



1.0 Introduction

The rescue of personnel from height on tower cranes, although required infrequently, should be planned for wherever tower cranes are being erected or dismantled or are in use.

Health and Safety legislation requires that safe systems of work are in place for all work activities and the particular references for the requirement to provide a means of safe rescue are:-

- 1.1 Health and Safety At Work Act - Sections 2 & 3
- 1.2 Work at Height Regulations – Regulation 6(5)(b)
- 1.3 LOLER – Regulation 3
- 1.4 Management Regulations – Regulation 3

2.0 Definitions

2.1 fall arrest system

a personal fall protection system which uses a body holding device connected to a reliable anchor to arrest and restrict a fall so as to prevent the collision of the user with the ground or structure whilst limiting the forces on the body



2.2 work restraint system

a personal protective system which uses a body holding device connected to a reliable anchor to prevent a person from reaching zones where the risk of a fall exists

3.0 Circumstances Requiring Rescue From Height

The following table summarises the activities during which persons may require rescue from height, the persons who may require rescue and the types of emergency that may precipitate the need for rescue.

Activity	Person Requiring Rescue	Type of Emergency
Erection Alteration Dismantle	Erector	Suspension from fall arrest system
		Injury
		Medical crisis
Crane in use	Operator	Injury
		Medical crisis
Maintenance Thorough Examination	Maintenance personnel Competent Person	Suspension from fall arrest system
		Injury
		Medical crisis

	Construction Plant-hire Association Tower Crane Interest Group	
	<i>Tower Crane Technical Information Note</i>	

TIN 013	Rescue of Personnel From Height on Tower Cranes
----------------	--

The table above indicates that the circumstances requiring rescue from height fall into two categories.

- 3.1 During erection, alteration and dismantling of the crane when the only people potentially requiring rescue will be members of the crane supplier's erection team.
- 3.2 During use, maintenance and thorough examination of the crane when those potentially requiring rescue will be the operator, visitors to the crane (safety advisors, HSE inspectors, managers etc), maintenance personnel and competent persons carrying out thorough examinations.

4.0 Statistical Probability of Requirement For Rescue

Historical data over the last ten years indicates that rescue from tower cranes has been very infrequent (see **Annex 2**). Despite the low probability of rescue being required, the severity of consequence may require the formulation of a rescue plan to meet the requirements of the Work at Height Regulations.

5.0 Responsibility For Planning and Provision of Rescue Resources

It is clear that the primary duty for ensuring that there are adequate resources for carrying out rescue from height of persons on a tower crane rests with the organization in control of the premises on which any tower crane is sited. In the case of a construction site this will be the Principal Contactor as defined by the Construction (Design and Management) Regulations 2007. In practice it is likely that arrangements for rescue during erection, alteration and dismantling (see **3.2**) will be made by the tower crane supplier whilst those for rescue during use, maintenance and thorough examination will be made by the Principal Contractor with advice from the tower crane supplier.

6.0 Planning

In carrying out rescue from height, as with all activities in the workplace, employers must ensure that a safe system of work is in place. Planning is a vital part of establishing the safe system of work and will involve the following stages:-

- 6.1 Identify the task to be undertaken.
- 6.2 Identify the hazards associated with the task.
- 6.3 Carry out a risk assessment.
- 6.4 Identify control measures.
- 6.5 Select appropriate equipment.
- 6.6 Develop the method to be used.
- 6.7 Record the planning in a Method Statement.
- 6.8 Communicate the plan to all persons involved.
- 6.9 Review the plan at intervals and incorporate any changing circumstances.

The control measures identified should include arrangements for training of personnel and the inspection and maintenance of the rescue equipment.

TIN No.	013	Issue Date	09.04.09	Issue	D	Page 2 of 9
---------	-----	------------	----------	-------	---	-------------



7.0 Measures to Reduce the Requirement for Rescue From Height

Section 3.0 indicates that the requirement for rescue from height may result from one of three hazards. The probability of occurrence of these may be reduced as follows:-

7.1 Suspension from a fall protection system

All personnel entering areas on the crane where personal fall protection measures are required should be trained and experienced.

7.2 Injury

All personnel working on a tower cranes should have adequate training and experience and be working to an agreed method statement

7.3 Medical crisis

All personnel working on or accessing tower cranes should be subjected to health surveillance to identify any problems that might lead to medical problems.

8.0 Methods of Rescue From Height

Section 3.0 identifies two distinct situations where rescue from height is required. The current methods used in each of these situations are as follows:-



8.1 Recovery from suspension during erection, alteration and dismantling



The majority of tower crane supply companies use the Spanset "Gotcha" system where the kit, contained in a bag, is taken up the crane by the erection team and kept there whenever fall arrest systems are in use. In the event of a person falling and being suspended in the fall arrest system his colleagues will attach a block and tackle to the crane structure and clip one end of the fibre rescue rope to the casualty's harness ring using the telescoping pole provided. The casualty can then be raised back up to the crane structure or lowered to the ground (after the casualty's harness lanyard has been severed). Details of the Gotcha system are attached at Annex 1.

The Gotcha system is always operated by members of the erection team who have been trained by the system manufacturer.

8.2 During use, maintenance and thorough examination of the crane

The basic principles of rescue from height whilst the crane is in use are similar to those outlined above. However the number of different configurations of tower cranes make it impossible to come up with a universal solution, particularly for rescuing personnel from the operators cab. Some cranes have cabs which are side hung and accessed from the top whilst others are accessed from the rear. A significant proportion of cabs are contained within the tower structure and are accessed through a trap door in the floor, sometimes requiring the operators seat to be slid forward. Each type of crane and cab requires a risk assessment to be carried out so that an appropriate means of rescuing personnel from the cab can be developed.

	Construction Plant-hire Association Tower Crane Interest Group					
		Tower Crane Technical Information Note				
TIN 013		Rescue of Personnel From Height on Tower Cranes				
<p>Once the person to be rescued has been recovered from the cab they are generally moved to the back jib of the crane from which they can be lowered to ground level. This is generally carried out using either a block and tackle or a winch, with the rescue rope attached to a davit arm to keep the casualty clear of the tower crane structure. The casualty may either be placed in a rescue stretcher or in a rescue harness.</p> <p>The rescue equipment should be available on site at all times that personnel are on the crane, as should be adequately trained personnel.</p> <p>If personnel are using fall arrest equipment during maintenance or thorough examination, additional arrangements should be made to ensure that rescue from suspension can be carried out. This will not be required if personnel are using work restraint systems (see definition in 2.2)</p> <p>8.3 Rescue by Stretcher</p> <p>Certain medical emergencies may require rescue by stretcher. As it is unlikely that a stretcher could be stored on a tower crane arrangements should be made for secure storage at ground level. The rope rescue equipment should be capable of lowering a person to the ground in a suitable stretcher (see Annex 3).</p> <p>9.0 Method Statement</p> <p>Details of the rescue plan should be recorded in a method statement which should be specific for each type and model of crane. The plan should include:-</p> <ul style="list-style-type: none"> 9.1 Details of the rescue equipment to be used; 9.2 Configuration of the equipment for different types of rescue; 9.3 Identification of anchor points on the crane for each type of planned rescue; 9.4 Limitation of the plan for adverse weather such as high winds. <p>The method statement should be used to train and brief persons who will be working at height and involved in the rescue plan.</p> <p>10.0 Training of Personnel to Carry Out Rescue</p> <p>It is essential that all rescue from height on tower cranes is carried out by adequately trained personnel who should be available on site at all times when rescue may be required.</p> <p>Initial training should be carried out by the supplier of the system to be used or by in-house trainers who have been trained and assessed by the system supplier. Trainees should be assessed for competence by carrying out a simulated rescue on site.</p> <p>Refresher training should be carried out at 6 monthly intervals, followed by assessment of competence by carrying out a simulated rescue.</p> <p>It is important that trainees are not exposed to additional risk during any simulated rescue carried out during training. Before beginning training the training organisation should carry out a thorough risk assessment and put in place any necessary control measures such as a secondary safety rope.</p>						
TIN No.	013	Issue Date	09.04.09	Issue	D	Page 4 of 9

	Construction Plant-hire Association Tower Crane Interest Group					
	<i>Tower Crane Technical Information Note</i>					
TIN 013	Rescue of Personnel From Height on Tower Cranes					
<p>Additional guidance is given in:-</p> <ul style="list-style-type: none"> • <i>BS 8454:2006 - Code of practice for delivery of training and education for work at height and rescue.</i> • <i>OC 282/31 – Rope evacuation from mechanical handling equipment.</i> (HSE Operational Circular available on http://www.hse.gov.uk/lau/lacs/20-3.htm) <p>11.0 Inspection and Maintenance of Rescue Equipment</p> <p>All equipment used for the rescue of persons from height on tower cranes must have a pre-use check before each use. Damaged equipment should be taken out of service immediately.</p> <p>In addition to pre-use checks, equipment should be subjected to detailed inspections by a competent person in accordance with a predetermined regime specified by the equipment manufacturer and after each use. Damaged equipment should be taken out of service immediately.</p> <p>Equipment should be kept clean and dry and should be properly stored. Wet equipment should be thoroughly dried before storage. Equipment should not be altered or repaired, unless this has been authorized by the manufacturer.</p> <p>The frequency of detailed inspection should be reviewed by a competent person to take account of storage conditions and any damage found at pre-use and detailed inspections.</p> <p>Additional guidance is given in:-</p> <ul style="list-style-type: none"> • <i>BS 8437:2005 - Code of practice for selection, use and maintenance of personal fall protection systems and equipment for use in the workplace</i> • <i>INDG 367 – Inspecting fall arrest equipment made from webbing or rope.</i> (HSE free leaflet available on http://www.hse.gov.uk/pubns/indg367.pdf) 						
TIN No.	013	Issue Date	09.04.09	Issue	D	Page 5 of 9



12.0 Rescue System Manufacturers

Company	Address	Website	Telephone
Capital Safety	Capital Safety Group (Northern Europe) Ltd Unit 7 Christleton Court, Manor Park Runcorn Cheshire WA7 1ST	www.csgne.co.uk	01928 571324
Heightec	Heightec Ltd LDBP Mintbridge Road Kendal Cumbria LA9 6NH	www.heightec.com	01539 728866
Heightworks	Heightworks Ltd 11 Rydal Close Hednesford Staffordshire WS12 4RP	www.heightworks.com	07812 206265
Spanset	SpanSet (UK) Limited Telford Way MIDDLEWICH Cheshire CW10 0HX	www.spanset.co.uk	01606 737494
Total Access	Total Access (UK) Ltd Unit 5 Raleigh Hall Industrial Estate Eccleshall Staffordshire ST21 6JL	www.totalaccess.co.uk	01785 850333
Tag Height Safety	TAG Ltd Waterside Mill Greenfield OL3 7NH	www.tagsafety.com	01457 878640

Rescue equipment should be CE Marked and comply with:-

- *BS EN 361:2002 - Personal protective equipment against falls from a height. Full body harnesses*
- *BS EN 362:2004 - Personal protective equipment against falls from a height. Connectors*
- *BS EN 363:2002 - Personal protective equipment against falls from a height. Fall arrest systems*
- *BS EN 1496:1996 - Rescue equipment. Rescue lifting devices*



Annex 1 - GOTCHA System

SPANSET GOTCHA RESCUE KIT



A rescue kit designed for those using fall arrest harnesses and lanyards. The idea of the gotcha is to provide a rescue kit that will enable the rescuer to:

- Attach a casualty who is suspended by a fall arrest lanyard
- Raise a casualty in order to release their current attachment
- Raise or lower the casualty to a point of safety

The above capabilities are all achievable without the need for the rescuer to access the casualty.

Self contained and pre-assembled. In a clearly identified bag as a piece of emergency equipment. Compact and easy to transport or store where needed.

Conforms to EN: 1496

Patent Pending.

SpanSet (UK) Limited
Telford Way
MIDDLEWICH
Cheshire CW10 0HX
United Kingdom

Telephone: 01606 737494

Facsimile: 01606 737502

E-mail: enq@spanset.co.uk



13.0 Annex 2 – Statistical Probability of Requirement For Rescue

There is a perception in the tower crane industry that the occurrence of rescue from tower cranes is very infrequent. To test this perception a survey was conducted amongst the major tower crane owning companies in the UK to determine:-

- Average holding of cranes over the last ten years.
- Average utilisation.
- Number of occasions on which rescue has been required.

The results of this survey were as follows:-

Company	Average Number of Cranes	Average Utilisation	Rescues in Ten Years
Bennetts of Bristol	60	80%	0
Vanson Cranes	15	80%	0
City Lifting	30	80%	0
HTC	180	80%	0
Falcon Crane Hire	150	80%	0
Vertical Transportation	40	80%	0
Select Plant Hire	170	80%	1
Total	645	80%	1

Assuming an operating week of 50 hours (which ignores overtime) and a working year of 50 weeks, this equates to a total of 12.9×10^6 operating hours ($645 \times 0.8 \times 10 \times 50 \times 50$). During this period rescue was required on one occasion, giving an occurrence rate of 1 per 12.9×10^6 operating hours. This compares favourably with an occurrence rate of 1 major injury per 2.1×10^6 working hours for employees in all industries.

Note: HSC Health and Safety Statistics 2004/05 gives the rate of reported major non-fatal accidents to employees in all industries as 117.7 per 10^5 employees. This equates to 117.7 per 250×10^6 hours worked ($100,000 \times 50 \times 50$) or 1 major non-fatal accident per 2.1×10^6 hours worked.



14.0 Annex 3 – Typical Rescue Stretcher

CHRYSALIS Rescue Stretcher - Supplied by The heightec Group Ltd www.heightec.com



Rescue stretcher for both horizontal and vertical lifting.

In rescue situations the casualty should be provided with as much security when they are being rescued as when they are working in a fall protection harness. The stretcher has therefore been provided with a patented integral body harness which conforms to the dynamic test requirements of fall arrest harness standard EN 361.

The Chrysalis is a real advance in casualty handling for both horizontal and vertical lifting. Retaining straps are aligned for easy fastening and provide a secure fit around the casualty.

The harness is retained completely flat when not needed but can be fitted in seconds by passing a strap between the casualty's legs. The interior stiffening sheet is removable and the whole stretcher is machine washable.

Comes complete with durable PVC storage bag. Not provided with horizontal lifting system.