



CONSTRUCTION
INDUSTRY COUNCIL
建造業議會



發展局
DEVELOPMENT BUREAU



2020
建造業安全周
CONSTRUCTION
SAFETY WEEK

吊運安全手冊

LIFTING SAFETY HANDBOOK



工地齊FUN享
SITE SAFETY GATHERING

Zero "意" 外
ACCIDENT
地盤零意外 關懷建未建
Zero Accident, we Build, we Care

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It is important to note that compliance with this publication does not itself confer immunity from legal obligations in Hong Kong. Employers, contractors, owners and all stakeholders are reminded to observe and comply with statutory provisions, relevant codes of practice and other government departments' requirements so as to discharge their legal and other pertinent duties related to lifting operation.

》 查詢 《 ENQUIRIES

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》 簡介 《 INTRODUCTION

為持續及更有效地推廣工地安全，主辦單位希望以「工地齊FUN享」作為建造業安全周2020的啟動活動，於不同工地推廣，以便讓更多工友參與。發展局及建造業議會（主辦單位）為協助工地舉行相關的安全推廣，會向參與單位提供本刊物（吊運安全手冊）。

本刊物簡介一般吊運工作的安全資料及重點，以供參閱，並進一步讓持份者了解進行相關工作的風險及安全預防措施。

In order to promote safety to construction site on a continuous and more effective basis, a "Site Safety Gathering" will be organised as a startup of the Construction Safety Week 2020. Lifting Safety Handbook (This publication) is prepared by the Development Bureau and the Construction Industry Council (the organiser) and provided to the participating sites as reference for the event. A summary of the safety information and highlights of the lifting operation for different duty holders, understanding the risks and the safety measures to be taken when conducting the related works, is given in this publication.

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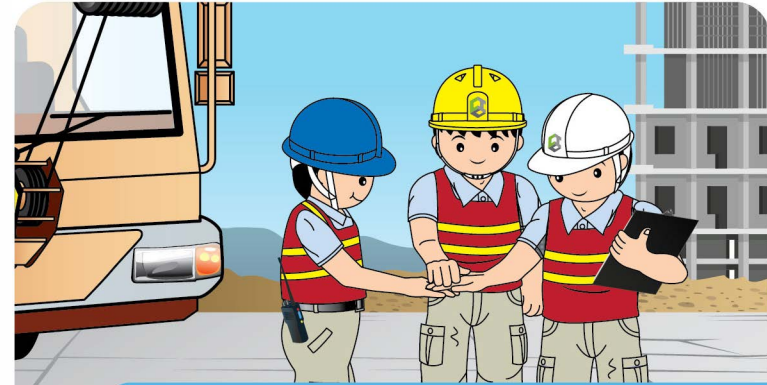
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» 承建商 / 僱主 / 擁有人的角色與責任
CONTRACTOR'S / EMPLOYER'S / OWNER'S ROLES AND
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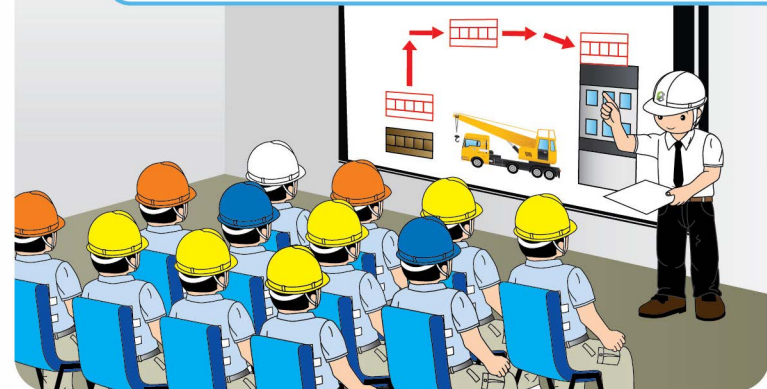


在進行吊運工作前，承建商 / 僱主 / 擁有人需：

- 確保負責準備、施工、架設、拆卸、操作及使用起重機的人士，就有關安全及操作程序方面，都曾接受良好的訓練。
- 制定一套安全計劃和安全施工程序，向所有相關人員介紹該計劃和程序，並明確分配各人的安全責任。

Before the lifting operation, the Contractor / Employer / Owner shall:

- Ensure that the responsible persons for preparing, operating, erecting, disassembling and using of cranes are well trained in safety and operating procedures.
- Develop safety plan and safe working procedures, brief all relevant staff about the plan and procedures and clearly assign individual safety responsibilities.



起重機操作員的角色與責任

CRANE OPERATOR'S ROLES AND RESPONSIBILITIES



起重機操作員應根據製造商的指引及安全工作制度的規定操作起重機。起重機操作員應符合下述要求：

- 年齡已屆18歲，並持有有效訓練證明書；
- 已接受足夠訓練及對該起重機有足夠的認識；
- 每次只應遵從一名訊號員的指示。熟悉吊運團隊之間所示的手號及使用對講機，以便安全地執行訊號員的指示；及
- 留意吊運範圍，如發現非相關工作人士進入，必須暫停吊運操作。

The crane operator should operate the crane in accordance with the manufacturer's guidelines and safe working procedures. The crane operator should fulfill the following requirements:

- Aged 18 years old or above, holding a valid training certificate;
- Sufficiently trained with knowledge in operating the crane;
- Only follow the instructions of one signaller. Familiar with hand signal used in the lifting team and use of walkie talkie to execute the instructions of the signaller; and
- Pay attention to the lifting zone. If any unauthorised entry is observed, the lifting operation should be suspended.

訊號員的角色與責任

SIGNALLER'S ROLES AND RESPONSIBILITIES

訊號員應負責將吊索工的訊號傳遞給起重機操作員，並負責指示起重機安全移動。他應符合下述要求：

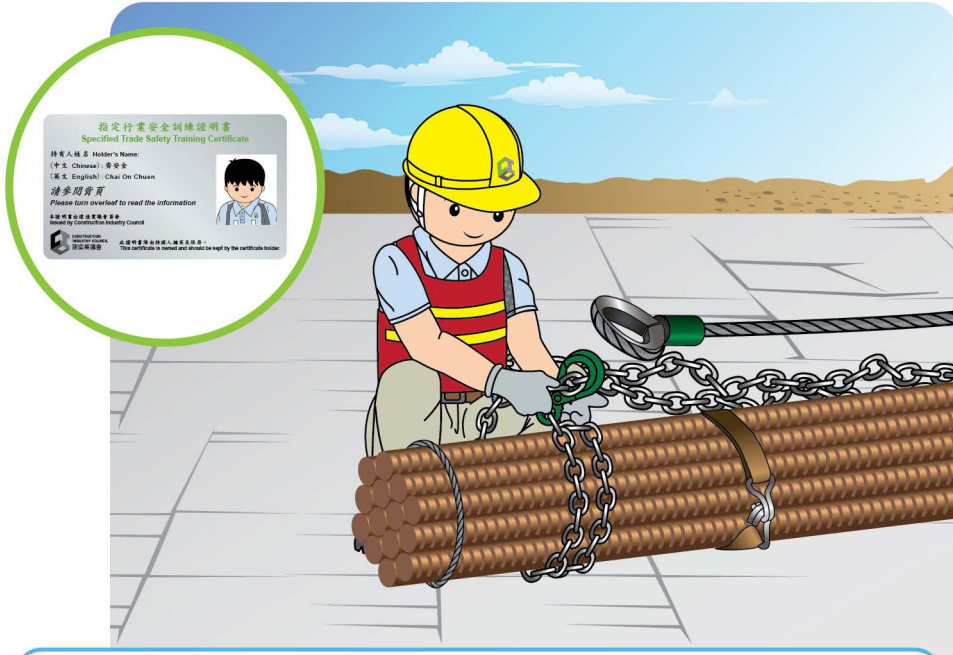
- 年齡已屆18歲，並曾受有關一般訊號員溝通原理及實務的訓練（例如：【銀卡A12S索具工及訊號員安全訓練課程】或【建造工地吊運操作訊號員課程證書】）；
- 明白熟識吊運團隊之間所示的手號，並能夠清楚地及準確地傳達吊索工的指示；及
- 留意吊運範圍，如發現非相關工作人士進入，需立即通知起重機操作員並警示該名人士離開。

The signaller shall be responsible for transmitting the signal of the rigger to the crane operator. Signaller should be responsible for the crane movement and should fulfill the following requirements:

- Aged 18 years old or above with training on general signaling principles and practices (for example, "Silver Card Course A12S Rigger and Signaller" or "Signaller for Hoisting Operations at Construction Sites course");
- Understand and familiar with the hand signals used by the lifting team, and be able to clearly and accurately deliver the instructions to the rigger; and
- Pay attention to the lifting zone. If any unauthorised entry is observed, the crane operator must be notified immediately and the person shall be warned to leave.



吊索工的角色與責任 RIGGER'S ROLES AND RESPONSIBILITIES



吊索工應負責將負荷物裝上起重機及將負荷物從起重機卸下，並應根據工作計劃使用正確的起重裝置及埋碼方法。吊索工應符合下列要求：

- 年齡已屆18歲，並曾受有關一般索具使用原理的訓練（例如：【銀卡課程A12 工地建材索具工】）；
- 完全明白吊運團隊之間所示的手號及無線電通訊的訊號；及
- 留意吊運範圍，如發現非相關工作人士進入，需立即通知起重機操作員並警示該名人士離開。

The rigger should be responsible for loading and unloading the load from the crane, and should use the correct lifting gear and rigging method according to the lifting plan. The rigger should fulfill the following requirements:

- Aged 18 years old or above with Training on the principles of using general rigging (for example, "Silver Card Course A12 Construction Materials Rigger");
- Fully understand the hand signals and radio communication signals used by the lifting team; and
- Pay attention to the lifting zone. If any unauthorised entry is observed, the crane operator must be notified immediately and the person shall be warned to leave.

吊運督導員的角色與責任 LIFTING SUPERVISOR'S ROLES AND RESPONSIBILITIES

吊運督導員是吊運團隊中的主管，根據吊運計劃書內的要求去執行職務。吊運督導員應符合下列要求：

- 擁有足夠經驗及能力，亦應已完成有關吊運督導的安全訓練（例如：香港建造學院的【吊運安全督導員證書訓練課程】），能有效地執行該職務；
- 確保吊運團隊知悉有關吊運計劃，並採取所有切實可行的步驟落實吊運計劃內容；及
- 若有任何不安全情況、行為或任何偏離吊運計劃時，應立刻停止該吊運操作及向管理層報告。

The lifting supervisor is the leader of the lifting team. The duties should be performed according to the requirements in the lifting plan. The lifting supervisor shall meet the following requirements:

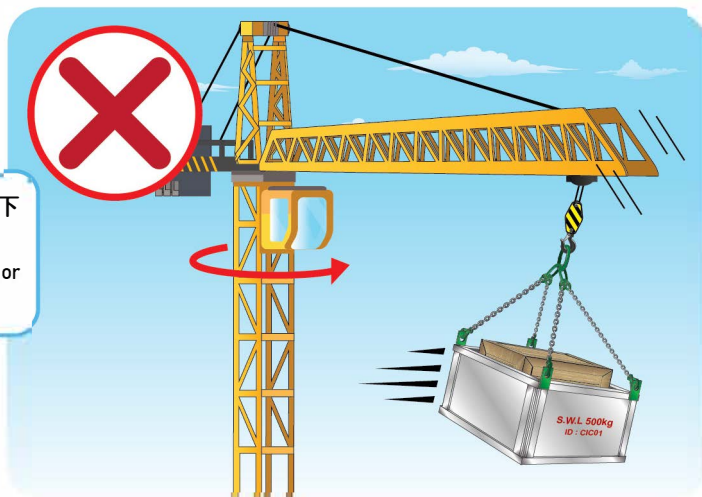
- Sufficiently experienced and ability, preferably with safety training on lifting supervision, (for example, "Certificate for Lifting Safety Supervisor training course" organized by the Hong Kong Institute of Construction") to perform the duties effectively;
- Ensure that the lifting team knows about the lifting plan and takes all practical steps to implement the lifting plan; and
- If there is any unsafe situation, behavior or any deviation from the lifting plan, the lifting operation should be immediately stopped and reported the case to management.



起重機械的操作一般安全要求 GENERAL SAFETY OPERATION FOR CRANES



不可吊運超越安全操作負荷的物件。
Do not lift any load with weight exceed the Safe Working Load.



避免突然開動或停下
起重機。
Avoid abruptly swing or
stop the crane.

起重機械的操作一般安全要求 GENERAL SAFETY OPERATION FOR CRANES



不可以在地面拖行物件。
Do not drag the loads on the
ground.



不可以快速移動負荷物，特別是接近目的地前應以較
慢速度移動。
Do not move the load at high speed and use low speed when
approaching to destination.

》起重機械的操作一般安全要求 GENERAL SAFETY OPERATION FOR CRANES

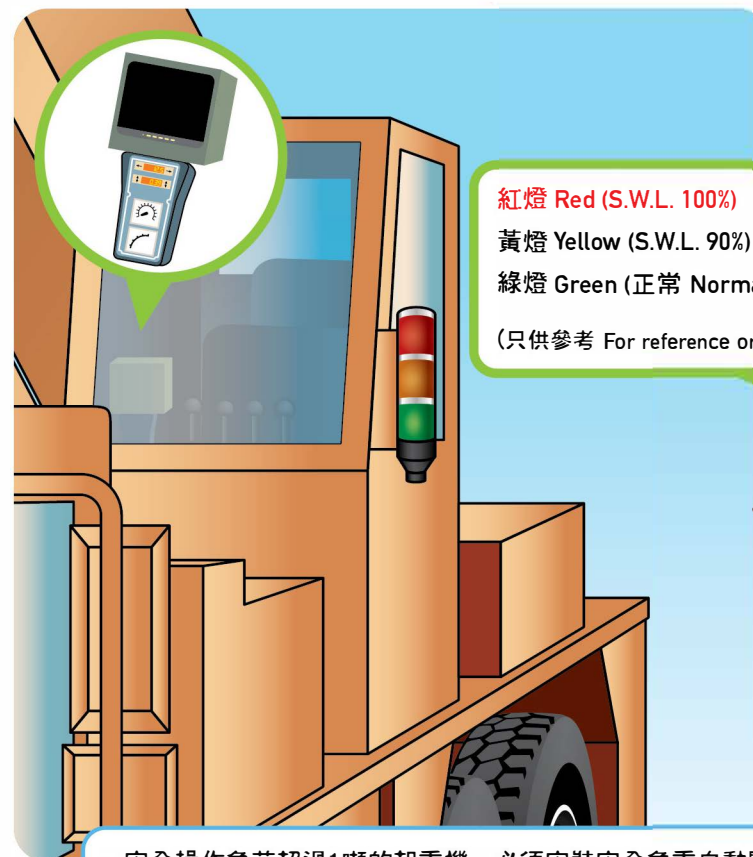


吊運路線應詳細計劃及安排，不可在任何人之上經過。
Do not pass over any person during lifting operation. lifting routes shall be detail planned and arranged.



吊運工程進行中不可離開駕駛座位。
Do not leave the operator's seat during lifting operation.

》安全負荷自動顯示器 AUTOMATIC SAFE LOAD INDICATOR (ASLI)



紅燈 Red (S.W.L. 100%)
黃燈 Yellow (S.W.L. 90%)
綠燈 Green (正常 Normal)
(只供參考 For reference only)

- 安全操作負荷超過1噸的起重機，必須安裝安全負重自動顯示器系統吊
- 不應只依賴安全負重自動顯示器，作為最高操作負荷的唯一指標吊顯示器只應用作檢查負荷是否在起重機能力範圍之內吊操作時亦應考慮起重機製造商建議的負荷表。
- Cranes with a Safe Working Load (S.W.L.) of more than 1 tonne must be installed with an ASLI system.
- The ASLI should not solely depend upon the indicator of S.W.L. ASLI should only be used for checking whether the load is within the capacity of the crane. Load chart recommended by the manufacturer should also be considered during operation.

》流動式起重機 MOBILE CRANE

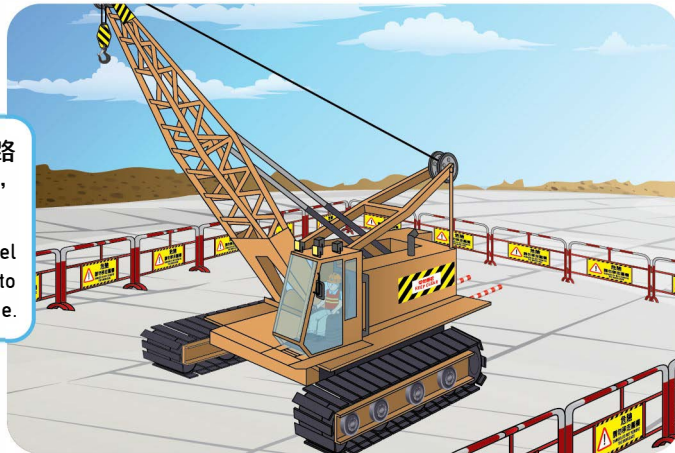


流動起重機停留地點需為穩固的地面，並可足夠承托流動起重機及負荷物的重量。

Mobile crane shall be operated on a firm and level ground that could adequately support the weight of the crane and loads.

流動起重機行經的路線，必須平坦和堅實，避免起重機翻倒。

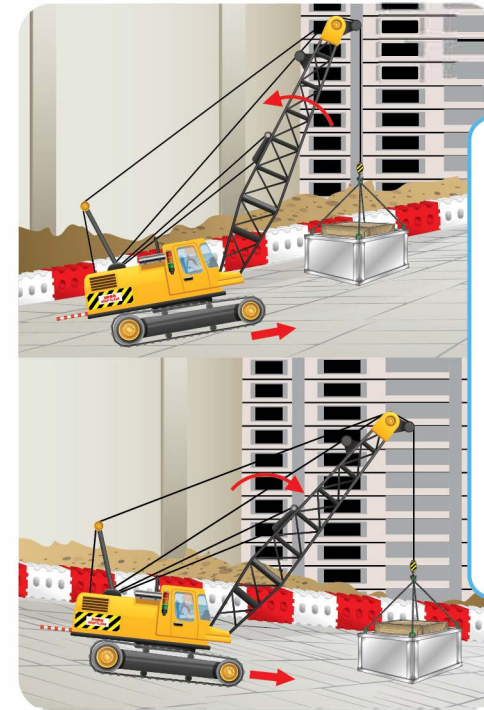
Mobile crane should travel on flat and firm ground to prevent overturning of crane.



》流動式起重機 MOBILE CRANE

應適當地調校吊臂長度，以確保流動式起重機是處於安全操作半徑內。

The boom length of the mobile crane should be adjusted to ensure the mobile crane is operated within the extent of the safe working radius.



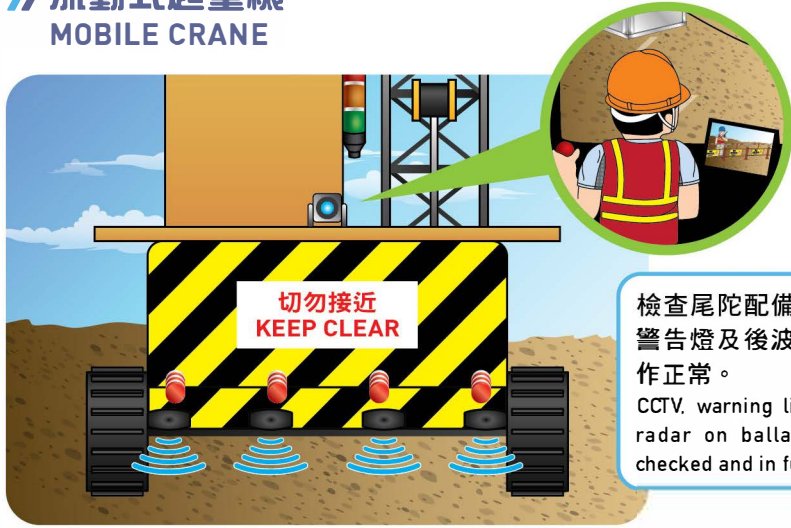
若流動式起重機無可避免在斜坡行駛：

- 必須在安全操作負荷預留足夠的緩衝度重縮短吊臂的操作半徑，防止起重機傾側及超負荷；
- 必須接上搖擺制動或旋轉鎖；及
- 吊運中的負荷物要盡量貼近地面。

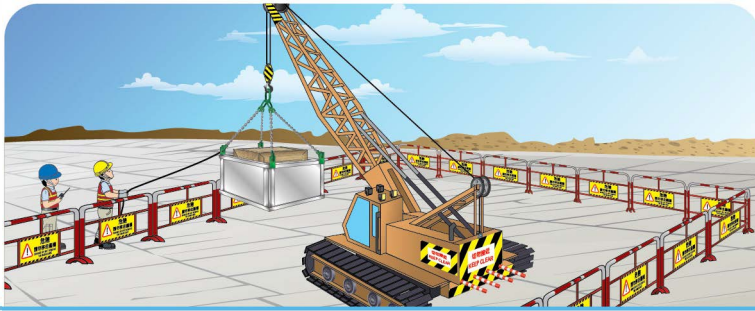
When mobile crane must travel on a slope:

- Sufficient buffer should be allowed for the lifting load. The working radius should be reduced to prevent topple of crane and overload;
- Spin lock and swing brake shall be applied; and
- Lifting loads should be as close to the ground as possible.

》流動式起重機 MOBILE CRANE



檢查尾陀配備閉路電視、警告燈及後波雷達，並操作正常。
CCTV, warning lights and rear radar on ballast should be checked and in function.



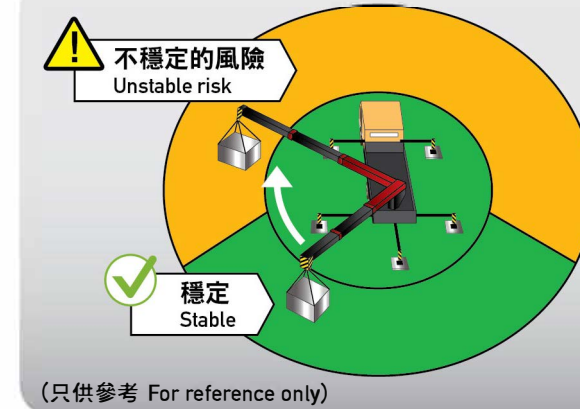
操作流動式起重機時，應注意：

- 圍封流動起重機操作範圍；
- 機身及行人通道保持最少600mm距離；
- 機尾部分塗上顏色顯著的油漆（例如黃黑色相間）；及
- 在流動起重機上，應張貼上告示，以中英文註明：「未獲授權人士，不得進入起重機的任何部份範圍」。

When operating a mobile crane:

- The mobile crane operation area should be fenced off;
- 600mm clearance should be maintained between the mobile crane and walkway;
- The counterweight or rear-end of the crane should be painted distinctively (e.g. Striped yellow and black); and
- Notice in English and Chinese should be displayed on the crane: "No Person is allowed to access to any part of the crane without permission".

》貨車式起重機 LORRY CRANE



(只供參考 For reference only)

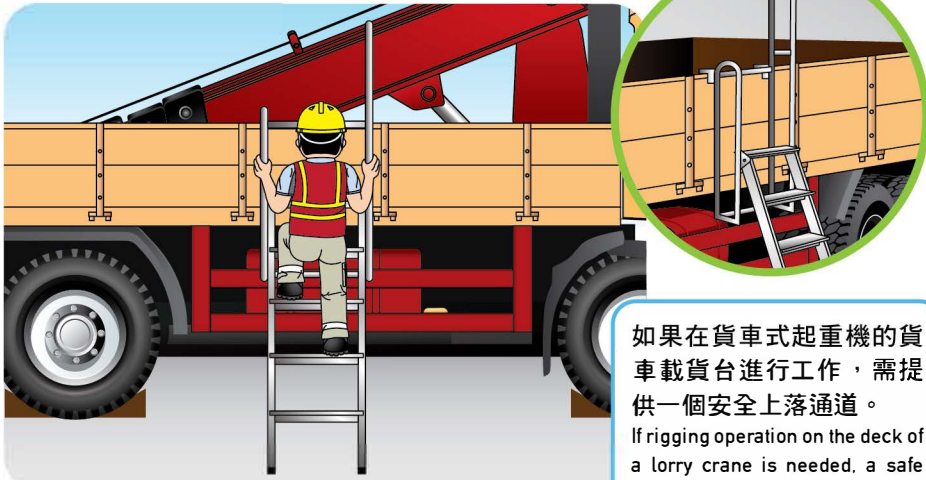
貨車式起重機在不同的吊運方向的安全操作負荷是有分別的。急速轉動或過度伸展吊臂可使安全操作負荷下降，導致貨車式起重機變得不穩定而導致翻側。

There is various S.W.L. of lorry crane in different orientations of jib. Rapid rotating or over extending the jib could decrease the S.W.L. The lorry crane will become unstable and thus overturn.



貨車式起重機可以使用接臂（延伸式吊臂），以增加吊運距離。但有關接臂的使用，需要參考製造商手冊及安裝後由合資格檢驗員測試及徹底檢驗的。Using fly Jib of lorry crane could increase the lifting distance. However, the manufacturer's manual should be referred for such modification. After the modification, test and thoroughly examination should be conducted by the competent examiner.

貨車式起重機 LORRY CRANE

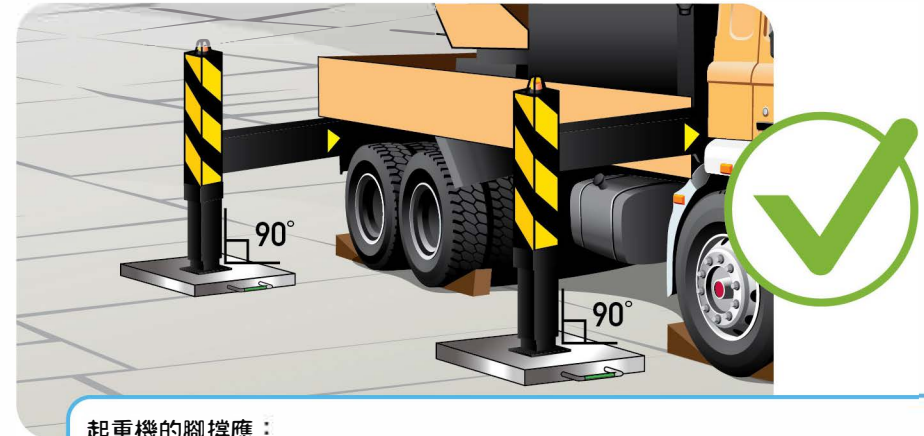


如果在貨車式起重機的貨車載貨台進行工作，需提供一個安全上落通道。
If rigging operation on the deck of a lorry crane is needed, a safe access should be provided.



使用鏟車或其他工具協助上落貨，以減少高處工作吊。
A fork-lift truck or other alternative tools should be provided for loading and unloading to reduce working at height.

起重機的腳撐 OUTRIGGERS OF CRANE



起重機的腳撐應：

- 除非製造商指明較細面積，否則底板最少應較浮盤面積大3倍。底板應使用足夠強度的鋼板、適當的底墊或適當的木墊來支撐負荷；
- 腳筒與浮盤應成一直角；及
- 遵從製造商的建議及指示以確保起重機的穩定性，確保支重腳撐適當地設置後才開始吊運操作。

Outriggers of crane should be:

- Mat/ Pad at least 3 times larger than the area of the float unless otherwise specified by the manual. Steel plates of adequate strength, suitable mat/pad or timber block should be used;
- Cylinder should be perpendicular to the float; and
- Manufacturer's recommendations and instructions should be followed to ensure the stability of the crane, and proper setup of outriggers should be checked before lifting operation.



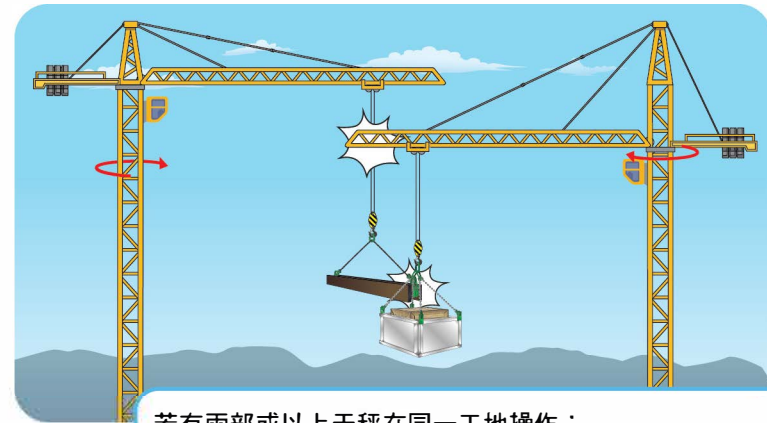
》塔式起重機（天秤） TOWER CRANE

遵照由建造業議會發出的《塔式起重機安全指引》及操作手冊指示組裝、升降或拆卸天秤。
Follow the CIC guidelines on Safety of Tower Cranes and operation manual during erection, telescoping and climbing and dismantling operation.



無人操作時，應將吊運車放置在最小的半徑上，並將吊鉤升至最高位置。
When the tower crane is not in operation, the crane's trolley must be positioned near the tower at minimum radius, with the hook raised to its highest position.

》塔式起重機（天秤） TOWER CRANE

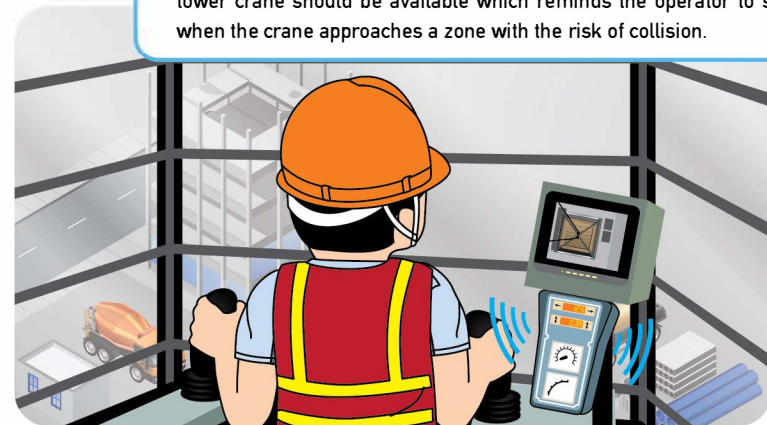


若有兩部或以上天秤在同一工地操作：

- 安裝「防止碰撞系統」，確保起重機不會在重疊區域內碰撞並定期（最少每週一次）測試系統功能。
- 當移近有可能發生碰撞的區域時，天秤的駕駛室內須不斷收到聲音和視覺訊號，以提醒天秤操作員減慢天秤移動速度。

If two or more tower cranes are operated in a construction site with overlapping zones:

- Provide "Anti-collision system" for the cranes to prevent collision within the overlapping zone. The functional system testing would be conducted regularly (at least once a week).
- A system to transmit a continuous audio and visual signal to the operator's cabin of the tower crane should be available which reminds the operator to slow down a crane when the crane approaches a zone with the risk of collision.



》吊具的測試及檢驗

TEST AND EXAMINATION FOR LIFTING GEAR (L.G.)



吊具須由合資格檢驗員在首次使用前測試及徹底檢驗及以後每六個月徹底檢驗一次，測試及檢驗目的是要確保吊具的構造良好及功能正常的
The L.G. shall be tested and thoroughly examined by a competent examiner before use in the first time and for thoroughly examined every six months. The purpose is to ensure that the L.G. are in good condition and function.

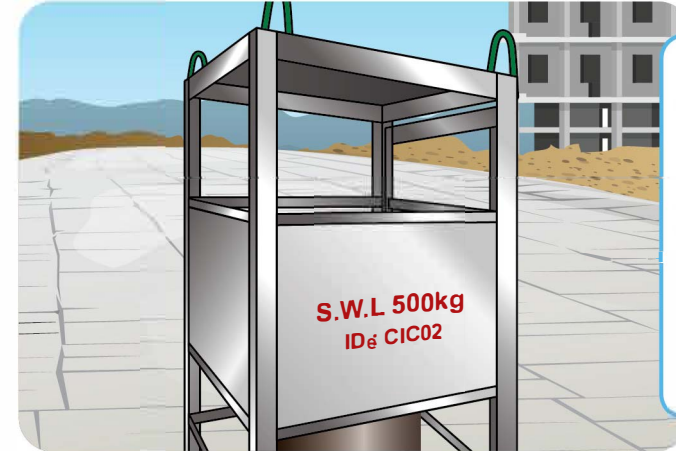
顏色標籤的目的是讓有關人士更容易辨別起重裝置證書是否已過期的當吊具已通過該季度的檢驗後並具有有效證明書，便應噴上該季度的顏色。

The colour code system can assist related parties to identify whether the certificate for the L.G. has expired or not. When the L.G. has passed the quarterly examination with a valid certificate, it shall be sprayed with the designated colour of the quarter.

Jan - Mar 一月至三月	BLUE 藍	
Apr - Jun 四月至六月	YELLOW 黃	
Jul - Sept 七月至九月	GREEN 綠	
Octe Dec 十月至十二月	ORANGE 橙	
To be removed from the site 不能再使用 待移離工地	RED 紅	
Equipment under quarantine 工具待驗	WHITE 白	
Not used for lifting purpose 不可作吊重用途	BLACK 黑	

》安全操作負荷

SAFE WORKING LOAD (S.W.L)



安全操作負荷是在特定情況下，吊具能夠吊起的最高負荷。任何情況下都不應超過安全操作負荷下進行工作。

The S.W.L. is the highest load that the L.G. can lift under certain condition. The work should be performed under safe working loads in all situations.



所有吊具的安全操作負荷及編號，須在起重操作工作人員容易看到的位置清晰展示。

The S.W.L. and identity number of all L.G. must be displayed clearly and visible to all workers easily seen.

》吊具使用前後需知

LIFTING GEAR BEFORE AND AFTER USE



必須檢查吊具狀態良好，才可使用。
Ensure that the L.G. is in good condition before use.

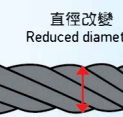
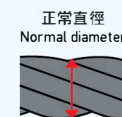
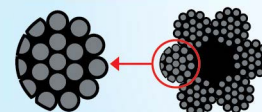


使用吊具後，必須放置在指定地方並妥善保存。
After using the L.G., they must be placed in the designated place and properly stored.

》保養纜吊索及鏈吊索

MAINTENANCE OF ROPE WIRE SLINGS AND CHAIN SLINGS

纜吊索 (威也) ROPE WIRES SLINGS

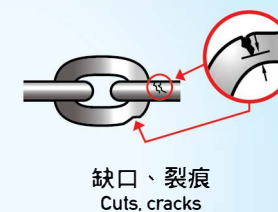


索股磨損程度高於1/3
Surface wires are worn by 1/3 or more

纜吊索直徑改變
Change of diameter of wire rope sling

如有以上情況的應立即停止使用該纜吊索的
The wire rope sling shall not be used under the above conditions.

鏈吊索 CHAIN SLINGS



如有以上情況的應立即停止使用該鏈吊索。
The chain sling shall not be used under the above conditions.

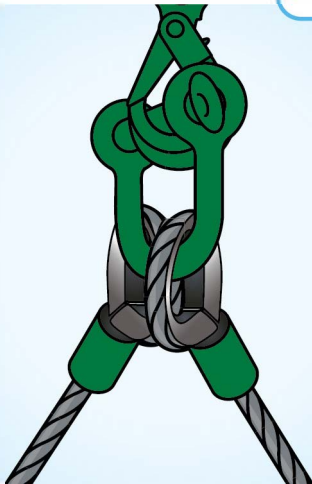
》 鈎環 (塞古) SHACKLE



物件移動可令螺栓鬆脫
If the load shifts, the sling will unscrew the shackle pin



- 不可用普通螺栓代替原有的塞古杆。
- 確保螺栓杆完全鎖上。
- Never replace the shackle pin with a bolt.
- Ensure the pin is totally locked.



》 吊鈎 / 纖維纜索 (帆布帶) HOOKS / FIBRE ROPE

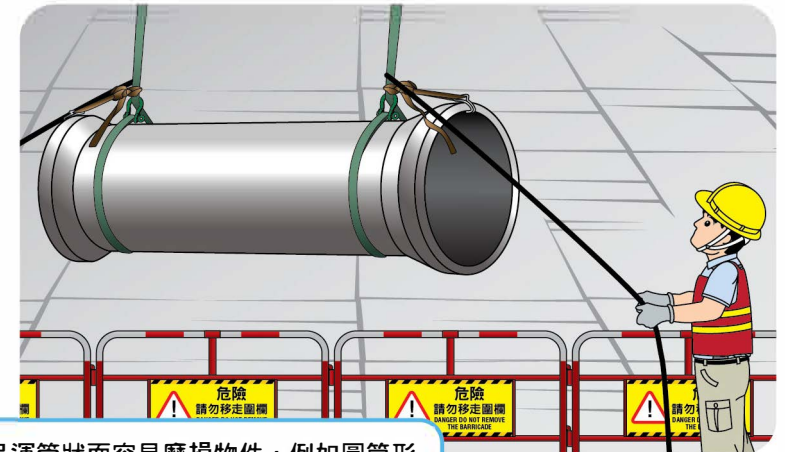


使用吊鈎時，應注意吊

- 選用合適大小的吊鈎；
- 不可將安全扣除下或縛上；及
- 保持吊鈎垂直，如果吊鈎側向一方可影響吊鈎之安全操作負荷。

When using the hooks:

- Select hooks with the right size;
- Do not tie or remove the safety latches; and
- Maintain the hook in a vertical position. If the hook is eccentrically loaded, the S.W.L. will be reduced.



帆布帶用作吊運管狀而容易磨損物件，例如圓筒形物件及沒有尖角的物件。

Fibre slings are used for lifting tubular and easy to wear objects. For example, materials with round shape and without sharp edge.

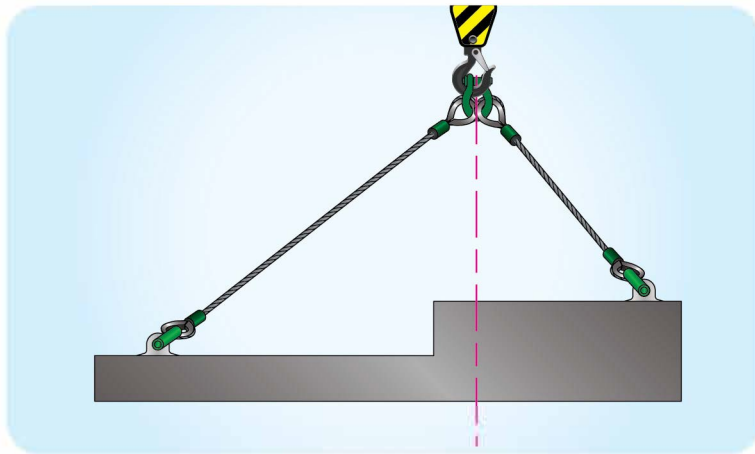
》使用不同吊具應注意地方

FOCUS AREA FOR USING DIFFERENT TYPES OF L.G.



當吊運不平衡重心物件時，吊運前應進行足夠評估。注意負荷物之重心以保持平衡。

When lifting material with a non-symmetrical centre of gravity, evaluation should be conducted before the lifting operation. The load's centre of the gravity should be checked and applied during lifting to ensure balance.

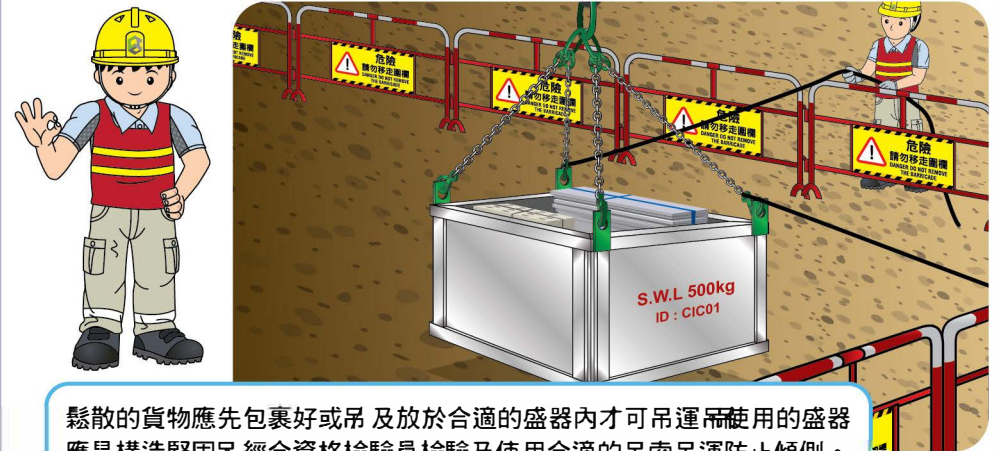


》使用不同吊具應注意地方

FOCUS AREA FOR USING DIFFERENT TYPES OF L.G.



吊運不同物件，使用特別製定的吊運工具。例如吊運工字鐵時使用工字吊夾。
Use specific lifting tools for lifting different objects. For example, using lifting clamps when lifting I beams.



鬆散的貨物應先包裹好或吊及放於合適的盛器內才可吊運而使用的盛器應是構造堅固吊經合格檢驗員檢驗及使用合適的吊索吊運防止傾側。
Loose loads shall be packed or / and placed in suitable containers before lifting. The containers must be structurally sound, tested and examined by a competent examiner and suitable slings must be used for lifting to avoid tilting.

》使用不同吊具應注意地方

FOCUS AREA FOR USING DIFFERENT TYPES OF L.G.



鋒利的物件邊緣應使用保護墊，並不應使用帆布帶吊運的
Corner pads shall be used for loads with sharp edges. Fiber slings are not suitable for use in this type of lifting operation.



吊運巨大體積之物件時，應考慮風力的因素、工程人員的位置及操作員的視線問題吊

When lifting large or heavy loads, wind factor, working location of the crews and operator's visibility must be considered.

》起重機械及裝置規例檢查、檢驗及測試表格

LALG REGULATIONS FORMS FOR INSPECTIONS, EXAMINATIONS AND TESTS

項目 ITEM	表格編號 (起重機械及裝置規例) FORM NO. (LALGR)						
	1	2	3	4	5	6	7
起重機 Crane	✓		✓		✓		
設有錨定及 壓重裝置的起重機 Crane with anchoring or ballasting devices	✓	✓	✓		✓		
絞車、起重滑車 Winch, Crab	✓		✓		✓		
滑輪組、吊重輪、 腳架起重機重 打樁機、拔樁機、 挖掘機、架空軌道、 拉索挖機等 Pulley Block, Ginwheel, Sheerlegs, Pile Driver, Pile Extractor, Excavator, Overhead, Runway, Dragline, etc.	✓				✓	✓	
起重裝置 Lifting Gear						✓	✓
纖維纜索 Fibre Rope							✓
周期 Period	7 天 7 days	架設後 After erection	4 年 4 years	使用前或重大修理、 重新架設重失靈、 翻倒或倒塌後 Before use or after substantial repair, re-erection, failure, overturning or collapse	12 個月 12 months	使用前 Before put into use	6 個月 6 months
表格 LALG Form							

» 埋碼方法 RIGGING METHOD

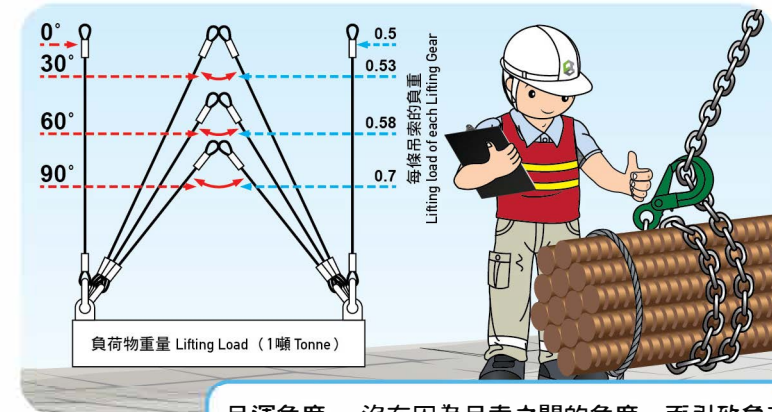


如需要在吊鈎下使用兩條或以上的吊索，必須使用足夠強度的鈎環，環圈或鏈環連接吊具支腳的上端。
If two or more slings under the lifting hook, their upper ends should be connected by a shackle, ring or link of adequate strength.



確保負荷物每一部份都平穩牢固地懸吊著，以免有鬆散物料或負荷物於吊運過程中滑落或移位的。例如，吊運物料如鋼筋的木枋等，應使用雙纏扼索結法、飛機帶及尾繩作固定。
Every part of the loads should be balanced and securely fastened to prevent slipping or displacement of any loose objects or loads during lifting. For example, double wrap choker hitch method, straps and taglines should be used for lifting materials such as steel bars, wooden blocks, etc. for rigging stabilization.

» 埋碼方法 RIGGING METHOD



吊運角度 - 沒有因為吊索之間的角度，而引致負荷超逾吊索的安全操作負荷。
Lifting angle - The safe working load of the slings should not be exceeded due to the angle between the slings.



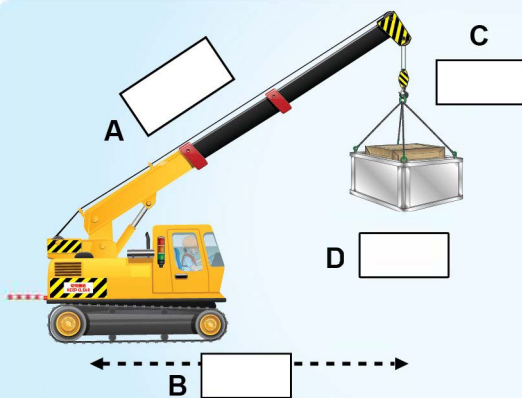
使用導繩的尾繩)的可以使吊運物件與附近工友保持安全距離，吊運物件亦會在吊運期間更穩定的避免尾繩纏結而產生其它危害的。
Using lifting tagline - Lifting objects and nearby workers should be kept at safe distance. Lifting object could be made stable during lifting. The tagline should be avoided from entangled causing another hazard.

吊運計劃 LIFTING PLAN



進行吊運工作前，應先進行針對該工序的風險評估，制定詳細的吊運計劃及施工方案，並向負責的前線人員清晰講解。

Task-specific risk assessment should be conducted. Detailed lifting plan and method statement should be prepared and clearly delivered to all frontline staff prior to every lifting operation.



A = ____ M (米) 懸臂長度
Jib Length

B = ____ M (米) 吊運操作半徑
Lifting Working Radius

C = ____ ton (噸) 吊鉤重量
Weight of Hook(s)

D = ____ ton (噸) 負荷物重量
Weight of Load(s)

總重量
Total Weight (C + D) = ____ ton (噸)

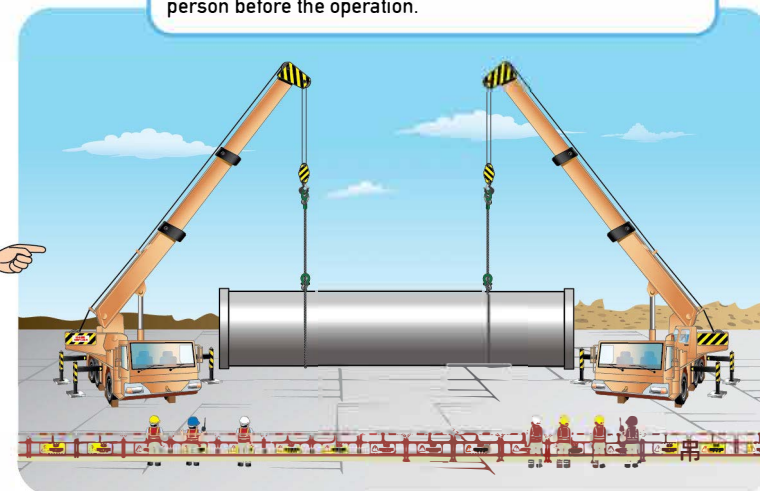
進行吊運計劃前，應掌握以上資料，以便制定有關的風險評估。
The above information should be acknowledged to conduct risk assessment before implementation of lifting plan.

特別吊運用途 - 多部起重機同時吊運 SPECIAL LIFTING - TANDEM LIFTING



這是一個高危起重操作，應盡量避免。若必須進行這類起重操作，操作前應由合格的人作詳細的策劃。

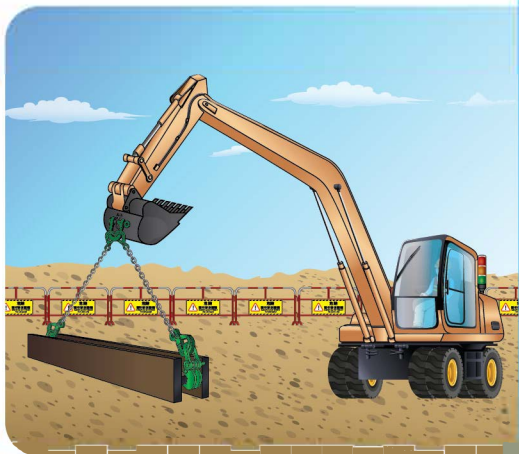
This is a comparative high risk lifting operation and should be avoided as far as practicable. If the lifting operation is unavoidable, a detailed plan should be made by competent person before the operation.



》特別吊運用途 - 使用挖土機作吊運用途 SPECIAL LIFTING - USING EXCAVATOR FOR LIFTING PURPOSE



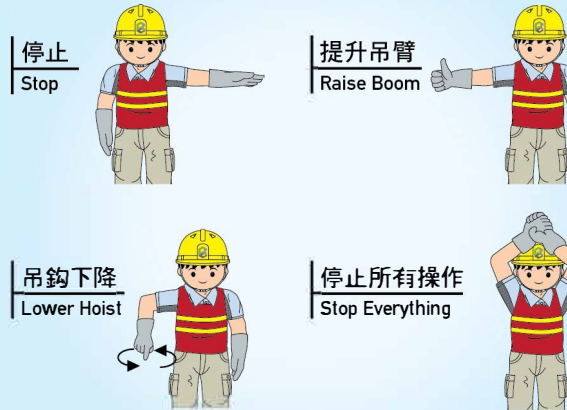
挖土機上應設有製造商所指定的吊重點，以作附加起重裝置。故此，當使用挖土機吊運重物前，必須參考製造商手冊，以確定該機械的設計是否可用於吊運工作。
Designated lifting point specified by the manufacturer should be used. Therefore, when using an excavator to lift loads, the manufacturer's manual should be referred to determine whether it is designed for lifting.



必須與其他起重機一樣，由合資格檢驗員測試及徹底檢驗，並合資格人士定期檢查，亦要顯示安全操作負荷及安裝安全負荷自動顯示器（如最高安全操作負荷超過1噸）。操作員亦須持有挖掘機及相關類型起重機操作訓練證明書。

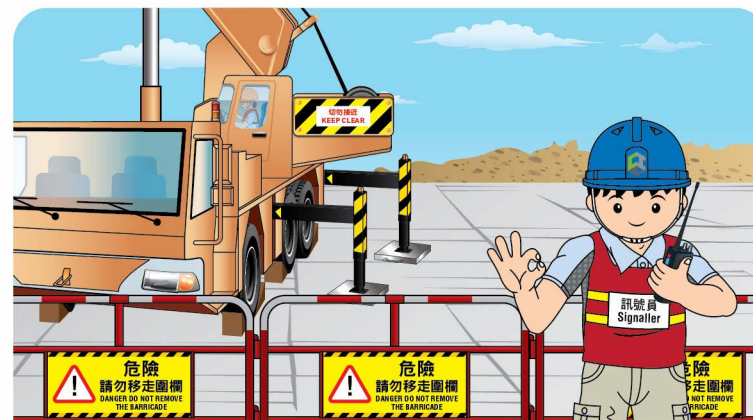
It must be tested and thoroughly examined by competent examiner and routinely inspected by competent person identical to cranes. Displaying S.W.L. and adopting ASLI requirements are applicable (If the S.W.L. over 1 tonne). The operator should possess excavator operator and appropriate type crane operator licences.

》溝通方法 COMMUNICATION METHOD



在吊運時，須採用一套標準的手號，所有起重機操作員、吊索工及任何其他有關人士，應懂得建議手號。

Standardized hand signals should be used for lifting operation. All operators, signallers and any other relevant persons should understand the recommended hand signal.



工地吊運通訊亦會使用無線電對講機，為免吊運訊息出現混淆而發生危險，每部起重機只許由一名訊號員發出訊號。如通訊發生故障或訊號不清晰，必須停止吊運操作。

The walkie talkie should be used for communication during lifting operation, in order to avoid confusion and dangerous during lifting. Only one signaller is allowed to give signal. If the communication fails or the signal is unclear, the lifting operation must be stopped.

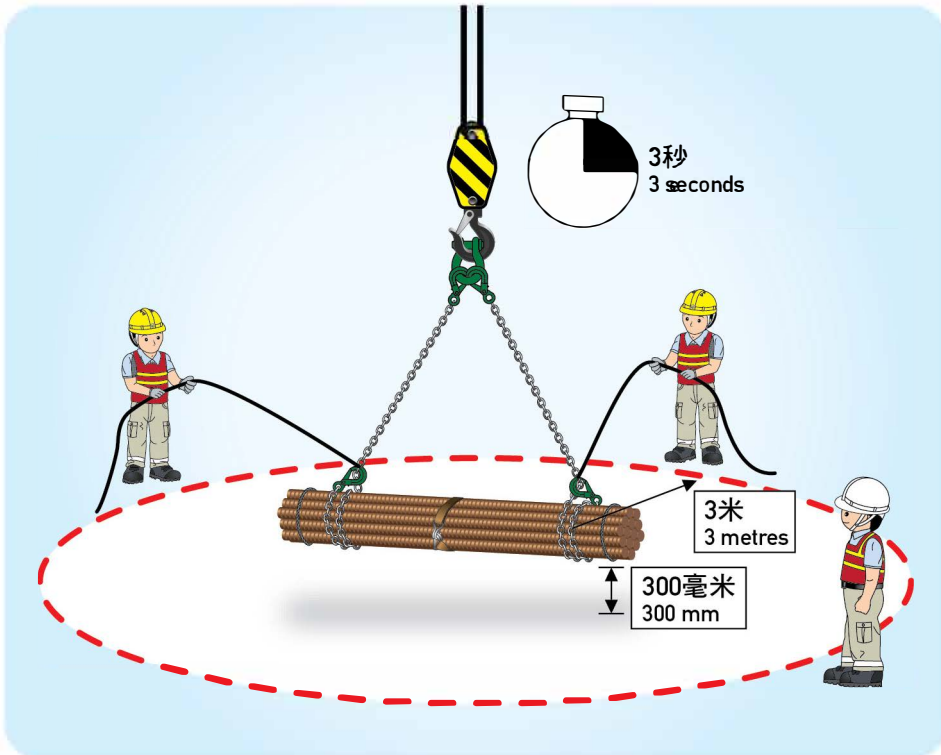
》安全吊運 3、3、3 SAFE LIFTING 3,3,3

安全吊運「3、3、3」是在吊運前的測試程序，可更有效地提升吊運工作的安全性：

- 與吊運物保持3米距離；
- 把吊運物升起離地300毫米；及
- 等待3秒後確保負荷物穩定後才進行吊運。

Safe lifting "3. 3. 3" is a hold point of lifting procedure before lifting, which can effectively improve the safety of lifting operation:

- Keep 3m away from materials being lifted;
- Lift up the materials 300mm from ground; and
- Wait for 3 seconds for stabilizing the lifting object before lifting operation.



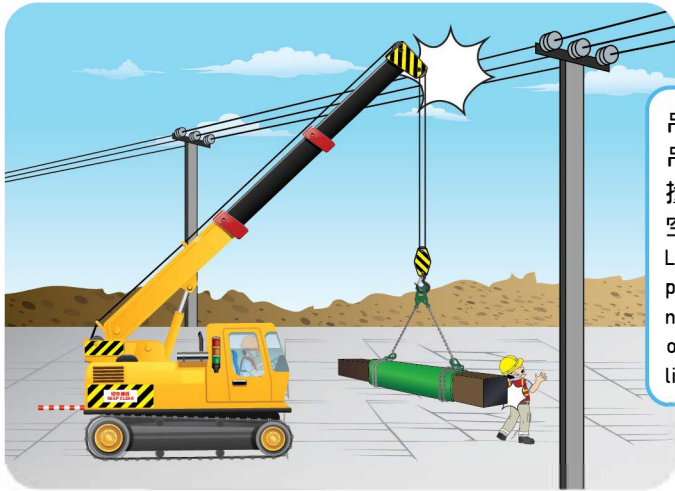
》吊運區域圍封 BARRICADE THE LIFTING ZONE

進行吊運工序時，必須確保吊運範圍妥善圍封及張貼清晰告示，並確保非相關人士不可擅自進入吊運範圍。

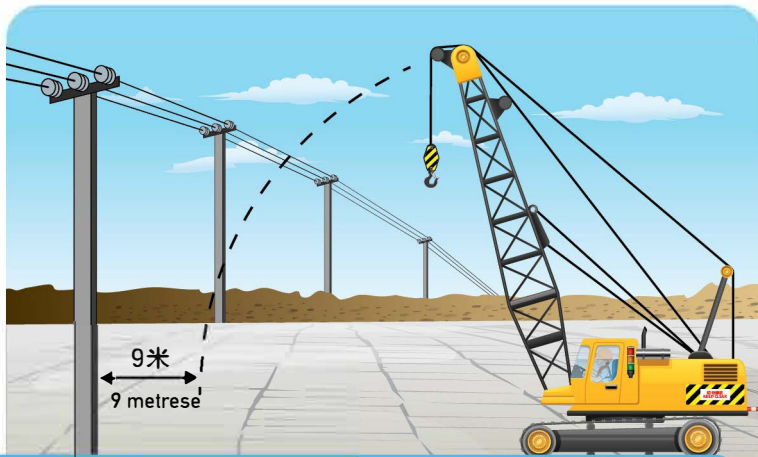
Lifting zone should be properly fenced off with barriers and prominent notices to ensure no unauthorized entry into the zone.



》 周邊狀況 SURROUNDING CONDITIONS

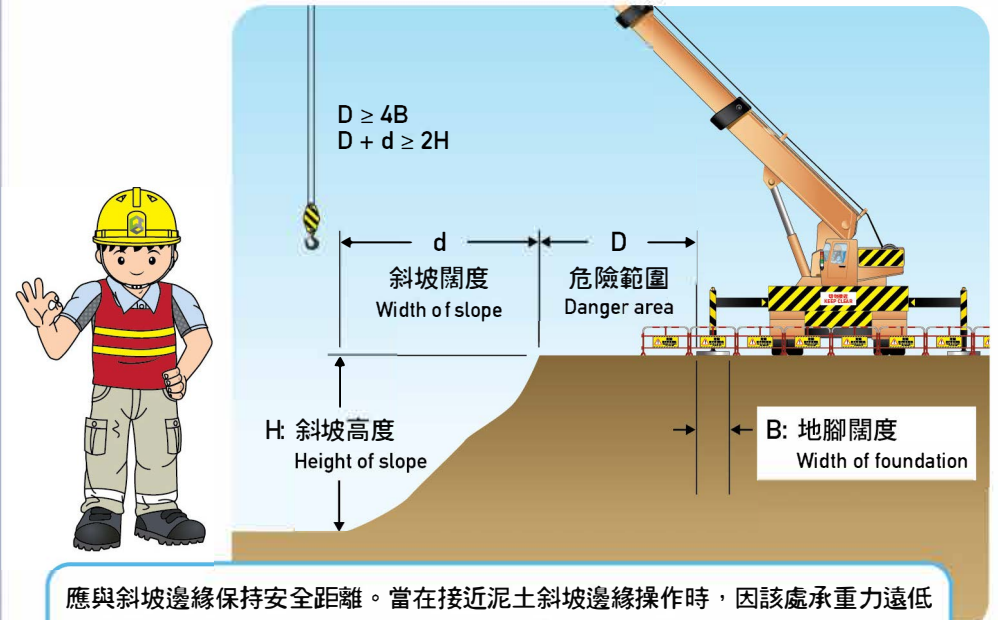


吊運前，需計劃適當的吊運路徑，確保不會碰撞到其他人員、物件或架空電纜。
Lifting route should be properly planned to ensure no collision with any person, object or overhead power line.



如果工作位置附近有架空電纜，應與電纜保持一定距離。安全距離應為吊臂長度加最少9米，或按電力公司建議的距離。
Overhead power lines should be stayed clear from the working location. The safety distance must be at least 9 metres away from the jib's length, or the distance suggested by the electricity suppliers.

》 接近斜坡邊緣工作 WORKING ADJACENT TO SLOPE EDGE



應與斜坡邊緣保持安全距離。當在接近泥土斜坡邊緣操作時，因該處承重力遠低於遠離邊緣位置，泥土可能塌陷，導致起重機傾倒。如有疑問，請向註冊土力工程師查詢。

工作前，檢查土地情況：

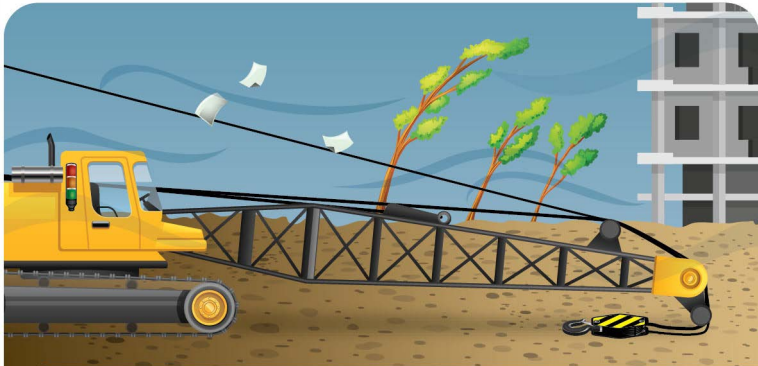
- 起重機在工地工作之前應先徹底檢查地面情況，以確保起重機所處的地點有足夠承重力。
- 應採取預防措施，以確保起重機所在地並無任何地下設施。否則，應對這些地下設施提供足夠保護，以免受到任何損害。

Operation should be kept at a safe distance from the slope edge. When the operation is closed to the edge of a soil slope or an unsupported soil excavation, the soil may collapse causing toppling of crane as the load bearing capacity is much lower than those away from the edge. Please check with a registered geotechnical engineer if in doubt.

Inspection of ground conditions before working:

- The ground should be thoroughly checked to ensure that it has enough load bearing capacity at the working location to support the crane.
- Precaution should be taken to ensure that the mobile crane standing is clear of any underground services. Otherwise, the services should be adequately protected to safeguard against any damage.

» 惡劣天氣（強風） ADVERSE WEATHER (STRONG WIND)

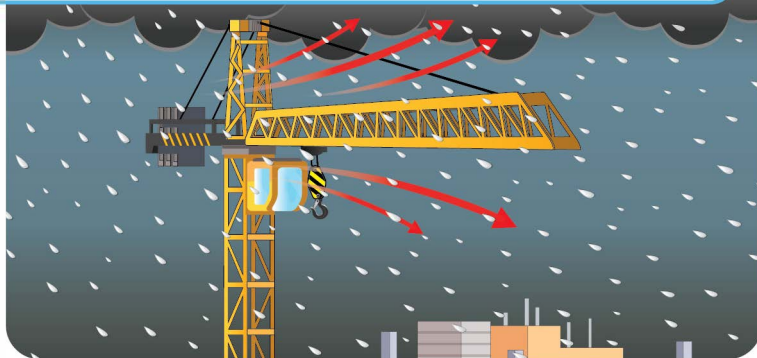


當颱風接近，烈風級別信號生效時或風速超過起重機製造商所設的上限，必須停止起重機操作。

- 流動起重機的吊臂應下降，放在堅固的支撐物上或不受強風影響的地方。
- 天秤方面需依照製造商的指引及因應工地周邊環境，作出防風措施。例如應將吊臂轉動到背向颱風方向，及將制動器鬆開讓吊臂自由轉動。

If a typhoon is approaching and a gale wind level signal is hoisted or the wind speed exceeds the limit set by the crane manufacturer, the crane operation must be stopped.

- The jib of mobile crane shall be lowered down, rest on strong support or in a place not affected by strong winds.
- The guidelines from the tower crane's manufacturer should be followed and nearby construction site condition should be taken into account of precautionary measures. For example, the jib shall be set to the typhoon's leeward side with the brake released for allowing the jib to swing freely.



» 惡劣天氣（大雨） ADVERSE WEATHER (HEAVY RAIN)



大雨可引致地面濕滑、能見度降低、泥土鬆散及山泥傾瀉等問題，管理人員應按工地的緊急應變計劃及實際情況，來決定大雨情況下是否繼續吊運工作。當發現以下情況，應停止有關工作：

- 泥土鬆散而影響起重機的穩定性；
- 能見度降低而影響了機手或訊號員的視線；或
- 香港天文台發出黑色暴雨警告訊號。

Heavy rains may cause slippery ground, low visibility, loose soil and landslides, etc. According to the agreed emergency preparedness plan and the actual situation, management shall decide whether to continue lifting operation under heavy rain condition. Whenever the following conditions happen, lifting operation should be **Stopped**:

- Soil condition is loosened and affecting the crane's stability;
- Low visibility affecting the vision of the operator or signaller; or
- The Hong Kong Observatory hoisting Black Rainstorm Warning Signal.



» 惡劣天氣 (雷暴) ADVERSE WEATHER (THUNDERSTORM)



雷暴對吊運工作有一定的影響，吊運團隊管理人員應按工地的緊急應變計劃及實際情況而決定是否需要暫停工作。

Thunderstorm have a certain impact on the lifting operation. The management of the lifting team should refer to emergency preparedness plan and the actual condition to decide to suspend work or not.



香港天文台
HONG KONG OBSERVATORY



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App Store

GET IT ON
Google Play

如吊運工作受雷暴情況影響，吊運團隊應暫停吊運及戶外工作，並在室內地方暫避。雷暴閃電影響範圍可參考香港天文台的網頁或流動應用程式內的雷暴位置圖。

If the lifting operation is affected by thunderstorm, the lifting team should suspend the lifting and outdoors operation and stay indoors. The affected area of thunderstorm / lightning can be made reference to the Website or Mobile Apps of the Hong Kong Observatory.

» 鳴謝 « ACKNOWLEDGEMENT

我們（發展局及建造業議會）謹此答謝以下機構為本刊物提供珍貴的資料，包括：

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Labour Department
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Dragages Hong Kong Limited
Gammon Construction Limited
Paul Y. Engineering Group
Hong Kong Professional Hoisting Engineering Association

1. 工廠及工業經營條例（59章）及其附屬規例
2. 職業安全及健康條例（509章）及其附屬規例
3. 建築工地安全實務手冊 - 發展局刊物
4. 安全使用塔式起重機工作守則- 勞工處刊物
5. 安全使用流動式起重機工作守則- 勞工處刊物
6. 起重機械及起重裝置的檢查、檢驗和測試指南- 勞工處刊物
7. 地盤意外個案簡析系列 - 流動式起重機 - 勞工處刊物
8. 颱風及暴雨警告下工作守則 - 勞工處刊物
9. 良好作業推廣套件之塔式起重機（天秤）吊運操作 - 香港房屋委員會刊物
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11. 起重機械及起重裝置安全訓練套件 - 職業安全健康局刊物
12. 地盤吊運安全工作手冊 - 中國建築工程-(香港)-有限公司刊物
13. 地盤吊運管理工作手冊 - 中國建築工程-(香港)-有限公司刊物
14. 標準及貨車式起重機指引 - 金門建築有限公司刊物
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5. Code of Practice for Safe Use of Mobile Cranes, Labour Department
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