West of England

Safety Alert

Pedestal Cargo Cranes - Wire Damage and Failure

Introduction

It is not uncommon for the Club to be notified of claims involving the failure of pedestal cargo cranes, or wire damage associated with the operation of such equipment. Although physical damage to a crane or its fittings do not fall within the scope of P&I cover, the consequences of crane wire damage or failure may result in significant and costly liabilities.

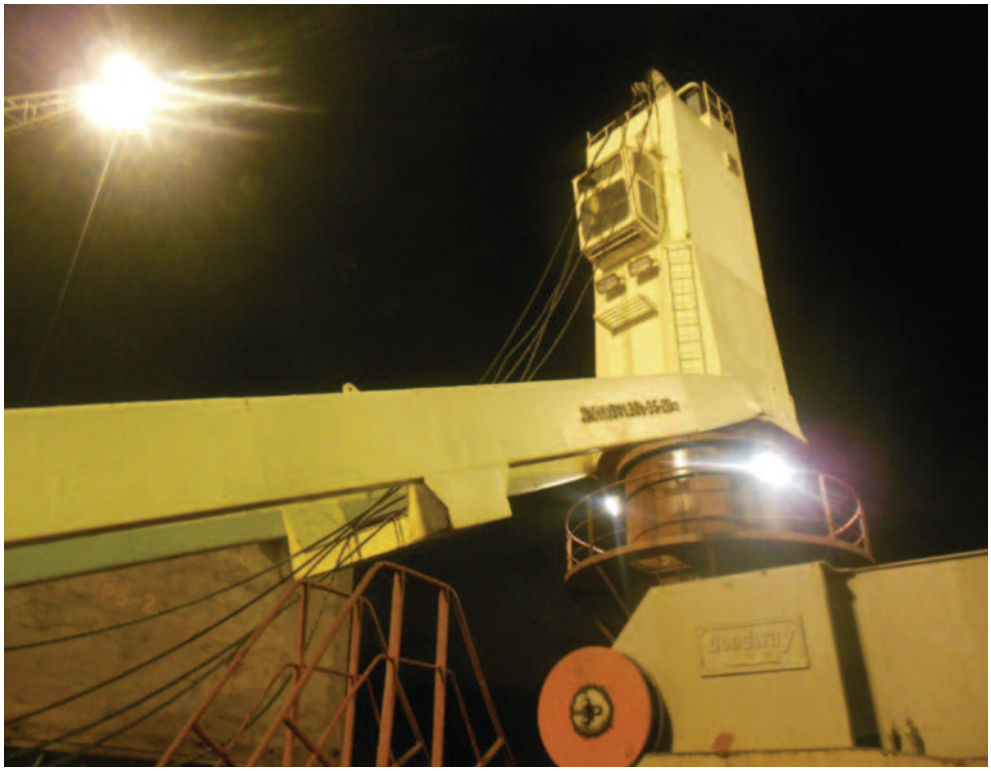

Photo courtesy of: Ocean Survey LDA

Luffing wire failure caused this jib to fall to deck, narrowly missing the accommodation ladder

Signs of crane wire damage include worn or broken strands in the hoist or luffing (topping) wires, or deformed wire that has stretched or kinked. This may lead to delay and off-hire disputes between owners and charterers as replacing the wire requires the crane to be taken out of service. If not, the crane wire may fail, possibly with catastrophic results. Hoist wire failure may cause hook blocks, cargo handling equipment and cargo to be dropped. Luffing wire failure may lead to the jib head falling on to the deck or quay or into the hold. In some cases the jib itself has buckled and collapsed. All incidents of this type may damage the load, stowed cargo, ship's gear or stevedoring equipment, together with the risk of someone being injured, possibly fatally.

A review of the Club's claims experience over a two year period found the most frequent cause of such incidents to be hoist wire damage. Relatively few claims involved damage to the luffing wire.

Causes of Damage

Crane wire damage can, in many cases, be attributed to improper or rough handling by the crane driver and/or poor maintenance of the crane.

Using cranes to pull or drag cargo from the wings and ends of the holds by slewing the crane and/or hoisting loads when the wire is at an angle to the vertical can impart huge side forces. Cranes are not designed for this purpose and using them in this way is a common cause of wire and jib problems. Trying to place cargo in a difficult area by swinging the load towards it is also unacceptable as this may damage the hoist wire; the wire should always be vertical when the load is landed. Moreover, the side forces imparted during such a practice can cause the wire to be pulled off the jib head sheaves and become jammed.

Photo courtesy of: Spark International

Heavily damaged hoist wire

If anchored in an exposed position, the movement of the vessel due to wind and wave action may produce dynamic loads in the crane, increasing the magnitude of any side forces. The same effect may be experienced by vessels with a list. As far as practicable, vessels should always be kept as near to upright as possible when using their own cranes.

In order to gain access to the extremities of a cargo hold, the hook block is often placed underneath the hatch coaming. This may result in the hoist wire chafing along the edge of the coaming and sustaining mechanical damage. Similarly, raising the hoist wire when it is lying alongside the hatch coaming will increase the risk of the hook block becoming caught underneath. This may damage the block or hoist wire and cause them to fail.

If a crane block is lowered at high speed and lands heavily, the shock may cause the hoist wire to jump off the sheaves at the jib head and become jammed as it suddenly slackens off. Riding turns may also form on the hoist drum, damaging the wire underneath.

Other types of incident have been reported to the Club. On one occasion a luffing wire was damaged when the crane operator attempted to lift a load that was still lashed and secured in place. In another case a jib head collapsed after the end of the luffing wire was pulled from its securing clamp on the winch drum. It was subsequently found that someone had overridden the limit switch.

Recommendations

During cargo operations the duty officer should watch out for any signs of poor crane driving, particularly if the vessel's cranes are being operated by stevedores or other third parties. If improper crane handling is observed, the duty officer should stop the crane immediately and explain their concerns to the foreman and the crane driver. If a critical situation appears to be developing it may be necessary to activate the crane's emergency stop, but only if it is safe and practicable to do so. Should the vessel's cranes continue to be operated in an unsatisfactory manner in spite of such measures, the Master should issue a Letter of Protest to everyone concerned. The vessel should also try to take photographs and/or video footage of cranes that are being operated in an unacceptable manner in order to mitigate any related claims that may arise.

Photo courtesy of: Inchcape Shipping Services

Hoist wire failure caused a crane block to fall on to this loaded container, causing considerable damage

Cranes should never be used to drag the load to a better position before hoisting, either inside the holds or on the quay. When discharging, if the crane's hook cannot be plumbed vertically, suitable stevedoring equipment such as fork lift trucks, bobcats, payloaders, wheel loaders or excavators should be used to move the cargo into the hatch square so that it can be lifted straight out of the hold.

Cargo should always be hoisted slowly and smoothly to avoid snatch and shock loads which may damage the wire.

Should damage to the crane or wire occur while handling cargo, the load should be lowered to a safe area at the earliest opportunity. If any wires appear to have jammed, the crane should be positioned to minimise the risk of personnel, the vessel or property being harmed should the wire suddenly part or break free.

Crane jibs are sometimes fitted with a bar running across the head block to prevent slack wires jumping off the sheaves and jamming. If not already fitted, Members may wish to consider equipping their cranes with this simple device.

Limit switches fitted to crane jibs to restrict luffing should never be overridden to expedite cargo handling. The only occasion when limit switches may be overridden is when stowing or unstowing the jib. At all other times the keys for overriding the limit switches should be protected from unauthorised use and should not be left in the crane cab. To prevent tampering with the limit switch, consideration should be given to fitting protective measures over the limit switch key slot.

Illustrative notices may be placed inside crane cabs to caution against unsatisfactory practices such as dragging loads and running hoist wires against hold steelwork.

Photo courtesy of: Aqaba Consultants Office

Hoist wire damage

Photo courtesy of: London Offshore Consultants

Protective measure to prevent tampering with the luffing limit switch

Wire Maintenance

Crane wire failure and crane wire damage are not always associated with poor driving. The Club has encountered a number of cases where the condition of the wire may have been a contributory factor. Examples include:

- Corrosion and wire failure due to:
  - Infrequent application of wire rope grease.
  - Incorrect grease used to lubricate wire ropes.
  - Insufficient lubrication, particularly in areas near wire sockets and standing parts of wires, on sheaves and on winch drums.
  - Ineffective lubrication, resulting in the wire corroding internally due to grease not penetrating between the stands and reaching the core.
- Crane wires used for a prolonged period without being replaced.
- External wire strands showing signs of excessive wear.
- Infrequent and/or ineffective visual inspections for damage.

It is recommended that a comprehensive inspection and maintenance programme for crane wires and associated

equipment is incorporated into the vessel's Planned Maintenance System (PMS). As a minimum the PMS schedule should include the inspection and maintenance recommendations of the manufacturer or, alternatively, be based on the international standard ISO 4319 "Cranes – Wire Ropes – Care and maintenance, inspection and discard". This will ensure that frequent and detailed inspections for damage are carried out, that all wires are greased thoroughly at regular intervals and that wires are always replaced when necessary.

Members requiring further guidance should contact the Loss Prevention department.

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