

Calling for more stringent crane ‘tie-down’ procedures

TT Club

With damaging hurricanes in the Atlantic, typhoons and cyclones in the Pacific, monsoons in the Indian, and random windstorms occurring anywhere, port equipment, premises and liability insurer, TT Club is strongly recommending that terminal operators urgently review their terminal emergency plans for dealing with high winds and in particular crane tie-down procedures.

Wind damage

Analysis of the TT Club’s claims over a number of years has highlighted that wind damage to quayside cranes is the biggest weather related cost to terminals. Commonly, this damage is caused by quayside cranes being blown over or blown along the crane rails.

Due to their size, profile and location on the quayside, these cranes are particularly susceptible to wind, and care must be taken in the design and operating procedures to protect against damage.

Preventative measures

“This type of incident can result in serious injuries to workers and be very costly in repairs and operational downtime,” notes Laurence Jones, TT Club’s Director Global Risk Assessment. However such incidents can be prevented, or at least the collateral damage caused can be restricted by having appropriate procedures and ensuring that they are followed. Essential elements include: having effective national and local weather reporting systems and ensuring that operational procedures respond effectively when sufficient warning is forthcoming. In addition, good practice would dictate that storm pin or tie-down facilities and procedures are invoked. Furthermore, better designed braking systems, which are properly maintained, can significantly help in conditions of sudden wind micro-bursts. There are two major windstorm issues to be considered: protection against forecast strong winds, and protection against sudden local winds called micro-bursts.

In the case of forecast strong winds, storm pins and tie-downs of sufficient number and size to hold a crane structure stationary (and procedures to implement these) are required to protect

quayside cranes. Storm pins are vertical sliding pins mounted at suitable positions under each leg of the crane. These pins are dropped into sockets set into the surface of the berth. The pins must be interlocked with the travel motion so that the crane can only be moved when the pins are disengaged.

Storm tie-downs are connections on the crane, normally at the four corners, where suitable slings, chains or bars of appropriate size and number are fitted to connect to anchor points in the terminal pavement. These anchors must be able to hold the loadings of the crane under potential wind conditions.

The other situation of primary danger is the occurrence of micro-bursts. In the worst circumstances, unknown to the driver, a strong wind arises blowing in the same direction in which the crane is traveling and the driver is unable to stop. To deal with these situations, suitable storm brakes and service brakes are necessary and should be fitted to the crane. These are not however, an acceptable alternative to pins or tie-downs for forecast weather conditions.

Storms brakes

There are a number of different systems used for storm brakes or, as they are sometimes called, parking brakes. These include rail clamps and railhead brakes. However, these are static brakes, i.e. they are only applied when the crane has stopped moving. They normally operate if the emergency stop is activated and unless severely damaged will help prevent a stationary crane from being pushed along by the wind. Their main purpose and benefit is to park and anchor the crane between normal operations without the need to apply the storm pins or tie-downs.

If rail clamp and railhead brakes are applied when the crane is moving, both the brakes themselves and the crane rail can be damaged. For this reason, wheel brakes should also be installed; these are normally disc brakes mounted on the crane wheels. Finally, the service braking system forms the normal operating brake. This is part of the motor and gearbox of the crane, which slows and ultimately stops the crane during daily working.

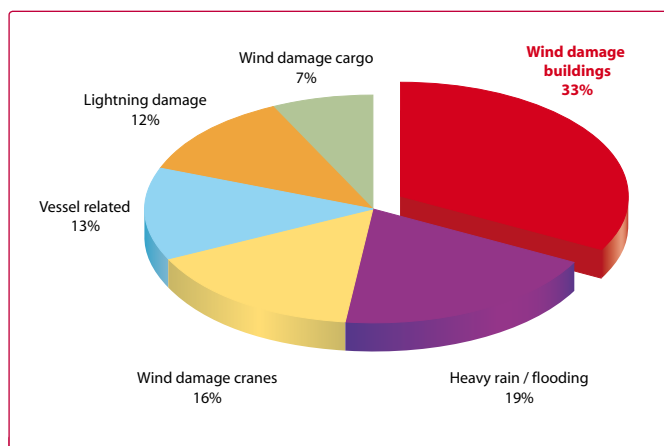


Figure 1. Number of weather related asset claims by cause type.

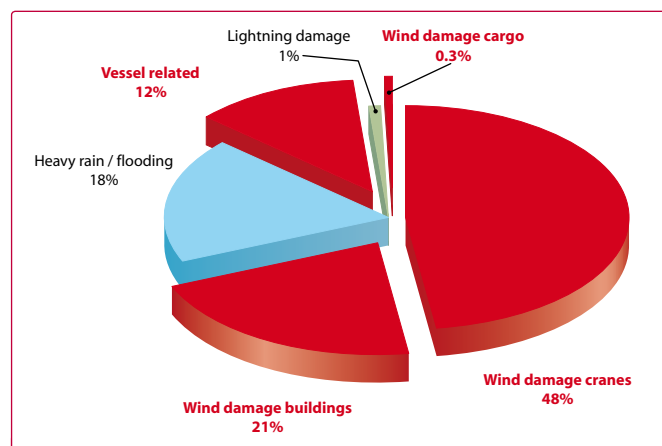


Figure 2. Cost of weather related asset claims by cause type.

Weather related claims

This claims analysis shows that over the last three years the number of occurrences of severe weather damage has increased and also appears to be occurring more randomly throughout the world. Although this is only a short analysis period and could be reflecting just a normal random cycle, we must all be prepared for severe weather conditions. The number of weather related claims has only increased from three to four per cent, but the cost of these claims has increased from three to 11 per cent (more than tripled). In the past the most severe weather damage was mainly centred on hurricanes in the western Atlantic and typhoons or cyclones in the western Pacific. Severe storms are a risk in any part of the world however the numbers resulting in claims and the damage costs have increased particularly in Europe. While weather related damage and claims will always occur there are many aspects of this risk that can be prevented or minimised.

Analysing weather claims has identified six main areas of damage which are described below with the numbers and costs shown in Figure 1 and 2:

- Wind damage to cranes is the biggest weather damage cost by a factor of over two. This damage is mainly caused by wharf cranes being blown along the crane rails. This can normally be prevented with better storm tie-down procedures where there is sufficient warning or with better designed and maintained braking systems and procedures where there is sudden wind microbursts
- Wind damage to buildings is often difficult to prevent unless buildings have been designed to handle the maximum possible wind. This does not normally happen as terminal buildings are often only designed for a 20 to 30 year life span.
- Heavy rain and/or flooding are also often difficult to prevent where cyclonic swells and tides or flooded river deltas surge into the terminal areas. With the possible consequences of rising sea levels and more flooding due to global warming, these things should be investigated when designing and locating future terminals
- Vessel damage or vessel impacting the berth due to large swells or high winds. Although this is only 12 per cent of weather related costs there were nine incidents. One of these well over US\$1m. These incidents although not common can result in catastrophic claims. Vessel damage or vessels impacting the berth is a major issue even in calm weather. Ship movement, berthing and mooring procedures in both calm and extreme weather must be reviewed to identify improvements
- Lightning damage occurs mainly to electrical equipment like computers, communications. Cranes can also suffer lightning damage to wheel bearings if earth shoes are not installed from the crane structure to the crane rails as the electrical surge current from the lightning will travel through and seize the bearings
- Wind damage to cargo is mainly confined to containers being blown over or water damage. Empty containers are often in danger of toppling in high winds and there are many ways to minimise this risk which most terminals are aware of (keep empty stack heights low; put laden boxes on top of empties; lay boxes longways parallel to prevailing wind; tie-down empty stacks; etc)

Loss prevention focus:

- Wharf crane storm tie-down procedures
- Wharf crane braking system design and maintenance
- Vessel movement, berthing and mooring procedures

Maintenance and training

Apart from accurate weather forecasting and adequate technical measures Jones emphasises that both maintenance and training are crucial to safer procedures. "Investigations of these incidents have shown that most were due to, or made worse by, many of the service brakes and park brakes being inoperative due to poor maintenance. Another major contributory factor to quayside crane damage being the lack of instruction provided to crane drivers," he states.

"When a driver is faced with a crane being blown along the quay, the natural tendency in many cases has been for him to try to move the crane back into the wind. However, by doing this the crane service brakes are lifted and become ineffective. The driver must immediately hit the emergency stop, applying the service brakes as well as the storm or parking brakes," explained Jones.

The TT Club urges terminal managers concerned with quayside cranes and bulk loaders/unloaders to review their emergency plans in respect of high wind situations and ensure that all necessary measures have been taken to prevent injury, damage and downtime arising from this cause.

Further information

For more risk management information in the event of a windstorm, TT Club has produced a Windstorm booklet to assist in developing and implementing procedures to mitigate the effects of severe weather. This booklet is available free of charge to members or at a small cost to non-members. The windstorm document can be found on the TT web site. In collaboration with the ICHCA International Safety Panel this Windstorm booklet is currently being revised and the revision will be available in early 2009.

ABOUT THE COMPANY

The TT Club is the international transport and logistics industry's leading provider of insurance and related risk management services. Established in 1968, the Club's membership ship operators, ports and terminals, road, rail and airfreight operators, logistics companies and container lessors. The TT Club has over 2,000 members, including over 400 Ports and Terminals globally. As a mutual insurer, the Club exists to provide its policyholders with benefits, which include specialist underwriting expertise, a world-wide office network providing claims management services, and first class risk management and loss prevention advice.

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