Inspection and maintenance guidance for ship cranes

The Club would like to thank Captain Purnendu Shorey, Director of Offing Marine & Offshore Consultants for his invaluable contribution to this article. Offing Marine specialise in a range of maritime activities including surveys, towage approvals and casualty investigations.

Both the Club and the wider maritime industry have observed a rise in crane related incidents, with both the number and cost of claims contributing to this increased figure. The root causes for many of these incidents have largely been attributed to inadequate maintenance. Shipboard procedures, on board practices and crew training have evolved over the years switching from generic, to equipment specific; with the widespread introduction of ship specific procedural systems. Despite these enhanced systems, crane incidents continue to occur, often ranging in severity and involving numerous ship and crane types.

What are some of the common issues affecting inspections and the maintenance of cranes and the associated lifting equipment?

In the experience of Offing Marine, a possible contributing factor to crane failures is inadequate inspections and maintenance. Unlike other machinery such as main engines, auxiliaries and purifiers, inspections of cranes may be infrequent, largely dependent upon the type, usage and the scope of the ship operation. Another common factor relates to the oversight of the manufacturer's manual and/or instructions when carrying out routine inspections or maintenance. Additionally, there may also be a tendency for over reliance on regulatory inspections carried out by external inspectors and entries in the Register of Lifting Appliances, which may give a false sense of confidence in the condition of the equipment, especially if a significant period of time has elapsed since the last inspection.

Advice for performing effective inspection and maintenance on cranes

Although a comprehensive inspection checklist is an effective tool to ensure ships' cranes are well maintained, maintenance and renewals of parts based on running hours is also key to ensure proper upkeep of this equipment. It is equally important that crew are aware of the common indicators of heightened risk. Examples could include: corrosion, small hairline fractures, indicators of condition from the lubrication or whether the equipment in use is duly certified.

Members', and their crew's, familiarisation with the ship crane(s), associated equipment and

parts is key to ensuring proper inspection and maintenance. Frequent visual inspections can provide early warning signs of defective lifting gear, which, if dealt with swiftly can prevent further damage to equipment and cargo and exposure to potentially expensive claims. In addition to enhancing safety, routine maintenance will also extend the working life of this essential piece of on board equipment.

The effect of poor lubrication

The risk of uncertified crane equipment

Items for consideration when conducting crane inspections and maintenance on board

Personnel

- A crane operator is the best party to identify operating irregularities, which may include abnormal sounds, jerks or 'stickiness' during movements, alarms on the operator panel (with due regard to a silenced alarm that may still have the indicating light on) and similar indications.
- Crew should be provided with the appropriate training and tools required to ensure that they are suitably competent and equipped to perform crane inspections and maintenance.
- On board personnel, whilst on deck, can assist by checking cranes for any abnormal sounds, sighting strands of broken wires etc. If observed, the findings should be reported, or the job stopped.
- Immediate reporting and appropriate rectification of defects and abnormalities is the first step towards avoiding an incident. This action must be encouraged on board.

Records and Certification

- As a crane ages there may be a possibility that the capacity of the crane is 'scaled down' by the competent authority. It is of utmost importance to obtain a record of this downrating and adjust the markings on the crane to avoid overloading.
- Records of running hours must be maintained as these are crucial in ensuring that maintenance is carried out in a timely manner.
- When reviewing crane documents, due attention should be paid to the Load Test Certificate. It must be verified that the load test has been carried out with a proof load that complies with relevant regulatory requirements. For example, British Standards dictate that for cranes of up to 20 tonnes Safe Working Load (SWL), a proof load exceeding the SWL by 25% must be applied during testing.
- A thorough analysis of all lifting appliances certificates, associated wires and loose gear must be carried out, including the marking of SWL and Breaking Strength/Capacity. It must be verified that the certificates in hand correspond to the equipment in use.
- Colour coding of loose gear must be checked for correctness and in line with the system adopted on board a particular ship.
- The lubrication oil analysis records must be referred to so that any changes in quality can be identified. These analyses should be performed at intervals as recommended by the manufacturer.

Operational

- Damage caused to links/wires due to abrasion or contact should be closely examined.
- A close visual inspection of the crane superstructure should be performed to check for signs of damage and/or degradation, paying attention to areas of corrosion. It may be necessary to remove paint in areas to investigate an area of suspicion with Non-Destructive Testing (NDT) methods.
- Connections on any hydraulic hoses should be observed as properly secured with no signs of leakage. It is also recommended that a hose replacement schedule is implemented.
- All oils/coolants must be monitored for condition and consumption and replenished in time to avoid damage caused by overheating. If levels must be maintained on a frequent occurrence further investigation may be warranted.
- Crane wires must be lubricated with the specification stated in the manufacturer's instructions. Surface lubrication alone is not effective as dry internals of wires can lead to serious damages, thereby weakening the strength of the wire.
- If fitted, guards, covers and locking arrangements must be checked for robustness and any damage.
- Electrical connections must be checked for cracking of wire sheaths, damaged switches and parts.
- Alarms and limit switches should be tested and must not be bypassed.
- All indicators and alarms, especially in the crane cabin, should be tested to ensure that they are working correctly.
- When changing parts, the original diagram that depicts the rigging of crane parts must be followed. Only certified parts should be used as a replacement.