

Lifting of I-beam by Lorry-mounted Crane

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Background

The accident :

- involved a metal works subcontractor's worker
- at the time of the accident, two scrapped I-beams were being lifted up by a lorry-mounted crane after successful "trial lifting"

Risk control measures for lifting of materials by lorry-mounted crane

1. Appoint competent signaller and rigger;
2. Inspect lifting appliance and lifting gears before use;
3. Prohibit any lifting operation exceeding safe working load;
4. Ensure no person is allowed to be under a load when it is being lifted;
5. Arrange designated persons to control and direct road users when works are carried out in the vicinity;
6. Provide control rope for long objects to prevent the swing;
7. Prohibit lifting of materials using single leg sling; and
8. Use a receptacle for lifting loose materials.

提名合資格人員表格

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地盤經理:

編號: LF-23

本公司按工程需要, 現推薦 _____ 先生為合資格人員, 負責上述地盤下列工作:

- | | | |
|---|-----------------------------------|---|
| <input type="checkbox"/> 起重機械操作員 | <input type="checkbox"/> 臨時工程統籌員 | <input type="checkbox"/> 挖泥機操作員 |
| <input type="checkbox"/> 挖掘工程檢查員 | <input type="checkbox"/> 機械檢驗員 | <input type="checkbox"/> 安全督導員 |
| <input type="checkbox"/> 棚架檢查員 | <input type="checkbox"/> 急救員 | <input checked="" type="checkbox"/> 信號/吊重/交通指揮員 |
| <input type="checkbox"/> 電業檢查員 | <input type="checkbox"/> 砂輪安裝及管理員 | <input type="checkbox"/> 安全代表 |
| <input type="checkbox"/> 其它(請列明): _____ | | |

現將其個人資料、履歷及工作經驗簡列如下, 望予以批准。

甲部: 被提名人仕資料

1. 履歷(請附上有關證書影印本一份)

姓名	受僱機構	發證日期	到期日期
地建材料員工	建築業議會	23/06/2011	22/06/2014

2. 工作經驗

由(日/月/年)	至(日/月/年)	僱主	職位

個人資料

姓名 (中文)	(英文)
性別 <input checked="" type="radio"/> 男 <input type="radio"/> 女	年齡 _____ 香港身份證號碼 _____
簽署	日期 _____

部: 僱主資料

公司名稱: (中文) _____ (英文) _____

負責人姓名: (中文) _____ (英文) _____

職位 地盤經理

簽署 (日期) _____

合資格人員委任書

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地盤名稱: _____

合約編號: N/A

委任書編號: LF-23

向志明:

茲根據提名合資格人員表格編號: LF-23, 由

起至另行通知為止, 委任閣下為

「地盤之信號/吊重/交通指揮員」, 負責

- 使用前檢查起重裝置(繩索、索具、鐵鏈、布帶等), 確保其狀態良好;
- 評估負荷物重量、形式及重心, 繫散物料應使用吊斗, 為負荷物選擇適當的索具及起重裝置, 採取正確吊運方法, 嚴禁超吊吊運;
- 將負荷物吊離地面約 500mm 後, 檢查起重裝置是否牢固扣穩負荷物, 確保負荷物吊運期間不會從高處墮下及在他人頭上經過;
- 將負荷物裝上吊機或從吊機卸下, 留意負荷物是否穩定及穩固, 有需要時應加上導繩;
- 與吊機操作員保持清晰溝通的聯絡方法, ;
- 如發現問題, 必須立即停止工作及通知地盤;
- 確保起重裝置有有效檢驗証書, 按季度噴上正確色碼, 1-3 月藍色、4-6 月黃色、7-9 月綠色、10-12 月橙、白色待驗、紅色不可使用。

f 工作, 若閣下對上述工作有任何疑問, 請與本人或地盤安全主任 譚志堅 先生聯絡。

被委任人
年 月 日

地盤經理
年 月 日

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Circumstances Of The Accident

- Under supervision by the general foreman, he and his co-worker assisted in rigging the two scrapped I-beams by the two legs chain sling and each of them was responsible for rigging one end of the scrapped I-beams.
- They wrapped both ends of the scrapped I-beams with the legs of the chain sling and shortened the leg length using the shortening clutches
- Having ensured that all workers were stayed aside, the general foreman informed the crane operator to lift the scrapped I-beams up to about 500mm above ground for “trial lifting”

Circumstances Of The Accident

- During “trial lifting”, they confirmed the scrapped I-beams were securely rigged and balanced.
- When the scrapped I-beams were being lifted up to about 2m above ground, somehow he returned back and approached the scrapped I-beams, during which the chain link of one sling leg that locked into the shortening clutch suddenly detached, causing tilting of the two scrapped I-beams
- His head was accidentally hit by the downward side of the tilted scrapped I-beams
- The whole process was recorded by a CCTV installed on site

The Accident Investigation

The Accident Scene

- The chain link of one sling leg that locked into the shortening clutch was found detached, causing the two scrapped I-beams with one end tilted and shifted downwards and the 2 legs of the chain sling shifted from the original balanced positions.



Photo taken immediately
after the accident

The Accident Investigation

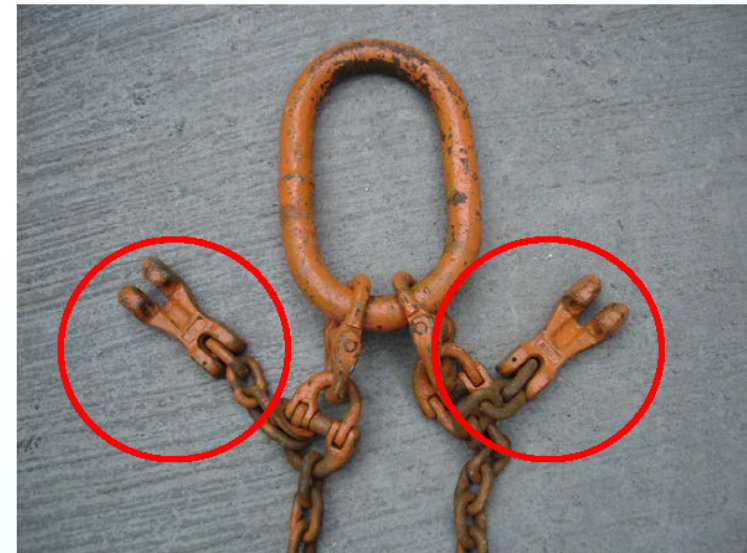
The Two Scrapped I-beams

- The dimensions of each scrapped I-beam were about 30cm (flange) x 63cm (web) x 3.85m (length)
- The two scrapped I-beams together were one stacked over the other with circumference 220cm and about 1358kg in weight in total.

The Accident Investigation

Lorry-mounted crane and Two Legs Chain Sling

- Both possessed valid certificates
- The lorry-mounted crane was in safe working order; and the chain sling had no newly-formed scratches, deformation and visible damage
- Each leg of sling had one chain shortening clutch and one hook with safety latch at the lower end



Shortening clutches

The Accident Investigation

Lorry-mounted crane and Two Legs Chain Sling

- The crane operator reported that the ASLI of the crane was not triggered at the time of the accident.
- A RPE was employed to carry out tests regarding lifting of two similar I-beams stacked together using a two legs chain sling with shortening clutches by a lorry-mounted crane.



Shortening clutch connected to chain in the **normal** direction



Shortening clutch connected to chain in the **reverse** direction

The Accident Investigation

Lorry-mounted crane and Two Legs Chain Sling

- Test results demonstrated that there was no slipping or displacements of the I-beams, and no detachment of chain links from shortening clutches
- After “trial lifting” was properly carried out by competent person, detachment of chain links from shortening clutches during subsequent lifting operation was thus highly unusual

Enhancement Measures Taken After The Accident

- At company level, the Company established a *Working Guidelines for the Use of Mobile Cranes on Sites*
 - defining the qualifications and responsibilities of:
 - mobile crane operator,
 - signaller,
 - rigger,
 - lifting supervisor and
 - site safety personnel;

Enhancement Measures Taken After The Accident

- suggesting proper lifting gears for rigging common construction materials;



- prohibiting the use of shortening clutches for except for special circumstances under a permit-to-work system

負重物	金屬吊鏈	帆布帶	鋼絲繩 (威也)	備註
鋼筋	✓		✓	-
工字鐵	✓		✓	使用工字夾
開板	✓		✓	-
施工機械及大型基礎工具	✓		✓	-
角鐵	✓		✓	加上與角鐵一樣長度木枋
零星材料	✓		✓	使用容器盛載吊運
大口徑鋼管	✓			使用吊夾
預製石夾板	✓			使用專用 4 爪鏈
佛沙	✓			使用吊杆
石夾斗 (靴斗)	✓			使用 8 噸仔鏈
鋼管		✓		使用尼龍索帶 (飛機帶)
板枋		✓		使用尼龍索帶 (飛機帶)
杉竹		✓		使用尼龍索帶 (飛機帶)
渠通		✓		吊運不可超過一件
乾掛牆		✓		-
英泥		✓		-