Construction Plant-hire Association
Tower Crane Interest Group

Tower Crane Technical Information Note

TIN 039

Operating Tower Cranes in the Vicinity of Aerodromes, Notification and En-route Obstacle Lighting

This Technical Information Note sets out requirements for tower cranes which are to be erected in the vicinity of aerodromes. It also deals with the requirements for the notification of tall structures and the lighting of en-route obstacles.

1. Introduction

The definition of an aerodrome includes small general aviation airfields, large commercial airports, military airbases and heliports where aircraft and helicopters take off and land. The unauthorised operation of cranes, particularly in the vicinity of aerodromes, could present a serious hazard to aircraft and helicopters, either as a physical obstruction or by interfering with guidance systems.

As with any tall structure, the presence of cranes could have flight safety implication that might be mitigated through notification of the crane to relevant aviation stakeholders and in some cases the fitting aviation warning lighting. Clause 11.3.3 of BS 7121-5:2006 says that:-

"*The appointed person should consult the aerodrome/airfield manager for permission to work if a crane is to be used within 6 km of the aerodrome/airfield and its height exceeds 10 m or that of surrounding structures or trees, if higher. Restrictions could be placed on the overall height of the crane and there could be a requirement to fit warning (obstacle) lights to the top of the crane.*

NOTE: *The Air Navigation Order makes it an offence to act recklessly or negligently in a manner likely to endanger aircraft."*

In the UK, in addition to any aerodrome-related requirement, any structure (temporary or otherwise and regardless of location) of a height of 300ft or more needs to be notified for aviation purposes. (See **Section 2e**)

Regardless of location, aviation lighting is legally required for all tall structures (including cranes) of a height of 150m (492ft) or more. Further to this statutory requirement, it is recommended that that tower cranes with a height of between 91.4m (300 ft) and 150m (492ft) are also equipped with aviation warning lighting. The Civil Aviation Authority is known to be strongly supportive of such an initiative and will routinely make similar recommendations. (See **Section 5**) .

The responsibility for notification to aerodromes and/or the CAA, together with the lighting of tower cranes, rests with the hirer of the crane (Principal or other contractor), however the supplier of the crane should assist the hirer by reminding him of his obligations.

2. Before Erecting a Tower Crane

The steps to be taken by the Hirer (Principal or other contractor) before erecting any tower crane are:-

a. Establish if the site is within 6km of an aerodrome (small general aviation airfield, large commercial airport, military airbase or a heliport) (See **Section 4** for information on locating aerodromes)

if it is then

b. Determine if the highest part of the crane, when erected, exceeds 10m or if it is higher than surrounding structures or trees (with the majority of tower cranes this will be the case)

if it is then

c. At least 28 days before the crane is to be erected, contact the manager of the airfield, airport, military airbase or heliport to tell them that it is intended to erect the crane and ask if there will be any:-

- Restrictions on the height of the crane;
- Restrictions on crane operating times;
- Crane operations depending on the runway(s) in use;

- Requirements for obstacle warning lights;
- Restrictions during poor visibility (fog or low cloud)
- Other requirements.

d. Aviation warning lighting is addressed in **Section 5** of this TIN.

e. If the site is not within 6km of an aerodrome, notification to the Civil Aviation Authority (CAA) will be required if the highest part of a tower crane is crane has a height of 91.4m (300ft) or more. Temporary structures such as cranes, expected to be in situ for periods of up to 90 days can be notified through the means of a **Not**ice to **A**ir**m**en (NOTAM). To discuss the potential need for an associated NOTAM, a developer should contact the CAA's Airspace Utilisation Section (ausops@caa.co.uk / 0207 453 6599); they will need an accurate location, an accurate maximum height (including any cranage) and a completion date.

f. The user (contractor) of any crane that is expected to be on site for in excess of 90 days should provide details of the crane(s) to the Defence Geographic Centre (DGC) which maintains the UK's master database of tall structures (the Digital Vertical Obstruction File). The notification and charting of all permanent structures of a height of 300ft or more draws on information recorded in the DGC-managed DVOF. The importance of ensuring the accuracy and completeness of DVOF cannot be over emphasised. DGC point of contact details icgdgc-aero@mod.uk. / 0208 818 2702

3. Information Required by the Airfield Manager

When contacting the airfield manager the following information should be provided:-

- The precise location of the equipment is to be provided on an Ordnance Survey Grid. Either a reference to at least six figures for Eastings and Northings or marked out on a map that shows the Ordnance Survey Grid.
- The maximum operating height in metres Above Ordnance Datum (AOD), or the height of crane Above Ground Level (AGL) plus ground level in AOD.

  NOTE: *Heights "Above Ordnance Datum (AOD)" are those shown on Ordnance Survey maps as "above mean sea level" (amsl).*

- Information must be provided on the type of crane to be used i.e. a tower crane;.
- The maximum radius of the jib;
- The intended dates and times of operation;
- Applicant's name and contact details;
- Contact details for the crane when operating.

4. Locating Aerodromes in the UK

Aerodromes in the UK fall into one of three categories:-

a. ***Licensed Aerodromes***

Licensed by the Civil Aviation Authority for the purpose of commercial air transport of passengers, the public transport of passengers and some types of flying training. A list of all licensed aerodromes in the UK can be found on the National Air Traffic Service's Aeronautical Information Service website at http://tinyurl.com/bxzo6qm

b. ***Un-licensed Aerodromes***

These can range from large airfields to private farm strips and helicopter landing sites. There are a number of websites which list these, including:-

http://ukga.com/home/view

http://www.flights4all.com/airfield_finder.asp

c. ***Military Airbases***

These are under the control of the Ministry of Defence. A map showing the location of military airbases can be downloaded from http://www.pb-photos.com/maps-ukairspace.html

d. ***Additional Sources of Information***

Local Planning Authorities could reasonably be expected to be aware of the aerodromes within relevant areas of responsibility and may be able to assist in providing associated contact details.

When locating the nearest aerodrome to the site on which a tower crane is to be erected a flight planning map is helpful as such maps show the locations of civilian aerodromes, government (military) aerodromes and heliports. Pooleys Flight Equipment sell a UK and Republic of Ireland flight planning map on www.pooleys.com

5. Aviation Warning Lighting

a. ***General***

In the UK, the need for aviation obstruction lighting on "tall" structures, including cranes, depends in the first instance upon any particular structure's location in relationship to an aerodrome. If the structure constitutes an "aerodrome obstruction" it is the aerodrome operator that with review the lighting requirement. For civil aerodromes, they will, in general terms, follow the requirements of CAP 168 - Licensing of Aerodromes. - Chapter 4 (12.8) refers to obstacle lighting.

Away from aerodromes Article 219 of the UK Air Navigation Order applies. This Article requires that for en-route obstructions (i.e. away from aerodromes) lighting only becomes legally required for structures (including cranes) of a height (measured above ground level) of 150m or more. However, structures of lesser height might need aviation obstruction lighting if, by virtue of their location and nature, they are considered a significant navigational hazard.

In cases where lighting cannot be mandated, aviation stakeholders may nevertheless make associated recommendations concerning the need for cranes to be equipped with aviation warning lighting. As a reasonable duty of care consideration, the CPA would endorse crane operators' and suppliers' routine employment of aviation warning lighting on all cranes of a height of 91m (300ft) or more. Whilst this will often exceed the mandated lighting requirement, such an initiative is known to have the support of the CAA. For further civil aviation regulatory advice on the need for aviation warning lighting on tall structures contact airspaceregulation@caa.co.uk

NOTE: *If a crane is located on top of another structure, it is the overall height (structure + crane) than is relevant.*

b. ***Lighting Specification – En-Route (away from aerodromes)***

Article 219 of the Air Navigation Order demands that structures (including cranes) of a height of 150m or more are required to be fitted with medium intensity (2000 candela) steady red lights positioned as close as possible to the top of the obstacle and at intermediate levels spaced so far as practicable equally between the top lights and ground level at intervals of not more than 52m.

NOTE: *Night is defined as the time from half an hour after sunset until half an hour before sunrise (both times inclusive), sunset and sunrise being determined at surface level.*

Where the maximum height of the crane falls below 150m, in the reasonable expectation that in the vast majority of cases such lighting will meet aviation stakeholder recommendations, the CPA Tower Crane Interest Group encourages the routine employment of steady red, medium intensity aviation warning lighting on cranes where the maximum height of a crane is between 91.4m to 150m. Such lighting should be positioned as close as possible to the highest point and to the top of the fixed structure. The CAA is supportive of such an initiative and may additionally make lighting recommendations for cranes below the 91.4m (300ft) threshold.

In all cases the lights must, as a minimum, be lit at night, positioned such that when displayed are visible from all directions and in the event of failure repaired or replaced as soon as possible.

c. ***Lighting Specification – Aerodromes***

Where the aerodrome manager specifies that the tower crane will be fitted with obstacle lights, the type quantity and position of lights will be specified by the aerodrome manager. The following describes normal practice but the aerodrome manager may require other solutions.

In general, obstacle lights will be steady red lights of either low intensity (200 candelas) or medium intensity (2,000 candelas), depending on height. For tower cranes they should be located on the top of the tower and at the end of the jib, be visible throughout 360 degrees and be illuminated at all times.

Unserviceable lamps should be replaced immediately after failure, and in any event within 24 hours. This requirement may be relaxed if pairs of lights are fitted and one is still working. Where the cranes is supplied from a generator or is being left unattended for a significant period of time, such as bank holidays, the use of battery back-up or mains powered systems should be considered for the obstacle warning lights.

d. ***Sourcing of Obstacle Warning Lights***

Obstacle lights must be of the specified intensity and visibility. Consequently they will have to be sourced from a suitable supplier who can certify that they are of the required specification. **Using general lights fitted with a red lamp of unknown intensity is not permitted.**

Obstacle lights of both low and medium intensity are now available with LED lamps which have the dual advantage of long life (typically 100,000 hours) and low power consumption (typically 50w). This avoids the need for frequent lamp replacements and allows for the use of solar panel power sources. Lights are available to run on 230V ac and 12, 24 & 48V dc supplies.

6. Sources of Information

a. Air Navigation Order 2009 (As amended)

b. CAP 393 - *Air Navigation: The Order and the Regulations,* Civil Aviation Authority, April 2011. www.caa.co.uk/docs/33/CAP393.PDF

c. CAP 168 - *Licensing of Aerodromes*, Civil Aviation Authority, April 2011. www.caa.co.uk/docs/33/CAP168.PDF

d. CAP 1096 - Guidance to crane operators on aviation lighting and notification, August 2013 www.caa.co.uk/CAP1096

e. Safeguarding of Aerodromes, Advice Note 4, *Cranes and other construction issues,* August 2006

f. *Cranes and Planes, A guide to Procedures for Operation of Cranes in the vicinity of Aerodromes*, Airport Operator's Association

g. BS 7121-5:2006, *Code of practice for safe use of cranes – Part 5: Tower cranes,* Clause 11.3.3

h. Civil Aviation Authority Directorate of Airspace Policy, *Policy Statement - Lighting of En-Route Obstacles and Onshore Wind Turbines,* April 2010

i. *Cranes, Planes and RAF Northolt,* Squadron Leader Peter Soanes, Senior Air Traffic Control Officer, RAF Northolt