



**Construction Plant-hire Association**  
Tower Crane Interest Group



***Tower Crane Technical Information Note***

**TIN 038**

**Leaving Tower Cranes Out-of-Service**

This Technical Information Note sets out the precautions to be taken when leaving tower cranes out-of-service. It is important that the operator monitors the wind speed constantly using the anemometer display in the cab. This will give early warning of rising wind speeds and enable him to take action to take the tower crane out of service and descend down the ladders to ground level **before** the limiting wind speed is reached.

**1.0 General**

When out-of-service, tower cranes rely on their ability to free slew and weather vane to ensure that the jib points downwind and presents the minimum area to the wind, thus reducing the wind forces on the crane. In the past cranes which have not been able to free slew have suffered considerable structural damage and in some cases collapse.

To be able to weather vane effectively a tower crane requires the slew brake to be released and, in the case of a luffing crane, the jib to be set at the manufacturer's specified minimum out-of-service radius. This will ensure that centre of pressure of the jib is sufficiently forward of the centre of slew to produce adequate turning moment to overcome friction in the slew bearing and turn the jib downwind.

***NOTE:** In exceptional circumstances it may be possible, with the crane manufacturer's agreement, to allow locking of the slew of luffing jib tower cranes when out of service (see **Annex A**)*

***NOTE:** Certain tower crane manufacturers design their cranes to allow them to be left out-of-service with the slew locked at all times. Such cranes are however the exception rather than the norm*

Different makes and model of tower crane have different slew brake release mechanisms and it is essential that the tower crane operator is fully familiar with the type on the crane they are to operate. Before leaving the crane out of service and climbing down the tower the operator should check that the crane is in free slew and that the jib of a luffing crane is set at the correct radius.

It is essential on all types of tower cranes (luffing, saddle and jack-knife) that sign boards, banners etc are not put on the counter-jib without the express agreement of the crane manufacturer, as this will reduce or negate the ability of the crane to weather vane.

A Safety Alert entitled *Preventing catastrophic failure of luffing jib tower cranes in high winds* issued by the Health and Safety Executive on 20<sup>th</sup> February 2014 (see **Annex B**), requires tower crane owners to take the following actions:-

1. **Ensure they have the most accurate, up to date information by discussions or correspondence with the supplier or manufacturer.**
2. Check the correct minimum out of service radius for the specific crane they are operating with the supplier or manufacturer;  
***NOTE:** Manufacturers may permit reduced out of service radii in certain circumstances. In such cases any additional requirements imposed by the manufacturer must be complied with in full.*
3. Check both after erection and periodically in service, the function of the device that releases the slew brake and places the crane in free slew;
4. Check both after erection and periodically in service, that the condition of the slew drive motors, gearboxes and slew ring bearing has not deteriorated to the extent that the crane is prevented from slewing freely;
5. Check both after erection and periodically in service, the setting and function of any devices that warn the operator that the crane jib has not been left parked at the correct out of service radius and the slew brake has not been released;



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6. Check that operators have been provided with instructions on how the crane should be placed in free slew and the correct radius at which the jib should be positioned when leaving the crane unattended. This should include measures to routinely check that the operators understand and are following the instructions provided;
7. Undertake periodic checks that the buildings under construction, other cranes or high reach plant are not preventing the crane from free slewing. Consideration needs to be given to both front jibs and rear counter jibs.

Whilst this HSE Safety Alert is specifically aimed at luffing jib tower cranes, actions 1, 3, 4, 5, 6 and 7 apply equally to other types of tower crane.

In addition the following points should be taken into account when leaving any tower crane out-of-service:-

- Loads and/or lifting accessories must not be left on the hook and the hook should be hoisted to the out-of service position specified in the manufacturer’s manual;
- On saddle jib cranes the trolley must be left in the position specified by the crane manufacturer;
- Before leaving the cab the operator should ensure that any aircraft warning beacon is lit;
- The operator should take care when passing through the slew ring when climbing down the crane as any change in wind direction will cause the upper part of the crane to rotate;
- The operator should leave the crane in a secure condition to avoid unauthorised access.

**2.0 Precautions to be taken when, on a site with multiple tower cranes, one or more cranes are left out-of-service, whilst the others are still in operation.**

When not all the tower cranes on a site are required to be in operation, there is a temptation to leave one or more cranes in free slew whilst the remainder continue in service. If the jib of the free slewing crane cannot enter the airspace of any other crane or its load this is not an issue. If however, as is the case with most multi crane installations, there is a risk of the out-of-service crane colliding with the structure, hoist rope or load of any other crane, additional precautions must be taken.

It is often thought acceptable to leave the out of service crane with the jib parked parallel with the nearest crane and the slew brake on. The danger with this practice is that if the wind is blowing from a direction at 90° to the jib it may well suddenly increase to a level where the jib is blown through the brake and the jib slews in an uncontrolled manner into the path of an adjacent crane.

**The only safe solution to this problem is to station an operator in the cab of the out-of-service crane to keep the jib and counter jib clear of the working cranes.**

The operator should be in radio communication with the operators of the other cranes at all times and should continuously monitor the wind speed. If the wind speed approaches the maximum in-service value (See **TIN 020**), the operator should put the crane into free slew as soon as the other cranes are taken out of service.



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**Annex A – Locking the Slewing Part of a Luffing Jib Tower Crane When Out of Service**

As stated on page one of this TIN, a tower crane should always be left out of service in free slew mode so that it will weather vane to ensure that the jib points downwind and presents the minimum area to the wind, thus reducing the wind forces on the crane. In exceptional circumstances it may be possible, with the agreement of the crane manufacturer, to lock the slew mechanism. Slew locking a crane should only be considered as a last resort, as it increases foundation loads, reduces freestanding heights and tie intervals, etc. The crane hirer should fully appreciate these issues before committing to slew locking.

Some of the circumstances in which this may be required are:

1. Near a railway such that the crane’s minimum parking radius cannot be achieved without oversailing the railway unless permission has been received to do so;
2. Oversailing neighbouring properties due to them being within the minimum parking radius for the crane;
3. Siting a crane near a tall building such that the jib of the crane at its minimum parking radius would be too close to the building or clash with it;
4. Siting tower cranes close together so that adjacent cranes cannot free slew safely.

The last two circumstances can generally be avoided by effective planning at an early stage of the pre-construction phase.

If locking the slew mechanism of a luffing jib tower crane is being contemplated the following points must be considered:

1. The manufacturer must be consulted for each wind zone, crane model, jib length and tower height;
2. The manufacturer should supply the correct tower build, foundation loads, parking radius and method of slew locking the crane. The manufacturer’s loading sheet should state that the configuration specified is specially for a slew locked configuration;
3. The slew locking method might be the slew brakes or a secondary “parking” brake;
4. If the crane is to be tied and climbed, the manufacturer should supply the specific tie spacings, maximum oversail and tie loads;
5. There should be an indication visible from the ground that the crane has been locked;
6. It is generally advisable to lock the crane in the direction of the prevailing wind, but this may not be possible due to site constraints.

When determining whether or not the luffing jib tower crane can be locked in the out of service condition the manufacturer will consider the following points:

1. The effects of the full out-of-service wind on the crane structure for the maximum height of the crane, or at the intermediate mast heights if the crane is being climbed, with the wind blowing from all directions;
2. The strength of the jib when blown sideways;
3. The likelihood of the jib being blown over the top of the crane with the wind blowing on its underside;
4. The resultant of the moments on the crane trying to blow it both clockwise and counter clockwise, which would determine the required strength of the locking device;
5. Whether the slew brakes would be adequate, or if an additional slew locking device is required.

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# Preventing catastrophic failure of luffing jib tower cranes in high winds

Health and Safety Executive - Safety Alert	
Department Name:	Field Operations Directorate/ Construction Sector
Bulletin No:	FOD 2 - 2014
Issue Date:	20 February 2014
Target Audience:	Tower crane owners and users, <a href="#">Construction</a> <sup>[1]</sup> , <a href="#">Engineering</a> <sup>[2]</sup> , <a href="#">Entertainment and Leisure</a> <sup>[3]</sup> , HID, <a href="#">Manufacturing</a> <sup>[4]</sup> , <a href="#">Nuclear</a> <sup>[5]</sup> , <a href="#">Offshore</a> <sup>[6]</sup>
Key Issues:	Placing luffing jib tower cranes in a safe out of service condition

## Introduction:

Following the recent collapse of three luffing jib tower cranes in high winds, HSE is making this information available to tower crane users as supplementary guidance to that contained in BS7121 Part 5:2006, *Code of practice for safe use of cranes - Tower cranes*. This information is issued without prejudice to any ongoing investigations.

HSE is using this alert to remind those who operate tower cranes that when left unattended in the out-of service condition, luffing jib cranes must be in free slew with the jib at a safe out-of- service radius.

## Background:

HSE has identified that some tower crane users have not been releasing the slew brake and/or placing the jib at the correct out of service radius, when leaving cranes out of service and unattended.

If luffing jib cranes are left out of service with the slew brake engaged and/or the jib parked at too small a radius, there is a possibility the crane may not be able to weathervane freely in high winds. This could result in very high loadings being placed on the crane with the consequential collapse of the jib or the whole crane.

## Action required:

### Users must

- **Ensure they have the most accurate, up to date information for the specific crane they are operating by discussions or correspondence with the supplier or manufacturer as some manufacturers have recently changed their guidance;**
- Check that such information includes the correct minimum out of service radius for the specific crane they are operating with the supplier or manufacturer;
- Check both after erection and periodically in service, the function of the device that releases the slew brake and places the crane in free slew;
- Check both after erection and periodically in service, that the condition of the slew drive motors, gearboxes and slew ring bearing has not deteriorated to the extent that the crane is prevented from slewing freely;
- Check both after erection and periodically in service, the setting and function of any devices that warn the operator that the crane jib has not been left parked at the correct out of service radius and/or the slew brake has not been released;
- Ensure that operators have been provided with instructions on how the crane should be placed in free slew and the correct radius at which the jib should be positioned when leaving the crane unattended. This should include measures to routinely check that the operators understand and are following the instructions provided;
- Undertake periodic checks that the buildings under construction, other cranes or high reach plant are not preventing the crane from free slewing. Consideration needs to be given to both front jibs and rear counter jibs.

## Relevant legal provisions:

- Provision and Use of Work Equipment Regulations 1998,
- Management of Health and Safety at Work Regulations 1999

## References:

BS7121 Part 5:2006, Code of practice for safe use of cranes -Tower cranes

Construction Plant Hire Association guidance ([www.cpa.uk.net](http://www.cpa.uk.net) <sup>[7]</sup>)

- Best Practice Guide – Maintenance, Inspection and Thorough Examination.
- Tower Crane Operator's Handbook
- Tower Crane Out of Service Wind Speeds
- Leaving Tower Cranes Out-of-Service When Other Cranes Are Working on Multiple Tower Crane Sites.

## Further information:

Health and Safety Executive  
FOD CD Cons Policy and Sector Unit  
Rose Court  
2 Southwark Bridge  
SE1 9HS

## General note:

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