

These flashes summarise key safety matters and incidents, allowing wider dissemination of lessons learned from them. The information below has been provided in good faith by members and should be reviewed individually by recipients, who will determine its relevance to their own operations.

The effectiveness of the IMCA safety flash system depends on receiving reports from members in order to pass on information and avoid repeat incidents. Please consider adding the IMCA secretariat (imca@imca-int.com) to your internal distribution list for safety alerts and/or manually submitting information on specific incidents you consider may be relevant. All information will be anonymised or sanitised, as appropriate.

A number of other organisations issue safety flashes and similar documents which may be of interest to IMCA members. Where these are particularly relevant, these may be summarised or highlighted here. Links to known relevant websites are provided at www.imca-int.com/links. Additional links should be submitted to webmaster@imca-int.com

I Failure of ROV Lift Umbilical Winch Brake

I.1 Introduction

One of our members has informed us of the following incident. An ROV system was providing subsea intervention support working from a drill rig in depths up to 2500msw. Whilst conducting routine operations, to a depth of 2300m, the ROV lift umbilical winch system was stopped. After approximately five minutes, the umbilical winch started to 'creep' and quickly gather speed. The operator attempted to arrest the load by operating the winch in an upward direction. This had no effect and by the time the operator had activated the emergency stop the load could not be stopped and the winch suffered an uncontrolled payout. Although nobody was injured, the ROV together with 3300m of steel armoured umbilical was lost from the rig and the winch suffered serious damage.

The initial investigation conducted by the company concerned has shown that the mechanical brake system had failed due to excessive wear on the brake plates.

The particular winch involved was a CORMAC unit manufactured by Norlau. It appears that only certain types of this winch have this characteristic, as the design appears to have changed over the life of the model.

I.2 Actions to be taken in the event of an Uncontrolled Payout

In the incident described above, by attempting to arrest the load by operating the 'pay-in' command, the operator unwittingly aided the uncontrolled payout. This is because when the winch command lever is in neutral, the mechanical brake is fully engaged. When a command is given to the winch, the mechanical brake is released as the system pressure builds in response to demand. In this situation, with the winch already starting to gather speed, any release of the mechanical brake will aid the uncontrolled payout before the hydraulic drive can counter this release.

The company concerned has instructed its personnel that if a similar incident is experienced whereby a CORMAC winch starts to 'creep' under load, no action should be taken and the winch allowed to continue to 'creep' until it stops. Should this occur the company has advised that immediate advice be sought in order to ensure safe recovery of the load.

I.3 Brake Test

The company concerned has identified a torque test with the motor against the brake to determine the amount of wear on similar winch systems. This simply tests the brake against the maximum torque induced by the motor and thereby gives an indication of brake condition.

In the unlikely event that winch drum movement occurs during the test, the company has instructed its personnel that all operations using the winch unit under test should be suspended until the extent of wear to the brake system has been evaluated.

I.4 Summary

The company concerned has noted that actions described above are designed to prevent re-occurrence of this serious incident by testing the integrity of the mechanical brake and advising what to do in the event of a similar

uncontrolled payout. However, it notes that these actions are considered to be short term and a long term solution is being investigated, possibly as a modification to be agreed in conjunction with the manufacturer.

2 Failure of Winch Brake on Air Diving Bell System

One of our members has recently reported a failure of a winch brake on an air diving bell system. One of their vessel's was undertaking air diving work using a wet diving bell. When the wet bell, which was deployed at deck level over the side of the DSV, was awaiting the diver to enter, it went into free-fall dropping 6m in air and a further 15m in water on to the clump weight. The wet bell was unmanned, nobody was injured although the diver was within seconds of entering it.

The subsequent investigation determined that the wet bell free fall was a direct result of a failure of the secondary band brake on the winch. The fault was clearly visible as the band brake adjustable actuating rod had snapped, rendering the brake totally ineffective. The winch control position is remote from the winch, hence the operator was not aware of the impending failure prior to it happening.

The primary brake on the winch, the hydraulically driven motor system, had supported the wet bell for approximately 5 or 6 minutes from the time the winch had been operated and normally the secondary mechanical brake would have been operational during this decay period. Since the secondary system had failed, when the hydraulic pressure decayed beyond the point that the motor would be held, the weight of the bell caused the winch to freewheel allowing the wet bell to free-fall from deck level into the sea.

The secondary brake is designed to be fail-safe in that it is applied by spring pressure and released by hydraulic pressure when the winch is operated. A hydraulic ram pushes against the spring to release the brake. The ram's linear action is applied to a lever to increase the braking force and therefore the lever moves through an arc. To permit the slight rotation of the lever, the band brake adjustable actuating rod is connected to the lever via a hinge pin/turnbuckle type arrangement. It was found that this hinge pin had become seized due to lack of lubrication and therefore had not been rotating as the brake was applied and released. This resulted in the brake band actuating rod being subjected to a bending moment as well as the tensile force for which it was only designed. This regular bending, small though it may have been, was sufficient to eventually cause the 24 mm diameter threaded adjustable rod to snap due to fatigue.

The root cause of the secondary brake failure was attributed to lack of maintenance. Although some of the winch band brake mechanism was being lubricated on a periodic basis, two grease nipples to lubricate the turnbuckle type hinge pin were both difficult to see, rather inaccessible and consequently had not been greased.

The primary brake, the hydraulic motor, "failed" after a period of 5 or 6 minutes from the time when the winch was last operated. This failure was due to the pressure decay in the hydraulic system as all hydraulic motors leak internally. The hydraulic system should have been configured to include an accumulator and/or valve(s) to allow hydraulic oil, at pressure, to remain behind the motor and thus only permit the winch to creep as oil pressure decays, rather than freewheel out of control.

The company involved plans to systematically check all winches on their vessels to ensure that this type of failure is not repeated. A system modification kit may need to be supplied to provide the correct control of the hydraulic motor in the neutral position. The company involved has also advised its staff to ensure that all moving brake parts of man-riding winches are properly lubricated, the mechanical braking system is fully functional and no signs of undue wear or uneven wear are apparent on the band brake; and that these checks should be carried out on a regular basis.

3 Incident involving Oxy-acetylene cutting

One of our members has informed us of recent incident which occurred during the assembly of oxy-acetylene cutting equipment. An internal explosion occurred and injured a Dive Tender, fortunately not seriously.

The review of the incident revealed the following:

- ◆ Oil or grease contamination in the presence of oxygen probably caused the explosion;
- ◆ A dangerous "home made" manifold of unknown origin had been used;
- ◆ Flashback arrestors were not fitted to the system;
- ◆ Regulators had been removed from the cylinders;
- ◆ The oxygen and acetylene cylinders had not been suitably segregated.

The company involved as proposed the following actions:

- ◆ All hoses and fittings to be thoroughly checked free of oil/grease contaminants;
- ◆ Only use correct approved fittings and hoses in any pressurised gas system;
- ◆ Flashback arrestors must be fitted in the system;
- ◆ Regulators must not be removed from the cylinders;
- ◆ Oxygen and acetylene gas cylinders must be suitably segregated.

The company has also advised its staff to inspect all oxygen and acetylene cutting gear and ensure correct fixtures and fittings in use.