

Casualty Information

Information from DNV to the maritime industry No. 3 May 2006

Fatal accident with lifting appliance

Ship type: Any Size (grt): Any Year built: Any

Course of events

A provision crane loaded pallets onboard a vessel using a pallet fork. After landing the pallet on the vessel's deck, the pallet fork was cleared and the crane operator moved the crane outward to pick up new load. During this operation, the crane wire broke and the pallet fork and the hook fell down and hit one of the crewmembers on the vessel.

Extent of damage

Despite the effort of the vessel's own crew, dedicated first aid personnel and a doctor, the injured person died shortly after the accident.

Probable cause

Two important reasons that allowed the failure to occur:

1. Malfunction/missing upper limit switch. If the upper limit switch had been operational, it would have stopped the movement before the hook was able to hit into the crane beam.
2. The wire end at the hook side was terminated by means of three incorrectly applied U-bolt clamps (see Fig. 2) instead of a ferrule lock device as prescribed in Maker's manual (see Fig. 3). Tests has shown that this lead to a considerable reduction of the breaking strength of the wire resulting in a breaking strength below the loading in the wire when the hook blocks hits into the crane beam with full hoisting speed.

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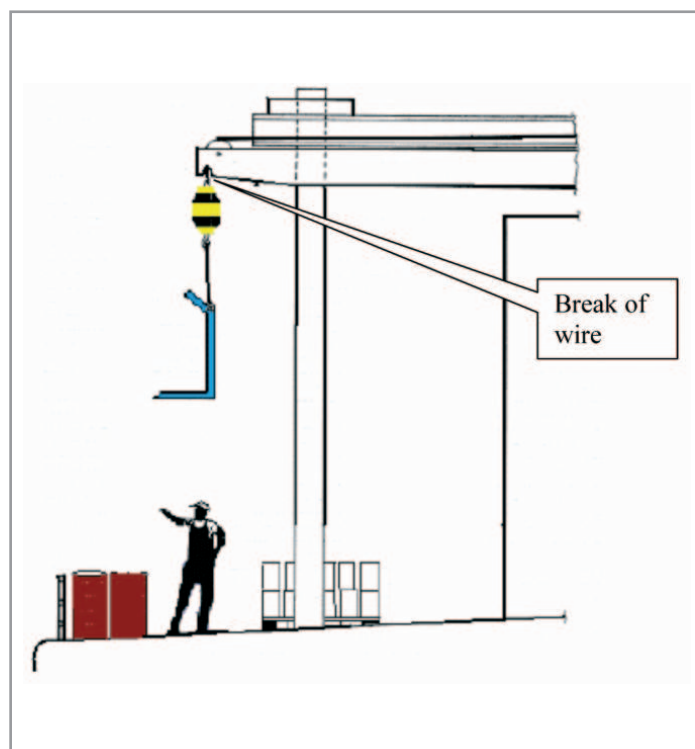


Fig. 1: Sketch of the lifting equipments.

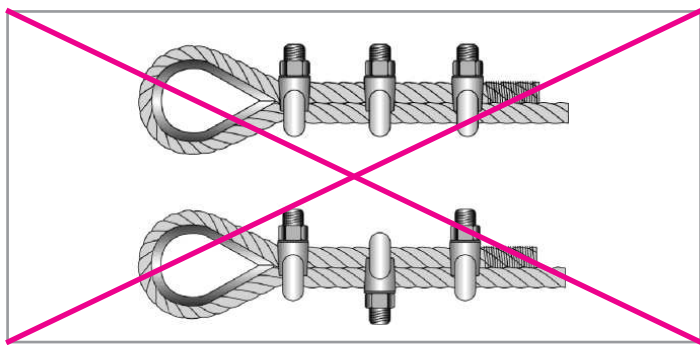


Fig. 2: Incorrect methods of attaching clamps to wire rope. The below method was used in this case. The pictures are copied from CASAR Special wire ropes, Wire Rope End Connections.



Fig. 3: Example of a ferrule lock suggested in makers manual. The picture is copied from CASAR Special wire ropes, Wire Rope End Connections.

Lessons to be learned

1. Limit switches are important safety related measures on a crane. It is recommended that the limit switches are tested regularly and confirmed to work as intended. Note that for electrically driven winches without any torque limiting device, the hook upper limit switch is particularly important.

The hook upper limit switch may for instance be tested by hoisting the hook slowly upwards until automatic stop imposed by the limit switch. Further, visually verify that the hook will hit the limit switch independent of motions due to wind and waves or operational effects.

2. Assure that wire end terminations are correctly performed. Note that DNV rules do not allow the use of U-clamps, but properly designed clamps with two gripping areas are accepted, see Fig. 4.

3. Inspect the appliance before use. Preferably apply a "Before use inspection checklist" accepted by the crane maker and the crane certifying authority.

4. Respect for established procedures with the aim to avoid persons under or nearby hanging loads. Make sure that all crew members are properly informed of the hazards involved in lifting operations and the precautions they are expected to take.



Fig. 4: Example of acceptable wire rope clamp with two gripping areas. Figure from The Crosby Group Inc, General Catalog 2005.

We welcome your thoughts!

Casualty Information is published by DNV Maritime, Maritime Technology and Production Centre (Dept. for Ships in Operation).

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The purpose of Casualty Information is to provide the maritime industry with 'lessons to be learned' from incidents of ship damage and more serious accidents. In this way, Det Norske Veritas AS hopes to contribute to the

prevention of similar occurrences in the future. The information included is not necessarily restricted to cover ships classed with DNV and is presented, without obligation, for information purposes only.

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