IMCA Safety Flash 11/02

December 2002

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

1 Failure During Lift Bag Operations

Keywords: Lifting

A member has reported a near-miss during a lift bag operation, which highlights the dangers of inadequate safe rigging practice and of lack of awareness of actual lifting capacity of bags in relation to stated capacity.

Saturation divers were operating at seabed level at 19 metres (62ft) and had to move a 600kg (1320lb) blind flange. They had attached a lift bag, nominally rated at 500kg, to the load, so that they could manhandle it more easily into position.

At some stage during the inflation process, the diver lost control and the lift bag, with attached flange, took off towards the surface. When the bag arrived at the surface, it lost some of its volume, resulting in partial deflation. Inevitably, the load fell back to the seabed, away from the dive site, and was later recovered, undamaged.

It was fortunate that there was no harm to the divers and that the bag did not become fouled in the support vessel's thrusters as it rose to the surface.

The company involved has noted the following key issues:

i) All involved in this type of operation need to be aware that there is a potential variance between the stated capacity and actual capacity of lift bags. In this case, the actual capacity was over 25% higher than the stated capacity;

ii) Rigging arrangements for lift bag operations should include an 'inverter' line, which must be connected between the top of the bag and a fixed anchor point on the seabed. The length of the inverter line should be such that there is sufficient length to conduct the operational task, but that would it prevent the bag and load from reaching the ship or surface in the event that the bag did over-lift the load and initial control was lost. When the restraint came on, the line would cause the bag to tip, spilling some air and returning the load to safety;

iii) When moving long spools, for example with multiple lift bags, it should be ensured that there are adequate anchoring points for each of the inverter lines, with the anchoring positions and lengths of 'inverter' lines suitably calculated to ensure a safe operation.

2 Fatality During Lifting Operation

Keywords: Lifting

We have been advised of the following fatality, which occurred on the pipe deck of an offshore platform.

Two chemical pods had been stacked to make room for arriving cargo. To improve overall deck safety, it was decided to unstack the pods during the next shift, since all cargo had arrived and space was available. As this was a 'blind' lift, the crew included two flagmen/hookmen.

One of the hookmen climbed up the integrated ladder on the side of the pods, in order to hook the chain sling. During this operation, the crane pendant was lowered too much and went inside the frame holding the pod. When the hookman told the crane driver to lift up approximately 20cm, the pendant snagged the frame and lifted one end of the pod. As soon as one side of the tank had cleared the stacking lugs, the tank started to slide.

The hookman had his upper body above the frame and, when the tank toppled, his chest was crushed between the falling pod and an adjacent container, stored approximately 2.6 metres from the pods. The injuries to his chest were fatal and death was immediate.

The company, in its investigations, noted that the deck had been surveyed by the crane driver prior to handover and that the deck had very well organised and managed. However, it noted the following points which had contributed to this incident:

i) Inadequate design: the pods were designed for stacking, but the lugs did not properly prevent sliding if subject to external forces (e.g. crane, container). The chain slings were also too short to allow hooking from deck level, which had been required in the company's procedure for stacking to be allowed;

ii) Inadequate planning and worksite walk-through: the safest way to perform the task had not been identified (the chain sling was hanging down the opposite side and there was no need to climb on top of the pod);

iii) Inadequate identification of job hazards: working at heights (4.6 metres at the top of the upper pod) and not recognising the potential hazard of a trapped pendant;

iv) Inadequate communication: the flagman could not see the top of the tank and hence could not direct the lowering of the crane pendant; the hookman was carrying out multiple tasks, including communication with the crane driver.

The investigation resulted in the following recommendations being made:

i) Stacking of these pods and others of similar design to be banned by the company; consideration to be given to banning all stacking of containers;

ii) A pocket-sized aide-mémoire card to be introduced by the company, to prompt and aid appropriate prior assessment of lifts;

iii) Existing company rules on working at heights to be properly enforced (working on a ladder above 2m height was already a violation of company rules);

iv) Company rules on lifting to be clarified/changed:

   a) 'hooking at deck level' means standing on the deck itself;

   b) flagman to be the only person communicating with the crane drive; flagman not to touch load; flagman to be identifiable by wearing a bright vest.

The company has also stressed the following points to its employees:

i) Design standards for stackable containers are to be clear; suitable design should be checked;

ii) Stacking loads where people have to work is inherently dangerous – check if it's happening on your worksite and review whether or not it should continue;

iii) Lifting operations, while often routine activities, are inherently dangerous with people around – check that people are adequately separated from the hazard; review how to recognise when a lift becomes non-routine;

iv) Working at height above 2m without adequate controls/safeguards in place is against company policy ('prohibited') – check it's not happening on your worksite;

v) Flagmen/banksmen should never be put in a position to handle a load – check that they're not on your worksite;

vi) 'Safety must be 100%. Be intolerant, small deviations will eventually combine and hurt you'.

3 Filter Failure in Diver Gas Reclaim Boosters

Keywords: Gas

A member has reported the following near-miss incident, whereby a diver experienced narcotic effects, possibly due to the effect of additional filters being placed in a gas reclaim system which obstructed free gas flow within the system.

Additional filters had been fitted in the booster gas circuit – upstream of the bypass regulator, in line with the booster bypass circuit – with the intention of protecting the regulator seat from the effects of Teflon dust emanating from the piston rings.

However, the insertion of the specific type of filter may have caused an obstruction to free gas flow between the outlet and the inlet of the compressors. If the compressors were run in 'bypass' mode (i.e. while the divers were not on closed circuit), there would be a risk of compromising the safe operation and reliability of the equipment, because the potential would exist for small quantities of air to be drawn into the reclaim system via the first stage piston top set of cross-head chevron seals.

The following advice has been issued by the member to its dive ships/sites.

i) Carry out a full system inspection of the booster bypass pipework, specifically that area between the compressor outlet and its inlet, to determine that no in-line filter or other potential obstruction has been installed and that pipework has not been modified in any other way;

ii) Remove any such items from service until the modification has been fully assessed and written approval given by the responsible company department;

iii) Check that inter-stage gauges are fully operational and in working order (they should give a tell-tale signal if a flow restriction exists);

iv) Check that the compressor running temperature is normal while running for extended periods in the 'bypass' mode.

4 EPIRB Antenna Failures

Keywords: Corrosion

The attached note provides details of defects identified by the US Coast Guard in antennae on EPIRBs (emergency position indicating radio beacons), caused by internal corrosion.

5 Saturn Engine Safety Notice

Keywords: Explosion

We have been passed the attached 'Product Advisory' from Solar Turbines, relating to a potential personnel safety issue resulting from an uncontained compressor section failure, which could involve risk of damage to property and serious bodily injury or death.

Marine Safety, Security and Environmental Protection
SAFETY ALERT - EPIRB ANTENNAE FAILURES
September 10, 2002 Washington, DC

The USCG Marine Safety Office Honolulu has recently reported that a high percentage of antennas equipped to Satellite 406 Cat I EPIRBs, product number 2754, manufactured by ACR Electronics Incorporated have failed during dockside examinations of Commercial Fishing Vessels.

On several occasions the antenna's outer rubber coating was discovered ripped or torn. Closer inspection often revealed extensive internal corrosion. Other antennas showed no perforations on the outer rubber coating but displayed bulges on the antennae near its base. Upon closer inspection when the bulging area was sliced open, total wastage of the antennae interior was revealed.

It is reported that evidence of a corrosion failure may be discovered when the antenna is unscrewed from the EPIRB body assembly. Rusty liquid dripping from the antenna or moisture present inside the threaded section are tell tale signs of failing equipment.

ACR Electronics has acknowledged receipt of the failed antennas and has initiated a study to determine the cause and scope of the problem. ACR is committed to support its safety products and will replace damaged antennas at no cost to the owner. Should you encounter similar problems with your vessel's 2754 EPIRB antenna, contact ACR Electronics Customer Service Representatives at (800) 432-0227, ext. 110 to receive a replacement antenna.

The Coast Guard strongly recommends that vessel operators carefully inspect their EPIRB antennas - particularly if it is manufactured by ACR Electronics Incorporated.

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PRODUCT ADVISORY

NOTICE: **The Type of Change and Recommended Compliance specified reflects Solar's best judgment regarding this Product Advisory. All questions should be directed to your local Solar District Office. Solar, Saturn, Centaur, Taurus, Mercury, Mars, Titan, SoLoNOx, and Turbotronic are trademarks of Solar Turbines Incorporated. Cat and Caterpillar are trademarks of Caterpillar Inc. Specifications subject to change without notice**

NUMBER:	**8.7/112**
ISSUED:	**March 2002**
REVISED:	
PRODUCT:	**Saturn**
MODEL(S):	**All**
Specifics:	
SUBJECT:	**SATURN ENGINE SAFETY NOTICE**
Type of Change:	**Product Safety**
Recommended Compliance:	**Immediate**
Purpose:	To alert users to a potential personnel safety issue resulting from an uncontained compressor section failure, which may involve risk of damage to property and serious bodily injury or death.

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GENERAL INFORMATION:

This Product Advisory is intended to inform users of an incident that is currently under investigation by Solar Turbines Incorporated. The information contained herein is not final. When the investigation is completed, you will receive supplemental information in the form of an updated Product Advisory or a Service Bulletin. The Type of Change and Recommended Compliance specified reflects Solar's best judgment regarding the Product Advisory. All questions should be directed to your Solar Field Service District Manager.

There are currently over 2100 *Saturn 10* single-shaft engines operating in power generation applications worldwide with approximately 174 million total operating hours.

During March 2002, a Solar *Saturn 10* single-shaft gas turbine experienced an uncontained compressor section failure at a customer site, which resulted in metal fragments penetrating the compressor casing. Initial reports were that this resulted in a fatality. The reported equipment damage was limited to the *Saturn* package.

Solar has initiated a failure investigation of this incident. Solar will provide additional information to users by way of an updated Product Advisory when all relevant data has been analyzed and the root cause(s) have been determined. Any operational recommendations will be communicated in a Service Bulletin.

SUPPLEMENTAL INFORMATION FOR OTHER SATURN USERS:

Solar Turbines is issuing this Product Advisory to all owners of Saturn single-shaft hot-end-drive generator packages. While this incident occurred on this model of Saturn, the root cause(s) is not known, and under investigation. Thus, this Advisory is also being sent to owners of *all* Saturn engines, including the two-shaft mechanical drive version. Solar is unaware of any uncontained compressor section failures involving two-shaft engines. Until a final Service Bulletin is issued, users of all Saturn engines are advised to comply with the actions required by this Product Advisory.

ACTION REQUIRED:

! WARNING !

FAILURE TO TAKE THIS ACTION COULD RESULT IN DAMAGE TO PROPERTY AND SERIOUS BODILY INJURY OR DEATH.

Solar recommends that in order to avoid possible injury to personnel, users are cautioned to advise all personnel to avoid the area adjacent to the compressor section during an engine start and while the engine is in operation. See Figure 1 for the locations of the engine area to be avoided.

Users are also advised to ensure that all maintenance checks are performed on all package systems including control system and safety shutdowns, vibration monitoring, fuel, and fire systems and ensure that all are operating properly as set forth in your Operation and Maintenance Manuals.

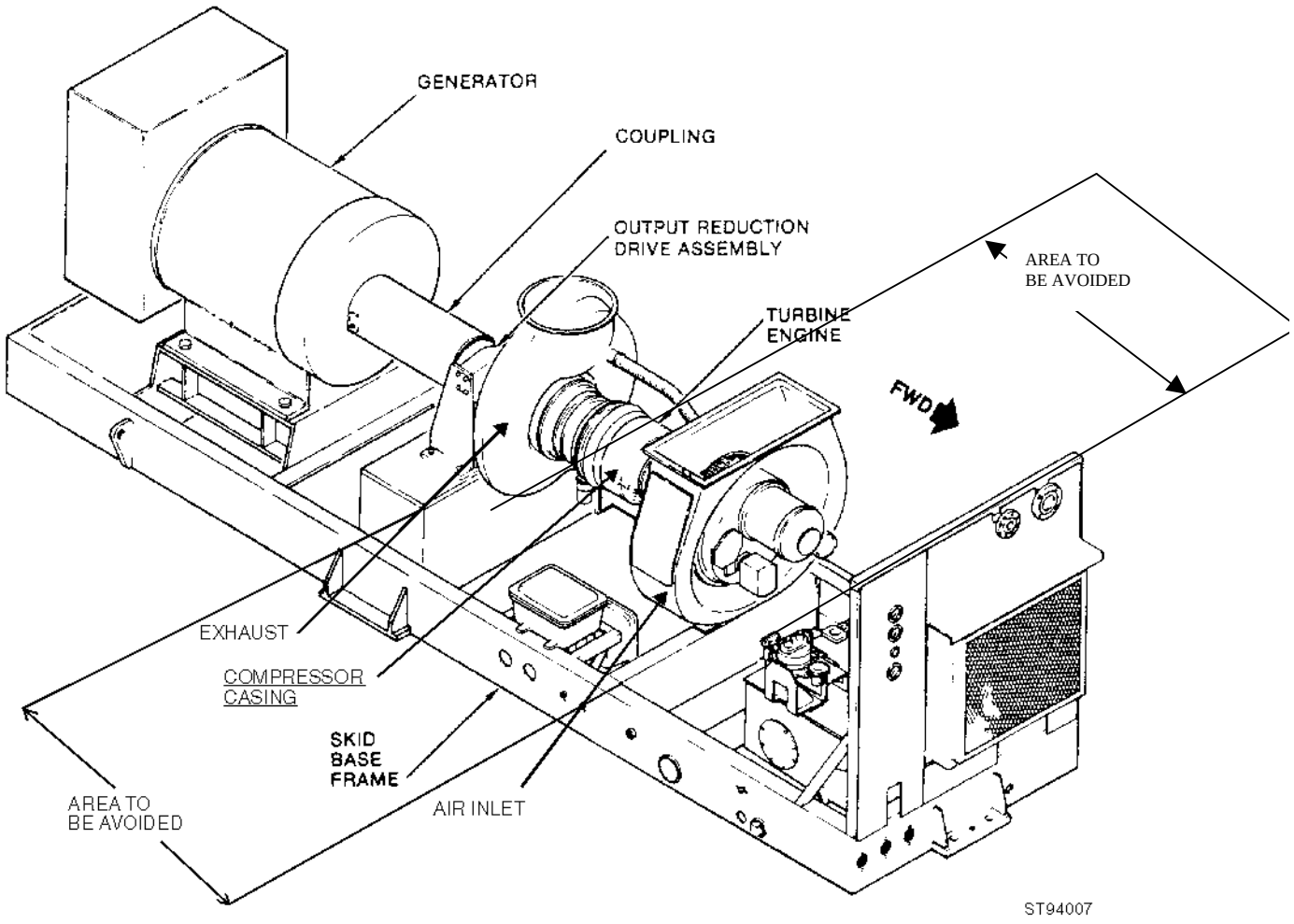

Figure 1. Typical *Saturn 10* Generator Set