

For information on  
21 January 2010

## **Legislative Council Panel on Manpower**

### **Safety in the Use of Tower Cranes on Construction Sites**

#### **PURPOSE**

This paper briefs Members on the regulatory regime on the use of tower cranes on construction sites as well as recent initiatives by the construction industry and Labour Department (LD) to enhance the safety of tower crane operations.

#### **BACKGROUND**

2. The Government attaches great importance to work safety in the construction industry. The operation of tower cranes, if not properly managed, could pose significant risk to people working on site. In this regard, LD has adopted a holistic approach to promoting improvements in tower crane safety in collaboration with the industry.

#### **The Regulatory Regime**

3. The Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations (the Regulations) (Cap. 59J) provides the statutory framework to ensure the safe use of lifting appliances and lifting gear, including tower cranes, in Hong Kong. Under the Regulations the owner of a tower crane shall ensure, among other things, that –

- (a) it is of good mechanical construction, made of strong and sound material and free from patent defects;
- (b) it has been tested and examined by a competent examiner, being a registered professional engineer within a relevant discipline, in the manner as stipulated in the Regulations;
- (c) it has been inspected by a competent person within the preceding 7 days;

- (d) it is fitted with an automatic safe load indicator;
- (e) all of the devices used for anchoring and ballasting are thoroughly examined by a competent examiner;
- (f) the weather condition is unlikely to endanger its stability; and
- (g) the erection, dismantling or alteration of cranes is to be under the supervision of a competent person.

An owner of a tower crane who contravenes the aforesaid provisions is liable to a fine of \$200 000 and imprisonment for 12 months.

4. In addition, the general duties provisions of the Factories and Industrial Undertakings Ordinance (FIUO) (Cap. 59) impose a duty on a proprietor of an industrial undertaking to ensure the safety at work of all persons employed by him by providing these persons with a safe workplace, safe plants and safe systems of work. Such duty applies to employers and contractors in the construction sector, and to the use of tower cranes. An employer or a contractor who contravenes the aforesaid provisions is liable to a fine of \$500 000 and imprisonment for six months.

5. Under the Occupational Safety and Health Ordinance (OSHO) (Cap. 509), the Commissioner for Labour (the Commissioner) may serve improvement notices or suspension notices (SN) on employers or contractors to secure prompt rectification of irregularities, or to remove imminent risks of death or serious bodily injury to workers. An employer or a contractor who fails to comply with a requirement of an improvement notice is liable to a fine of \$200 000 and imprisonment of 12 months, and to a fine of \$500 000 and imprisonment for 12 months for contravening an SN.

6. To provide practical guidance to the industry on how to use tower cranes safely and properly, and how to comply with the provisions described above (paragraphs 3 to 5), the Commissioner issued in 2002 a *Code of Practice for Safe Use of Tower Cranes* (the COP) under section 7A of the FIUO. Although a failure to observe any guidance in the COP is not itself an offence, that failure may be taken by a court in criminal proceedings as a relevant factor in determining culpability.

## **Enforcement**

7. Enforcement is the key to ensuring the efficacy of the regulatory regime. Occupational Safety Officers of LD conduct surprise workplace

inspections to help induce compliance with the safety legislation. These include regular planned inspections to individual workplaces, special enforcement campaigns targeting specific sectors or activities with high risks, as well as inspections initiated in response to complaints and accident investigation. In 2009, 50 801 inspections were made to construction sites resulting in 1 222 prosecutions against contractors for non-compliance of safety legislation.

8. Because of its high-risk nature, the use of tower cranes has been one of the main targets of regulatory inspections by LD. Prosecution will be initiated against duty holders for breaches of the law. Where appropriate, we also serve improvement notices or SNs to secure speedy rectification of irregularities or remove imminent risks.

### **Publicity and Promotion**

9. Through publicity campaigns, including initiatives like radio broadcast and roving exhibitions, we seek to enhance the occupational safety awareness among employers and employees. We also conduct seminars with different industry stakeholders to promote knowledge and understanding of skills and practice which concern work safety in their industries. Safety publications are also issued free of charge to disseminate practical information and provide guidelines to facilitate compliance with relevant safety legislation. Examples include a *Guide to the Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations*, the *Guidance Notes on Inspection, Thorough Examination and Testing of Lifting Appliances and Lifting Gear*, as well as the COP.

### **RECENT INITIATIVES**

10. It is worth noting that while regulatory control would set the minimum standards which should be observed, safety awareness and a sense of responsibility and ownership on the part of stakeholders would ultimately be the best safeguard against tower crane accidents. Following an accident involving the collapse of a tower crane in July 2007, the Government had, in collaboration with stakeholders in the construction industry, taken a number of initiatives to promote improvements in the safety standard of tower crane operations. These included the immediate establishment of a task force to identify, comprehensively and systematically, measures to enhance the safety of tower crane operations; the promulgation of a set of guidelines for the industry; the tightening of training for workers and supervising personnel involved; and promotional work within stakeholders to heighten their safety awareness.

11. These efforts have resulted in noticeable improvements in the safety standards of tower crane operations in the past two years. Initiatives undertaken in the period are described in further detail in paragraphs 13 to 18.

12. In addition, LD has also stepped up enforcement, taking into account the recommendations set out in the guidelines so released to encourage compliance (paragraphs 19 to 23).

### **Collaboration among Industry Stakeholders**

13. Soon after the accident in July 2007, the Construction Industry Council (CIC) established an Informal Task Force on Safety of Tower Cranes (the ITF) under its Committee on Construction Site Safety. The ITF was tasked to carry out a thorough study and come up with recommendations on how to improve safety in the use of tower cranes. Its membership was drawn from various stakeholders, including relevant government departments (i.e. LD and the Buildings Department), the Hong Kong Construction Association (HKCA), the Construction Industry Council Training Academy<sup>1</sup>(CICTA), the Hong Kong Professional Hoisting Engineering Association (HKPHEA), construction companies, tower crane owners/suppliers, tower crane erection contractors, professional institutions (e.g. The Hong Kong Institution of Engineers) and workers' unions. (The membership list of the ITF is at **Annex**)

14. LD plays an important part in the deliberations of the ITF, providing the ITF with information on the latest development regarding the safe operation of tower cranes including both local and overseas regulatory systems, accident data, problematic areas, and details of previous tower crane accident cases. It also assumes a key role in ensuring that wider public interests prevail over sectoral interests and that the recommendations of the ITF are reasonably practicable.

### **Industry Guidelines**

15. As part of its work, the ITF conducted a systemic and thorough process review of tower crane operations from pre-erection, to installation, operation and maintenance. Having concluded its study in end-2007, the ITF formulated a set of *Guidelines on Safety of Tower Cranes* (the Guidelines) setting out the good practices for enhancing the safety of tower crane operations for adoption by the construction industry. The Guidelines were published in June 2008, and would be reviewed in 12 months' time after implementation.

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<sup>1</sup> The Construction Industry Training Authority before 1 January 2008.

16. The Guidelines contain various recommendations for improving safety in the use of tower cranes. These include, amongst others –

- (a) tightening the requirements for inspection and certification of tower cranes to include, amongst others, checking of key components before delivery to site;
- (b) tightening the requirements for site supervision. These include requirements for the appointment of a supervising engineer with qualifications, experience and competence to control, monitor and supervise operations on tower cranes, the conduct of a risk assessment and the carrying out of pre-installation checking;
- (c) mandating proper keeping of maintenance and operations record to facilitate checking and verification by a competent examiner<sup>2</sup>; and
- (d) tightening the requirements with respect to the professional competence of specialist contractors and working crew. In this regard, principal contractors should only engage competent specialist contractors registered on the specialty of “Erection, dismantling and climbing” of the tower crane trade of the Voluntary Registration Scheme established in 2008 and administered by CIC to execute tower crane operation. Specialist contractors should employ competent persons and workmen with the appropriate qualifications, training and experience to perform all operations on tower crane taking into account the requirements set out in the Guidelines.

Major stakeholders have pledged their full support for recommendations made therein. In addition, LD would also take into account non-compliance of the recommended practices in considering the serving of SNs on the principal contractors or specialist contractors concerned when imminent risks were identified.

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<sup>2</sup> A competent examiner, in relation to the carrying out of any test and examination required by the Regulations, means a person who is –

- (a) appointed by the owner required by those regulations to ensure that the test and examination is carried out;
- (b) a registered professional engineer registered under the Engineers Registration Ordinance (Cap. 409) within a relevant discipline specified by the Commissioner; and
- (c) by reason of his qualifications, training and experience, competent to carry out the test and examination.

## **Enhancement in Training**

17. Knowledge and skill are essential to the proper management of hazardous work processes. One of the areas of focus of the ITF was to examine training requirements for workers and supervising personnel to ensure that they possess the updated knowledge and special skill required to carry out competently hazardous operations, such as erection, height-alteration and dismantling of a tower crane, rigging and signaling for hoisting operations. Such deliberations had resulted in the introduction of four skills and safety training courses for workers and supervising personnel who are engaged in the hazardous operations, by the CICTA in collaboration with various stakeholders such as the HKPHEA. Table 1 outlines CICTA's training efforts since August 2007.

Table 1 – Skills and safety training courses by CICTA as at 30 November 2009

<b>Item</b>	<b>Course Name</b>	<b>No. of Workers Trained</b>
1	Tower Crane Competent Person (Erecting, Dismantling, Telescoping & Climbing).	206
2	Safety Training Course for Construction Workers of Specified Trade – Tower Crane Worker (Erecting, Dismantling, Telescoping & Climbing).	643
3	Safety Training Course for Construction Workers of Specified Trade – Construction Materials Rigger.	4 332
4	Signalman for Hoisting Operations at Construction Sites.	298

## **Promotion of Recommendations of the Guidelines**

18. After the release of the Guidelines, various efforts have been made to promote awareness among stakeholders. These included a seminar jointly organized by CIC, HKCA and LD for various duty holders involved in tower crane operations, including principal contractors, specialist contractors, suppliers, engineers and workers. To reinforce its momentum, LD issued advisory letters to all building contractors, appealing for their adoption of the recommendations listed in the Guidelines. We also conducted a series of special promotional campaigns to promote compliance.

## **Special Campaigns Targeting Use of Tower Cranes**

19. In addition, LD has also included in its enforcement work promotion of compliance with the recommendations set out in the Guidelines. A number of special promotional/enforcement campaigns have been conducted in the last 18 months.

20. Between July and October 2008, LD launched a promotional campaign to assess the situation of compliance with the Guidelines and to encourage compliance. A special technical team of LD checked all 210 tower cranes in operation at construction sites to encourage commitment by stakeholders to adopting the measures set out in the Guidelines. The outcome of the campaign revealed that the compliance rates in respect of the measures set out at items (a), (b), (c) and (d) of paragraph 16 were 85%, 77%, 89% and 100% respectively. Although some duty holders were not yet able to comply with the measures at the time, it was noted that many were taking active steps towards compliance. The result was encouraging.

21. LD further followed up to gauge the compliance situation with a special enforcement campaign between November and December 2008. Where imminent risks of death or serious bodily injury were detected, LD officers would issue SNs to ensure speedy rectification.

22. The special technical team inspected all 204 tower cranes in operation at the time. Although five Notices of Intention<sup>3</sup> had been served on several contractors, the compliance rates in respect of the measures set out at items (a), (b), (c) and (d) of para. 15 were 100%, 94%, 100% and 100% respectively. The slight deficiency with respect to item (b) was related to the failure of some contractors in employing qualified supervising engineers to supervise height-alterations of tower cranes. These were rectified immediately upon the issuance of the five Notices of Intention.

23. In a subsequent enforcement campaign conducted in August 2009 covering operation of tower cranes, the compliance rates for all the four items were 100%. This affirms the commitment of the industry to complying with the requirements of the Guidelines.

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<sup>3</sup> A Notice of Intention is an administrative notice to inform a contractor that LD will serve an SN within 24 hours to suspend the use of a tower crane. However, if the irregularities are rectified before the SN is served, LD will withhold the issuance of the SN.

## **Review of the Guidelines by CIC**

24. The ITF has conducted in mid-2009 a review of the Guidelines, as pledged. Apart from certain minor amendments on technical details, ITF noted that improvements were required for the inspection and examination of derrick cranes as well as the routine and maintenance of tower cranes, and came up with two major recommendations as follows –

- (a) tightening the inspection and examination of derrick cranes<sup>4</sup> by requiring the owner of the crane to conduct checks on the critical components before it is erected; and
- (b) further enhancing the requirements for routine inspection and maintenance by introducing an additional monthly inspection by experienced technicians appointed by the owner. The technician should have completed a course on routine inspection and maintenance of tower cranes organized by the CICTA.

25. CIC has amended the Guidelines accordingly. The revised version will be published in early 2010.

26. The efforts since July 2007 in promoting the safety standard of tower crane operation in Hong Kong is a clear manifestation of the importance of ownership among stakeholders for assuring commitment to work safety. The involvement of relevant stakeholders in the work of the ITF has proven to be an effective model for addressing issues which cut across parties with different interests, and provides the best assurance of buy-in to measures which are both practicable and effective. The compliance record in the enforcement campaign conducted in August 2009 bears testimony to this.

## **WAY FORWARD**

27. LD will continue to monitor closely the safety performance of the industry in tower crane operation. In addition, we have also commenced a review of the COP taking into account measures recommended in the Guidelines.

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<sup>4</sup> A derrick crane is used to dismantle a tower crane on roof level. An owner of a derrick crane should conduct pre-delivery checks on critical components of a derrick crane before it is erected on a roof to dismantle a tower crane.



## **CONCLUSION**

28. Members are invited to note this paper.

Labour and Welfare Bureau  
Labour Department  
January 2010

**Membership List of the Informal Task Force on Safety of  
Tower Cranes under the Committee on Construction Site Safety**

<b>Convener:</b>	
Construction Industry Council	Mr Thomas HO
<b>Member:</b>	
Gammon Construction Ltd	Ir Danton N C LEE
Construction Industry Council Training Academy	Mr WONG Doon Yee, Charles
Buildings Department	Mr LEUNG Siu Man
The Hong Kong Institute of Architects	Mr CHAN Dick Sang, Philip
Hong Kong Construction Association Chan Shum Kee Sam Lee Construction Co Ltd	Mr CHAN Yiu Tung, Anthony
Aegis Engineering Co Ltd	Ir MAK Kwok Leung
Labour Department	Mr TSO Sing Hin, JP
	Mr WONG Wing Yau
	Mr MAK Ping Sang
<b>Co-opt Member:</b>	
Trade Associations & Unions	Hong Kong Construction Association
	Hong Kong Construction Industry Employees General Union
	Construction Site Workers General Union
	Hong Kong Construction Industry Professional Plant-operators and Mechanics' Association
	Hong Kong Professional Hoisting Engineering Association Limited
	Concern Group on Guidelines on Safety of Tower Cranes

Building Contractors	Gammon Construction Ltd
	Hip Hing Construction Co Ltd
	China State Construction Engineering (Hong Kong) Ltd
	Shui On Building Contractors Ltd
	Sanfield (Management) Ltd
	Hanison Construction Co Ltd
Specialist Contractors	Aegis Engineering Co Ltd
	Comming Transportation Engineering Co Ltd
	Kingsland Engineering Co Ltd
	Farspeed Contractors Limited
	Hang Cheong Machine Engineering Co Ltd
	Soar Engineering Company Limited
	Hero Step Engineering Ltd
Tower Crane Suppliers / Leasors / Owners	Hontrade Engineering Limited
	AST Equipment Engineering Co Ltd
	AST Equipment (HK) Co Ltd
	Manta Engineering & Equipment Co Ltd
	Moreton Engineering & Equipment Co Ltd
	Proficiency Equipment Ltd
	Proficiency Net Ltd
	Shriro Equipment Ltd
	China State Machinery Ltd
Consultants & Surveyors	BestCity Consultants Ltd
	Oriental Fine Consultants Ltd
	Associated Professional Engineers Ltd
	Elitt Engineering Consultants Ltd
	Sam & Sam Testing & Surveyor Services Co Ltd
	Soar Consultants Company Ltd
Training Institutions / Professional Bodies	Construction Industry Council Training Academy
	The Hong Kong Institution of Engineers