety and health procedures/instructions/rules to get the job done. (Pilot 2 - Q28)	2.61	.932	394	394.000
Q41. The company really cares about the safety and health of the people who work here. (Pilot 2 - Q29)	3.66	.678	394	394.000
Q42. Some safety and health procedures/instructions/rules do not reflect how the job is now done. (Pilot 2 - Q30)	3.33	.753	394	394.000
Q43. Supervisors here are not very effective in ensuring safety and health. (Pilot 2 - Q31)	2.94	.821	394	394.000
Q44. The training I had covered all the safety and health risks associated with the work for which I am responsible. (Pilot 2 - Q32)	3.42	.755	394	394.000
Q45. There is nothing I can do to further improve safety and health here. (Pilot 2 - Q33)	2.95	.834	394	394.000
Q46. People who work here sometimes take risks at work which I would not take myself. (Pilot 2 - Q34)	3.37	.858	394	394.000
Q47. Suggestions to improve safety and health are seldom acted upon. (Pilot 2 -Q35)	2.77	.841	394	394.000
Q48. Management sometimes turn a blind eye to safety and health procedures/instructions/rules being broken. (Pilot 2 -Q36)	2.70	.854	394	394.000
Q49. I am worried about my job security. (Pilot 2 - Q37)	3.11	.908	394	394.000
Q50. My job is boring and repetitive. (Pilot 2 - Q38)	2.90	.893	394	394.000

	Q51. Accidents which happen here are always reported. (Pilot 2 - Q39)	3.48	.745	394	394.000
Total	Q39. My immediate boss would be very helpful if I asked for advice on safety and health matters. (Pilot 2 - Q27)	3.59	.713	541	541.000
	Q40. Management would expect me to break safety and health procedures/instructions/rules to get the job done. (Pilot 2 - Q28)	2.58	.917	541	541.000
	Q41. The company really cares about the safety and health of the people who work here. (Pilot 2 - Q29)	3.64	.697	541	541.000
	Q42. Some safety and health procedures/instructions/rules do not reflect how the job is now done. (Pilot 2 - Q30)	3.36	.773	541	541.000
	Q43. Supervisors here are not very effective in ensuring safety and health. (Pilot 2 - Q31)	2.94	.819	541	541.000
	Q44. The training I had covered all the safety and health risks associated with the work for which I am responsible. (Pilot 2 - Q32)	3.43	.751	541	541.000
	Q45. There is nothing I can do to further improve safety and health here. (Pilot 2 - Q33)	2.91	.835	541	541.000
	Q46. People who work here sometimes take risks at work which I would not take myself. (Pilot 2 - Q34)	3.44	.843	541	541.000
	Q47. Suggestions to improve safety and health are seldom acted upon. (Pilot 2 -Q35)	2.75	.830	541	541.000

	Q48. Management sometimes turn a blind eye to safety and health procedures/instructions/rules being broken. (Pilot 2 -Q36)	2.68	.854	541	541.000
	Q49. I am worried about my job security. (Pilot 2 - Q37)	3.18	.926	541	541.000
	Q50. My job is boring and repetitive. (Pilot 2 - Q38)	2.96	.935	541	541.000
	Q51. Accidents which happen here are always reported. (Pilot 2 - Q39)	3.55	.707	541	541.000

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.946	29.571	4	.000

Appendix 44 Measures to prevent fall accidents suggested by the industry based questionnaire respondents

- Pay for working at height scheme for main contractor, sub-contractor and worker.
- Research good international practices for example working platforms.
- Increase individual safety awareness.
- Apply appropriate safety measures. Contractors to include a certain proportion of the contract sum for safety measures and procedures, and this also to be stated in the contract.
- License for workers who work at height. Workers can complain to company about insufficient personal protective equipment. Company can also ask workers performing unsafe acts to leave.
- Enforce personal protective equipment. Briefing before work. Appropriate work training. Work assessment and improvement.
- Reduce the need for working at height. Government increases inspection and penalty.
- Introduce international personal protective equipment. Redesign the introduced products to suit the local situation. And produce new invention locally to reduce costs and lower the product price to be readily available. State in project contract the amount to be spent on safety.
- Design procedures for working at height.
- Check that workers have had enough rest before starting work.
- Use personal protective equipment including independent life line.
- Increase monitoring, inspection and penalization
- Lack monitoring from the government. Employers neglect safety guidelines. Reduce responsibility. Many workers are new immigrants. Mainland workers lack safety knowledge. Fewer contracts create keen competition.
- Increase safety training and education. Educate workers to use safety belt.
- Avoid working at height.

- Estimate the risks before working at height. Increase the safety awareness of workers for working at height. Define legislation relating to working at height. Increase supervision and monitoring for installing truss-out scaffold.
- For repair works it is often difficult to find a suitable anchor point, so instead use working platforms.
- More discussions should be undertaken on the special design of working at height maintenance works. The government should review the lowest bid price system so that the cost of work can be maintained at an appropriate level.
- Use more rigid safety working platforms.
- Enforce the safety awareness of frontline workers; consider companies with low financial backup.
- Registered persons should inspect bamboo scaffold after installation; enforce the safety awareness of workers; enforce green card safety training on using personal protective equipment.
- Enforce safety awareness of workers.
- Enforce safety of workers at work
- Establish responsibility system for clients, contractors and workers; the government should set up guidelines and enforce legislation for the project team to follow.
- The government should enhance safety awareness of working at height through media.
- Frequent use of safety belts; rest after work.
- Enforce the set up of safety system, such as independent life line and safety belt.
- Enforce legislation on workers working at height for safety
- Provide safety belt and independent life line; penalty on workers who do not use safety measures.
- Enforce penalty on workers.
- Revise design of new buildings for maintenance activities; provide training and enforcement for client and workers; control on workers.
- Raise safety awareness of workers working at height.

- Enforce execution on safety guidelines by management and training for workers.
- Set up Codes of Practice on safety. Penalty or even ban on work on those, including contractors who do not comply with the Safety Codes of Practice.
- Check the safety of truss-out scaffold by registered officer. Discuss the possible position for the independent life line. Charge the owners and workers by legislative means.
- Workers need to be certified and comply with all safety regulations.
- Enact rules and regulations; penalty on workers without concern on safety.
- Set up safety installation guidelines including fixing details by professionals.
- Provide morning session to workers on safety awareness and work procedures.
- Client and the project management company should consider the safety of external wall maintenance and more research should be conducted on this area.
- Enhanced workers safety training.
- Careful monitoring on the safety conditions on site and inform the management of any irregularities.
- Wear safety belt. Do not work if feeling unwell. Do not work after taking medicine.
- Each party should be prepared to bear the additional costs of safety devices.
- Show the mistakes in undertaking works at height on TV. Raise the awareness of the workers on safety.
- Enforce the training of workers and the management level involved in working at height projects. The exam system should be received regularly and the practitioners should sit for the exam at regular levels. Those who do not meet the requirements should be refrained from working at height.
- Employ more safety personnel to increase patrolling. Enforce the safety regulations to be followed by workers and contractors. Let workers understand the seriousness of the negative results in regular meetings.
- Flat owner or tenant must report wall conditions.
- Increase contract price.

- On the job training
- Enforce the installation of safety devices for all works involving working at height.
- Enhance the workers safety education. The management should enforce the safety instructions strictly.
- Before commencing work, the construction site should be checked and accident prevention methods prepared. All safety measures should be carried out.
- Must be careful and use all safety measures.
- Increase safety awareness of workers working at height.

Appendix 45 Crosstabs between type of building and mode of property Management

Crosstabs Part II - Q2. Sector type of building/court * Part II - Q7. Mode of property management

			Part II - Q7. Mode of property management					Total
			Owners' corporation	Property management company	Neither	Not sure	Both	
Part II - Q2. Sector type of building/court	Public	Count	5	16	5	12	7	45
		% within Part II - Q2. Sector type of building/court	11.1%	35.6%	11.1%	26.7%	15.6%	100.0%
		% within Part II - Q7. Mode of property management	17.2%	10.9%	62.5%	66.7%	8.5%	15.8%
		% of Total	1.8%	5.6%	1.8%	4.2%	2.5%	15.8%
	Private	Count	24	131	3	6	75	239
		% within Part II - Q2. Sector type of building/court	10.0%	54.8%	1.3%	2.5%	31.4%	100.0%
		% within Part II - Q7. Mode of property management	82.8%	89.1%	37.5%	33.3%	91.5%	84.2%
		% of Total	8.5%	46.1%	1.1%	2.1%	26.4%	84.2%
Total		Count	29	147	8	18	82	284
		% within Part II - Q2. Sector type of building/court	10.2%	51.8%	2.8%	6.3%	28.9%	100.0%
		% within Part II - Q7. Mode of property management	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	10.2%	51.8%	2.8%	6.3%	28.9%	100.0%

Appendix 46 Crosstabs between type of building and provision of information about residential repair works

CrosstabsPart II - Q2. Sector type of building/court * Part III - Q8. Does the property management company provide any information about residential repair?

			Part III - Q8. Does the property management company provide any information about residential repair?			Total
			No	No property management company manages the building	Yes	
Part II - Q2. Sector type of building/court	Public	Count	25	0	7	32
		% within Part II - Q2. Sector type of building/court	78.1%	.0%	21.9%	100.0 %
		% within Part III - Q8. Does the property management company provide any information about residential repair?	37.9%	.0%	5.7%	16.6%
		% of Total	13.0%	.0%	3.6%	16.6%
	Private	Count	41	5	115	161
		% within Part II - Q2. Sector type of building/court	25.5%	3.1%	71.4%	100.0 %
		% within Part III - Q8. Does the property management company provide any information about residential repair?	62.1%	100.0%	94.3%	83.4%
		% of Total	21.2%	2.6%	59.6%	83.4%
Total		Count	66	5	122	193
		% within Part II - Q2. Sector type of building/court	34.2%	2.6%	63.2%	100.0 %
		% within Part III - Q8. Does the property management company provide any information about residential repair?	100.0%	100.0%	100.0%	100.0 %
		% of Total	34.2%	2.6%	63.2%	100.0 %