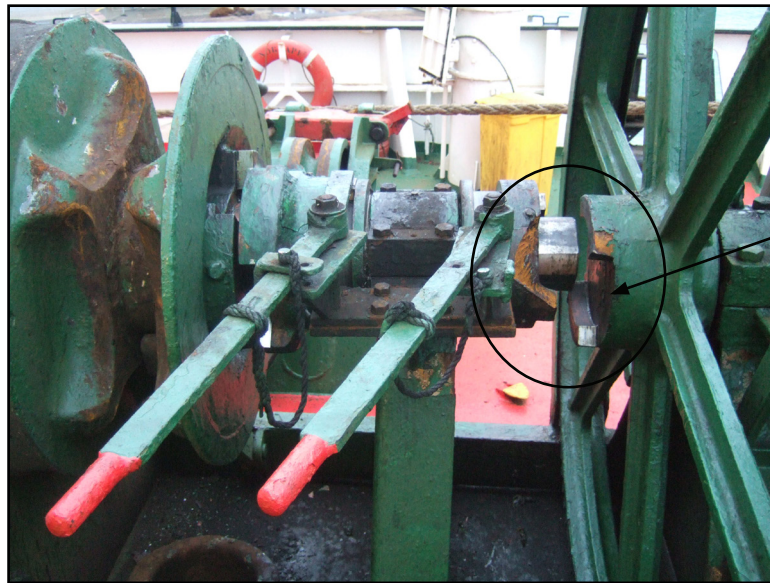


FLYER TO THE SHIPPING INDUSTRY

Windlass damage when weighing anchor in gale force winds



Broken dog clutch
and bent shaft on
port windlass

Narrative

On 26 November 2011, the port windlass of the UK registered ro-ro vessel *Norcape* suffered catastrophic damage during an attempt to weigh anchor in near gale force winds.

At 0354 the wind was south westerly 30 knots when the vessel anchored in Brodick Bay, Isle of Arran, with 8 shackles on the port anchor and the starboard anchor on the seabed to reduce anticipated yaw. A short time after anchoring, *Norcape* began to yaw, the intensity of which increased steadily until, at 0536, the vessel yawed through 150° and the port cable began to slip through the windlass.

The decision was taken to get underway, and the starboard anchor was weighed. The crew then began to weigh the port anchor, using engines to reduce the load on the cable.

The wind strength was increasing steadily and the windlass struggled to recover the cable when, suddenly and without warning, the dog clutch shattered and the cable payed out to the bitter end. The cable was subsequently slipped and *Norcape* was taken out of service due to the damage to the windlass and the loss of her anchor.

Safety Lessons

The decision to anchor was taken with strong winds blowing and with gale force winds expected. Although the selected anchorage was on the lee side of the Isle of Arran, it did not provide sufficient shelter to prevent the vessel's anchoring equipment being subjected to excessive loads.

An extract from the International Association of Classification Societies (IACS) *Requirements concerning mooring, anchoring and towing* states:

The anchoring equipment required herewith is intended for temporary mooring of a vessel within a harbour or sheltered area when the vessel is awaiting berth, tide, etc.

The fact that the anchor cable rendered indicated that the cable had slipped through the guillotine bar arrangement. Investigation revealed that the locking pin, which should have held the bar in place, was not engaged when the cable rendered. It transpired that the vessel's SMS for anchoring operations contained no reference to the use of the locking pin when anchoring.

The IACS requirements in relation to the strength of the windlass brake and stopper (guillotine) states:

A chain stopper should withstand a pull of 80% of the breaking load of the chain. The windlass with brakes engaged and cable lifters disengaged is to be able to withstand a pull of 45% of the breaking load of the chain.

The guillotine/chain stopper housing is the strongest part of the anchoring equipment and is designed to take the load of the cable when a vessel lies at anchor. In this case, the load of the cable transferred to the windlass as the cable slipped, and this initiated the failure mechanism which culminated in the catastrophic failure of the dog clutch.

The severe yaw that developed was due to the windage of the vessel's superstructure, which generated forces in excess of the design load of the anchoring equipment.

To try and prevent such accidents occurring in the future, owners and operators are strongly advised to review their SMS procedures for anchoring to ensure they address the above safety issues and, specifically:

1. That masters have clear guidance on the capability of their vessel's anchoring system, including:
 - Any limitations of the anchor system components, including that of the windlass.
 - Effects of windage in various load conditions
 - Risks associated with excessive yaw.
2. That the SMS guidance on anchoring is vessel-specific and highlights that, when at anchor, the weight of the cable should be taken on the guillotine fittings, which should be correctly engaged (Nautical Institute, *Mooring and Anchoring Ships*, Volume 1, 2009. ISBN: 978 1 870077 93 4 refers).

This flyer and the MAIB's investigation report are posted on our website:

www.maib.gov.uk

For all enquiries:

Marine Accident Investigation Branch
Mountbatten House
Grosvenor Square
Southampton
SO15 2JU

Tel: 023 8039 5500

Email: maib@dfi.gsi.gov.uk

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