



TIN 025

**Luffing Jib Tower Cranes -
Precautions for Operators Working at or near Minimum
Radius in Strong Winds**

The HSE investigation into the collapse of a luffing jib tower crane at a housing project in Liverpool in January 2007, has highlighted a number of issues with lifting light loads at minimum radius and in wind speeds approaching the luffing jib tower crane manufacturer's limiting values.

The likely sequence of events leading to the collapse of the crane was as follows:-

- Immediately before the collapse, the crane was lifting a light load with its jib almost vertical, whilst at the same time a gust of wind, at or above the safe in-service limit of the crane, lifted the jib momentarily.
- This was sufficient to release tension in the luffing rope which then came off the sheaves in the reeving system and jammed. The driver then tried to lower the jib, however, because the luffing rope was jammed, slack rope paid out from the luffing rope winch drum and formed a loop at the back of the counter jib.
- The luffing rope jam subsequently became free and the jib went in to free fall, until it took up all the slack in the rope. At this point a massive shock load was imparted to the crane structure via the luffing rope.
- This caused the jib to bend, the bolts holding the main crane assembly to the top of the crane tower (via the slewing ring) to fail and the slewing ring to fracture. The crane assembly then toppled from the tower landing upside down on the building below (the concrete counterweights falling out in the process, one of which killed a joiner working in the building below).

The purpose of this TIN is to draw the following points to the attention of all luffing jib tower crane operators:-

1. Before the start of each shift ensure that the anemometer is functioning (See **TIN 020** *The Effect of Wind on Tower Cranes in Service* for additional information);
2. Particular care should be taken operating luffing jib tower cranes when carrying out lifts which require the lifting of light loads at or near the crane's minimum radius to ensure that the luffing rope is under tension;
3. Particular care should be taken when operating in gusty wind conditions with the jib facing into the wind as there may be a tendency at minimum radius for the wind to overcome the weight of the jib and load, particularly if lifting a light load, thus preventing the jib from being luffed down under gravity;
4. If, when starting to luff down, the jib does not move, immediately release the luffing winch control and take the following steps;
 - 4.1 Ensure that the load, hook block and hoist rope are hanging free;
 - 4.2 Carefully slew away from the wind through between 90° to 180°;
 - 4.3 Carefully attempt to luff down;
 - 4.4 If the jib **does not** move, immediately release the luffing winch control, report the situation to your supervisor and await instructions.
 - 4.5 If the jib **does** move, report the situation to your supervisor and await instructions.